Course Companion

International Baccalaureate · IB Diploma · Economics · HL

Every topic handout in one volume

全部专题讲义合集

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Introduction to economics (1.1-1.2)

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What is economics? How do economists approach the world?

Why it matters. In January 2018 the city of Cape Town in South Africa, home to about four million people, announced that it might soon become the first major city in the world to run out of water. After three years of drought its dams were less than a third full. The city named the date when it expected to turn off the taps in homes "Day Zero", and from 1 February 2018 each resident was asked to use no more than 50 litres a day, about one short shower. Water prices were raised sharply, farmers' supplies were cut, and every choice became visible: water for drinking or for gardens, for farms or for factories, for rich suburbs or for poor townships. People cut their use so much that the city's daily consumption fell by about half, winter rains came, and Day Zero never arrived. Cape Town lived through the basic economic problem in a single year: resources are limited, wants are not, so every use of a resource has a cost.

In this unit you will:

- explain scarcity, choice and opportunity cost;
- identify the factors of production and the main economic agents;
- distinguish positive statements from normative ones;
- explain how economists use models and the *ceteris paribus* assumption;
- use the production possibilities curve and plan a Paper 1 answer.

This unit covers syllabus sections 1.1 and 1.2 of IB Economics Unit 1, *Introduction to economics*.

What is economics?

Economics 经济学 is the study of how individuals, firms and governments make choices about how to use scarce resources. The starting point is **scarcity** 稀缺性: human wants are unlimited, but the **resources** 资源 to satisfy them are limited.

Because resources are scarce, every choice has an **opportunity cost** 机会成本: the value of the next best alternative that is given up. An hour spent revising economics cannot also be spent working in a café; money spent on a hospital cannot also build schools. Every economy must therefore answer three basic questions: **what** to produce, **how** to produce it, and **for whom**.

The **factors of production** 生产要素 are the resources used to make goods and services. Each earns a reward:

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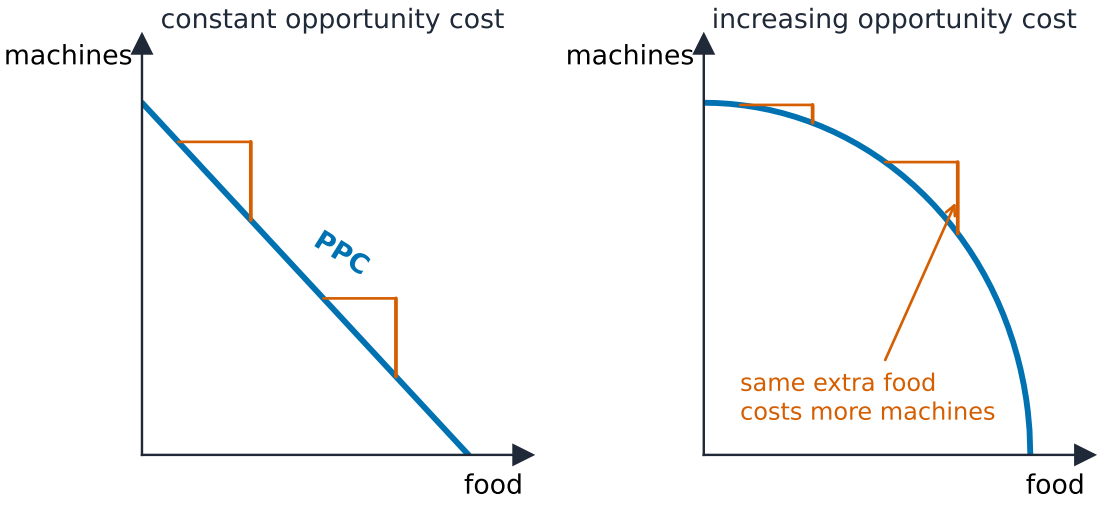
Factor	Meaning	Reward
land	natural resources: soil, water, minerals, forests	rent
labour	human effort, physical and mental	wages
capital	man-made goods used to make other goods: machines, roads, computers	interest
enterprise	the skill of organising the other factors and taking risks	profit



An outdoor market: economics studies how scarce resources are allocated among competing uses.

The main **economic agents** 经济主体 are **consumers** (households), **producers** (firms) and the **government**. Later units add the rest of the world, through trade.

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opportunity cost = goods forgone · bowed-out PPC ⇒ increasing opportunity cost

A straight PPC shows constant opportunity cost; a bowed-out PPC shows increasing opportunity cost.

Positive and normative statements. A **positive statement** 实证表述 can be tested against evidence: it may be true or false, but data can settle it. A **normative statement** 规范表述 contains a value judgement about what ought to be, often signalled by words such as "should", "fair" or "too high".

Statement	Type	Why
"Cape Town's water use fell by about half between 2015 and 2018."	positive	it can be checked against meter data
"Rich households should pay more for water than poor ones."	normative	it is a judgement about fairness
"Raising water prices reduces water use."	positive	it can be tested, even if the result is uncertain

Economists can agree on the facts and still disagree about values. In exam answers, keep the two apart.

> **Worked example: opportunity cost for a government.** A government has 10 billion yuan to spend. It can build one hospital, whose benefits are valued at 10 billion yuan, or two schools, whose benefits are valued at 7 billion yuan. If it builds the hospital, the opportunity cost is the 7 billion yuan of benefit from the schools it does not build. The choice is efficient if the benefit of the hospital is greater than the benefit of the best alternative given up, as it is here.

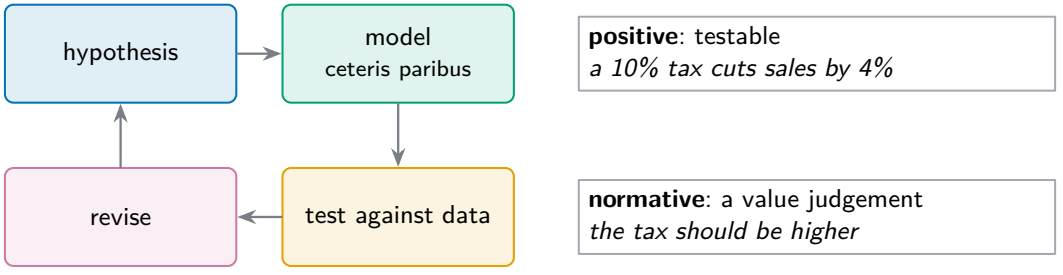
How do economists approach the world?

Economists use the **scientific method** 科学方法:

1. observe something in the real world;
2. form a **hypothesis**: a statement that can be tested;
3. build a **model** 模型: a simplified picture of how the economy works, such as a demand curve or a production possibilities curve;
4. make predictions and test them against data;
5. keep, change or reject the model depending on the results.

Models simplify on purpose. A map of the underground railway does not show every street, but it is the most useful map for travelling by underground. In the same way, a demand curve leaves out almost everything except price and quantity, so that we can see one relationship clearly.

To do this, economists use the **ceteris paribus** 其他条件不变 assumption: "all other things being equal". To study how price affects quantity demanded, we hold income, tastes and the prices of other goods constant. In the real world many things change at once, so testing a model against data is harder than in a laboratory.



Models are tested simplifications.

> **Worked example: testing a hypothesis.** Hypothesis: a higher price for water reduces the amount people use. Cape Town raised its water tariffs steeply in 2018, and use fell. But at the same time the city set a 50-litre limit, published a map of households' water use and ran a huge public campaign. The price rise was not the only change, so ceteris paribus did not hold, and the data alone cannot tell us how much of the fall the price caused. An economist would look for better evidence, for example comparing similar cities with and without price rises.

The key concepts. The IB course uses nine **key concepts** 核心概念 to frame every topic:

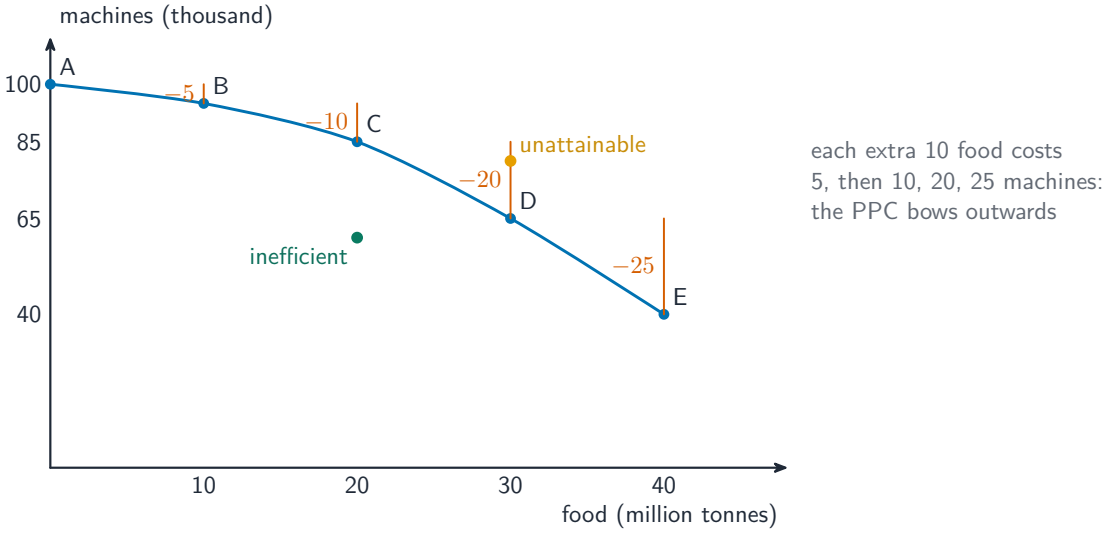
Concept	The question it asks
scarcity	What is limited?
choice	What must be given up?

Concept	The question it asks
efficiency	Are resources used without waste?
equity	Is the outcome fair?
economic well-being	Are people's lives getting better?
sustainability	Can this continue without harming future generations?
change	What is changing, and why?
interdependence	How are people, firms and countries linked?
intervention	Should the government act, and how?

In Cape Town, all nine appear: scarce water, hard choices, the efficiency of farm use, the equity of prices for rich and poor households, well-being, sustainability under climate change, interdependence between farms and the city, and government intervention.

Worked practice: opportunity cost on a PPC

An economy can produce these combinations of food and machines with all its resources, using today's technology:



Increasing opportunity cost bows the PPC

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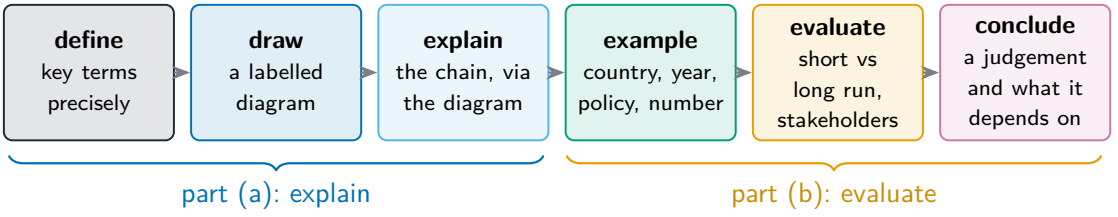
Point	Food (million tonnes)	Machines (thousand)	Opportunity cost of the extra 10 food
A	0	100	–
B	10	95	5 machines
C	20	85	10 machines
D	30	65	20 machines
E	40	40	25 machines

- **Increasing opportunity cost.** Each extra 10 million tonnes of food costs more machines (5, then 10, 20 and 25), so the PPC is bowed outwards. Resources are not equally good at both jobs: the first workers and land moved to farming are the best farmers and the best soil; later ones are better suited to factories.
- **Inside and outside.** Producing 20 food and 60 machines is possible but inefficient: at point C the economy could have 85 machines with the same food. Producing 30 food and 80 machines is unattainable now (D gives only 65 machines).
- **Growth.** Better technology in farming shifts the PPC out along the food axis more than the machine axis: the curve pivots outwards.

A real case. World military spending reached a record of about 2.7 trillion US dollars in 2024 (Stockholm International Peace Research Institute). For each government, the opportunity cost of that spending is the schools, hospitals or lower taxes it could have funded instead. Economists can measure the size of the trade-off (a positive question); whether the spending is worth it is a normative judgement.

Writing a Paper 1 answer

Paper 1 is an extended-response paper. Each question has a part (a), which asks you to **explain** with a diagram, and a part (b), which asks you to **evaluate** using real-world examples. The same skills apply in every unit:



The shape of a Paper 1 answer

1. **Define** the key terms in the question precisely.

2. **Draw** a fully labelled diagram (axes, curves, equilibrium, shifts) and **refer to it** in your writing.
3. **Explain** the chain of cause and effect step by step, using the diagram.
4. **Use a real-world example** with specific detail: the country, the year, the policy and, where you can, a number.
5. **Evaluate:** weigh short-run against long-run effects, consider different stakeholders, question the assumptions (for example *ceteris paribus*), and say which effect matters most and why.
6. **Conclude** with a judgement that answers the question as it is set, and say what it depends on.

The key concepts (scarcity, choice, efficiency, equity, well-being, sustainability, change, interdependence, intervention) are useful frames for evaluation: name the one that fits and use it, rather than listing them all.

Sources for this lesson

- International Baccalaureate, *Economics guide* (first assessment 2022).
- City of Cape Town, water dashboard and Level 6B restrictions (2018).
- Stockholm International Peace Research Institute (SIPRI), *Trends in World Military Expenditure, 2024* (2025).
- N. G. Mankiw, *Principles of Economics* (10th edition, 2024), chapters 1–2.

Common errors

- Defining opportunity cost as "the cost of something" or as all the alternatives; it is the value of the **next best** alternative only.
- Calling a statement normative just because it is about a controversial topic; if it can be tested, it is positive.
- Thinking a model is wrong because it is simple; models are judged by how well they explain and predict.
- Forgetting *ceteris paribus* when using a diagram to explain one change.
- Drawing a PPC with unlabelled axes, or a point outside the curve called "inefficient" (it is unattainable).

Key terms

- **Scarcity**: the gap between unlimited wants and limited resources.
- **Opportunity cost**: the value of the next best alternative given up when a choice is made.
- **Factors of production**: land, labour, capital and enterprise.
- **Positive statement**: a statement that can be tested against evidence.

- **Normative statement**: a statement that contains a value judgement.
- **Model**: a simplified representation of how part of the economy works.
- **Ceteris paribus**: the assumption that all other things stay the same.

Check yourself

1. Define opportunity cost and give an example from your own week.
2. Name the four factors of production and the reward each earns.
3. Is "the minimum wage should be raised" positive or normative? Explain.
4. Why did Cape Town's 2018 data not prove that higher prices reduce water use?
5. On the PPC table, what is the opportunity cost of moving from C to D?
6. Which key concept fits the question "Is it fair that richer households can afford to fill swimming pools during a drought?"

Answers: 1. The value of the next best alternative given up; for example, an evening spent at a concert instead of working a paid shift. 2. Land (rent), labour (wages), capital (interest) and enterprise (profit). 3. Normative: "should" signals a value judgement that evidence cannot settle. 4. Other things changed at the same time (the 50-litre limit, publicity, a public map of use), so ceteris paribus did not hold. 5. 20 thousand machines for the extra 10 million tonnes of food. 6. Equity.

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Demand, supply and policy (2.1-2.7)

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Demand, supply and policy

Why it matters. When the Beijing Winter Olympics opened on 4 February 2022, the official mascot, a panda in an ice shell called Bing Dwen Dwen, suddenly became the most wanted toy in China. People queued for hours in the cold outside the official shop on Wangfujing Street, the online store sold out in minutes, and shops limited buyers to one each. The factories that made the toys could not respond quickly: it was the Spring Festival holiday, and many workers had gone home. Toys bought at the official price were resold online for several times as much. In a few days the whole of this unit happened in one market: a sudden rise in demand, supply that could not respond in the short run, a shortage at the official price, rationing by queues and limits, and a second market where the price rose to match what people would pay. This unit gives you the tools to explain markets like this one, and to judge when governments should step in.

In this unit you will:

- explain demand and supply, and the difference between movements and shifts;
- find equilibrium, excess demand and excess supply, and measure consumer and producer surplus;
- question the assumption that consumers and firms always maximise;
- calculate and use price, income and cross elasticities, and price elasticity of supply;
- analyse indirect taxes, subsidies and price controls with diagrams and numbers.

This unit covers syllabus sections 2.1 to 2.7 of IB Economics Unit 2, *Microeconomics*. One market model runs through the worked examples, so every calculation can be checked against the others:

- demand: $Q_d = 140 - 2P$;
- supply: $Q_s = 20 + 4P$;
- equilibrium: $P = 20$, $Q = 100$.

Demand and supply

Demand 需求 is the quantity of a good that consumers are willing **and able** to buy at each price, over a given period (2.1). The **law of demand** 需求定律 says that, other things equal, quantity demanded falls as price rises. One explanation is **diminishing marginal utility** 边际效用递减: each extra unit gives less extra satisfaction than the one before, so consumers buy more only if the price falls.

A change in the good's own price causes a **movement along** the demand curve. A change in anything else causes a **shift** of the whole curve:

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Determinant	Example of a rightward shift
income	incomes rise and the good is **normal**; for an **inferior good**, demand falls when incomes rise
price of a substitute	the price of coffee rises, so demand for tea increases
price of a complement	cheaper printers increase demand for ink
tastes and fashion	the Olympics make a mascot fashionable
expectations	buyers expect prices to rise next month
number of consumers	population growth, or a new export market



A price change moves along D; a non-price determinant shifts the whole curve.

Supply 供给 is the quantity that producers are willing and able to sell at each price (2.2). The curve slopes upward because a higher price makes it profitable to produce more. Again, own price moves along the curve; other factors shift it: the costs of production, technology, indirect taxes and subsidies, the prices of other goods the firm could make, and the number of firms.

Behavioural economics: questioning the model (2.4). The standard model assumes **rational** consumers who maximise their utility and firms that maximise profit. Behavioural economics shows where real people differ:

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Idea	Meaning	Real example
bounded rationality 有限理性	people have limited time and information, so they use rules of thumb	shoppers choose the "middle" price option on a menu
default choice 默认选项	people tend to accept whatever is already set	UK workplace pensions became opt-out from 2012, and the share of employees saving rose sharply
framing 框架效应	the way a choice is described changes the decision	"90% fat-free" sells better than "10% fat"
nudge 助推	a small change to the choice environment that changes behaviour without banning anything	healthy food placed at eye level in school canteens

Firms, too, may not maximise profit: some **satisfice** (aim for "good enough" profit), and many pursue corporate social responsibility, market share or growth.

Competitive market equilibrium

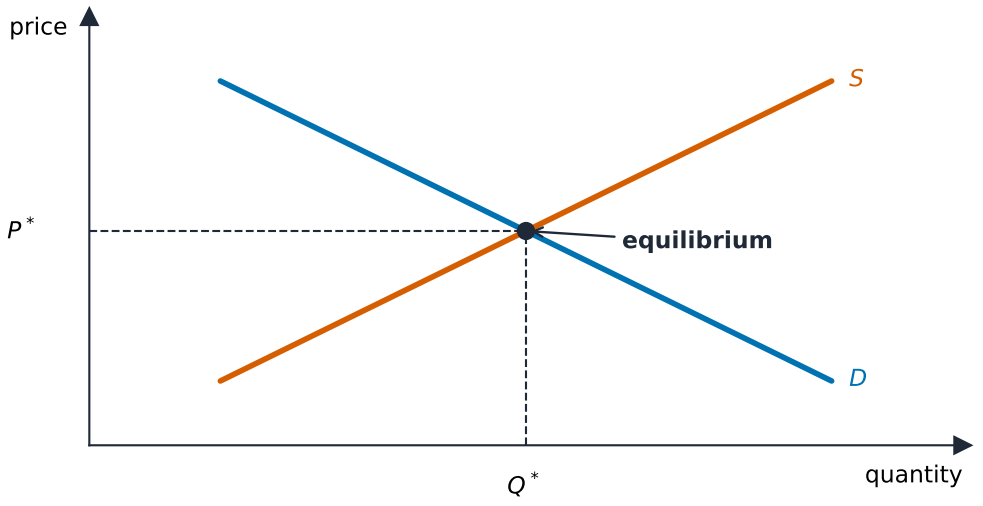
Equilibrium 均衡 is where quantity demanded equals quantity supplied (2.3). On the model:

$$140 - 2P = 20 + 4P \quad \Rightarrow \quad 6P = 120 \quad \Rightarrow \quad P^* = 20,\ Q^* = 100$$

Away from equilibrium the market corrects itself:

Price	Q_d	Q_s	Result
12	116	68	**excess demand** 超额需求 of 48: buyers compete, so the price is bid up
20	100	100	equilibrium
25	90	120	**excess supply** 超额供给 of 30: sellers cut prices to clear stock

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

Equilibrium is where quantity demanded equals quantity supplied.

Prices do three jobs in a free market: they **signal** where resources are wanted, give firms an **incentive** to produce, and **ration** scarce goods to those willing to pay. Adam Smith called this coordination the "invisible hand".

Consumer and producer surplus. Consumer surplus 消费者剩余 is the difference between what consumers would be willing to pay and what they actually pay: the area below the demand curve and above the price. **Producer surplus** 生产者剩余 is the difference between the price producers receive and the lowest price they would accept: the area above the supply curve and below the price.

Worked example: surplus at equilibrium.

1. Demand meets the price axis where $Q_d = 0$: $P = 70$. Consumer surplus is a triangle: $CS = \frac{1}{2} \times 100 \times (70 - 20) = 2{,}500$.
2. Supply starts at $Q_s = 20$ when $P = 0$, so producer surplus is a rectangle plus a triangle: $PS = 20 \times 20 + \frac{1}{2} \times (100 - 20) \times 20 = 400 + 800 = 1{,}200$.
3. Social surplus $= 2{,}500 + 1{,}200 = 3{,}700$.

At the competitive equilibrium, with no externalities, **allocative efficiency** 配置效率 is reached: price equals marginal cost, and social surplus is as large as possible. Any price or quantity away from equilibrium creates a **deadweight loss** 无谓损失.

Elasticity

Price elasticity of demand 需求价格弹性 (PED) measures how strongly quantity demanded responds to a change in price (2.5):

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

Worked example: PED and the total revenue test. The price rises from 20 to 22, so Q_d falls from 100 to 96.

1. $\%\Delta Q_d = -4\%$ and $\%\Delta P = +10\%$, so $PED = -0.4$: demand is **inelastic** (its absolute value is below 1).
2. Total revenue $TR = P \times Q$ rises from $20 \times 100 = 2{,}000$ to $22 \times 96 = 2{,}112$.
3. The **total revenue test**: when demand is inelastic, a price rise increases revenue; when demand is elastic, a price rise reduces it.

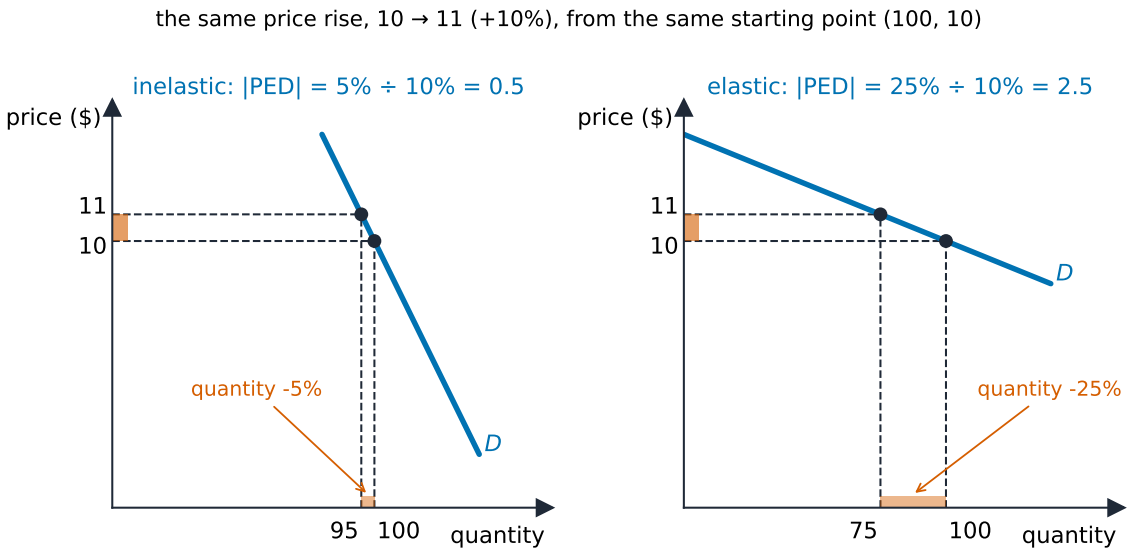
PED value	Name	Effect of a price rise on revenue
between 0 and −1	inelastic	revenue rises
exactly −1	unit elastic	revenue unchanged
below −1	elastic	revenue falls

Determinants of PED: the number and closeness of substitutes, whether the good is a necessity, the share of income spent on it, and time (demand becomes more elastic in the long run as buyers find alternatives). Petrol is a classic inelastic good in the short run: drivers have few substitutes until they can change car, job or home.



A petrol station: with few substitutes in the short run, demand for fuel is price inelastic.

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The same 10% price rise: a small fall in quantity (inelastic) or a large one (elastic).

HL: elasticity along a straight-line demand curve. PED is not the same at every point. On $Q_d = 140 - 2P$, demand is elastic at high prices and inelastic at low prices. Total revenue is highest where PED $= -1$, at $P = 35$ and $Q = 70$, giving $TR = 2{,}450$. **Marginal revenue** 边际收益 here is $MR = 70 - Q$, which is zero exactly at $Q = 70$, where TR peaks.

Price elasticity of supply 供给价格弹性 (PES) measures how strongly quantity supplied responds to price (2.6). If the price rises from 20 to 24, Q_s rises from 100 to 116, so $PES = 16\% \div 20\% = 0.8$: supply is inelastic. PES is higher when firms have spare capacity or stocks, when factors of production can move easily, and over longer periods.

Why commodity prices swing. Primary commodities often have inelastic supply (crops take a season or years to grow) **and** inelastic demand (they are necessities or essential inputs). A small shift then causes a large price change. In 2023–24 poor harvests in Côte d'Ivoire and Ghana, which grow about 60% of the world's cocoa, pushed the world price of cocoa above 10,000 US dollars a tonne in 2024, more than three times its usual level.

HL: income and cross elasticity.

- **Income elasticity of demand** 需求收入弹性 (YED) $= \%\Delta Q_d \div \%\Delta$income: positive for normal goods, above 1 for luxuries, negative for inferior goods. Firms use YED to predict sales over the business cycle.
- **Cross elasticity of demand** 需求交叉弹性 (XED) $= \%\Delta Q_{d,A} \div \%\Delta P_B$: positive for substitutes, negative for complements. Firms use it to price against rivals.

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The role of government in microeconomics

Governments intervene in markets to raise revenue, to correct market failure, to support producers, or to make outcomes fairer (2.7). Every intervention has winners, losers and unintended consequences.

Indirect taxes 间接税. A **specific tax** of 6 per unit shifts supply up by 6: the new supply curve is $Q_s = 20 + 4(P - 6) = 4P - 4$.

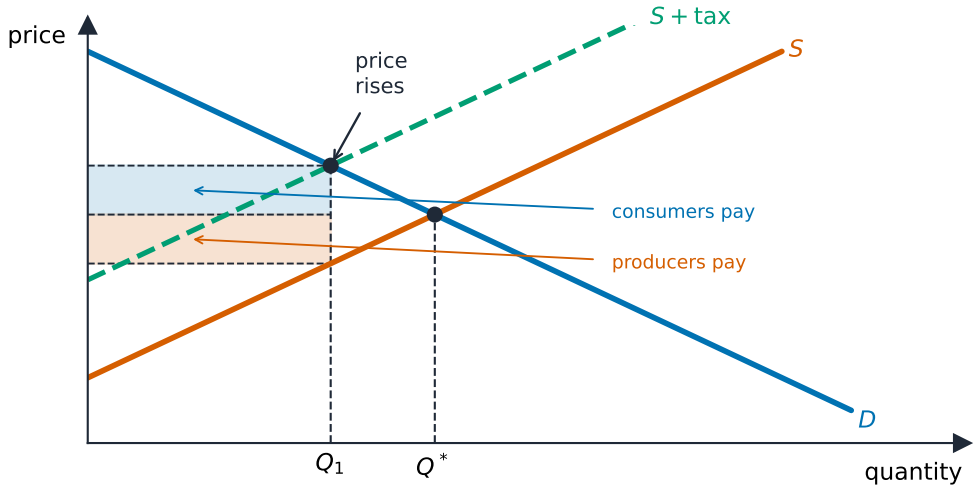
Worked example: the effect of a tax of 6.

1. New equilibrium: $140 - 2P = 4P - 4$, so $P_c = 24$ and $Q = 92$.
2. Consumers pay 24, which is 4 more than before; producers keep $24 - 6 = 18$, which is 2 less.
3. Tax revenue $= 6 \times 92 = 552$.
4. **Incidence** 税负归宿: consumers bear 4 of the 6 and producers 2, because demand is more inelastic than supply here. The more inelastic side of the market bears more of the tax.



Cigarettes carry heavy indirect taxes: governments use taxes to change both price and consumption.

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tax: S shifts left · incidence split consumers/producers

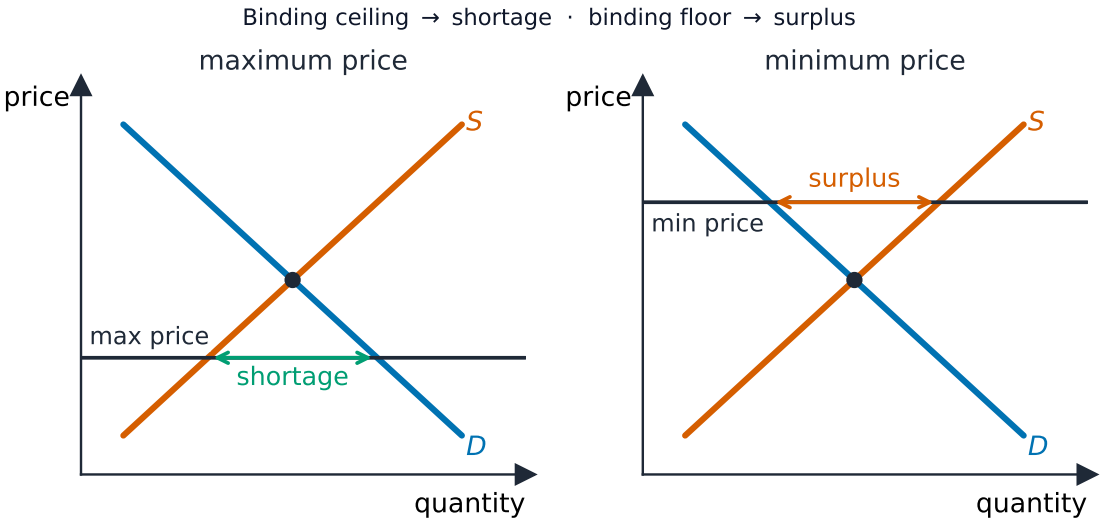
An indirect tax shifts supply up; consumers and producers share the burden.

Subsidies 补贴. A subsidy of 6 per unit shifts supply down: $Q_s = 20 + 4(P + 6)$. The new equilibrium is $P_c = 16$ and $Q = 108$, and the government pays $6 \times 108 = 648$. China's subsidies for new-energy vehicles from 2009 to 2022 used exactly this tool to lower prices and grow an industry.

Price controls.

Control	On the model	Real example	Consequences
maximum price 最高价格 (set below equilibrium)	at 16: $Q_d = 108$, $Q_s = 84$, a shortage of 24	Berlin froze most rents at their June 2019 level in 2020; the number of flats offered for rent fell sharply, and the law was struck down by Germany's Constitutional Court in 2021	shortages, queues, black markets, falling quality
minimum price 最低价格 (set above equilibrium)	at 24: $Q_s = 116$, $Q_d = 92$, a surplus of 24	Scotland set a minimum price of 50p per unit of alcohol from May 2018, raised to 65p in 2024	surplus; the government may have to buy it; inefficient producers protected

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A binding maximum price causes a shortage; a binding minimum price causes a surplus.

Evaluating intervention. A good evaluation weighs:

- **effectiveness**: does consumption or price change as intended? This depends on elasticity;
- **equity**: who gains and who loses? Indirect taxes take a larger share of poor households' income;
- **efficiency**: does the policy create a deadweight loss, or correct one?
- **unintended consequences**: black markets, smuggling, firms leaving the market;
- **government failure**: the policy may cost more than the problem it fixes.

Data-response practice (Paper 2 style)

Extract. In July 2023 India, which supplied about 40% of world rice exports, put an **export ban** 出口禁令 on non-basmati white rice to keep food prices at home low. The FAO All Rice Price Index rose by almost 10% in one month and in August 2023 reached its highest level since 2008. Rice prices jumped in many importing countries in Asia and Africa. India eased the ban in September 2024.

Country R imports most of its rice.

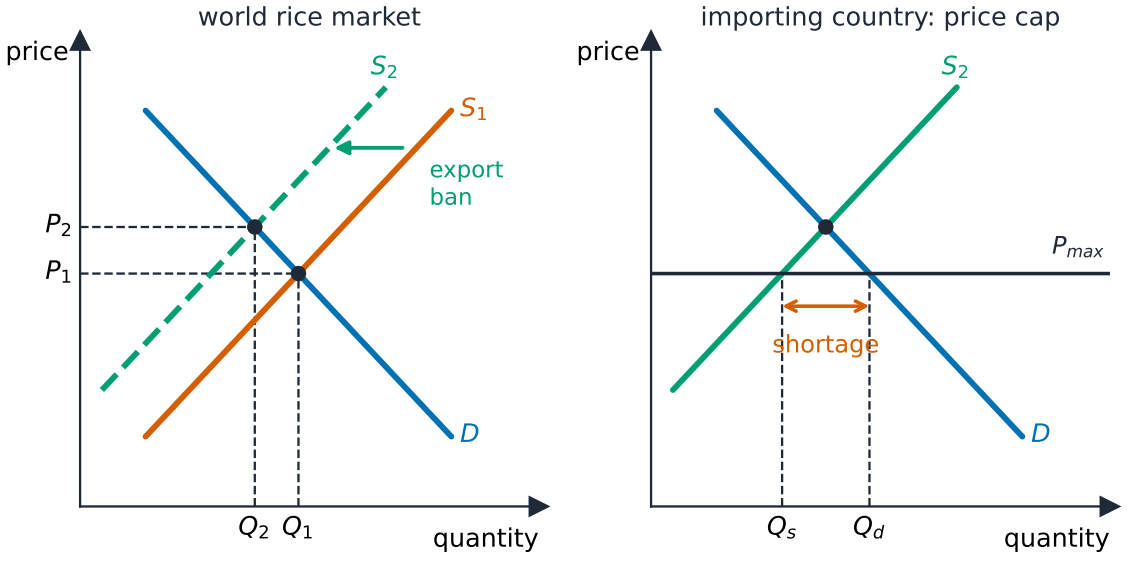
	Before the ban	After the ban
Price of rice (US dollars per kg)	0.80	1.00
Rice bought (thousand tonnes per month)	50	48

Country R's government is considering a maximum price of 0.85 dollars per kg. At that price sellers would supply 44 thousand tonnes a month, but consumers would want to buy 49.5 thousand tonnes.

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Questions

- (a) Define *maximum price*. [2]
- (b) Using a demand and supply diagram, explain why India's export ban raised the world price of rice. [4]
- (c) Calculate the price elasticity of demand for rice in Country R and comment on your answer. [2]
- (d) Using a diagram, explain the effect of the planned maximum price on the rice market in Country R. [4]
- (e) Using information from the text and your knowledge of economics, evaluate the use of a maximum price to protect consumers in Country R from higher rice prices. [15]



Left: the export ban shifts world supply left. Right: a maximum price below the new equilibrium creates a shortage.

Model answers

(a) A maximum price is a legal upper limit on the price of a good, set by the government below the equilibrium price. Sellers may not charge more than this price.

(b) The ban takes Indian rice off the world market, so world supply shifts left from S_1 to S_2 (left panel). At the old price P_1 there is now excess demand, so buyers bid the price up to P_2 and the quantity traded falls from Q_1 to Q_2. The price rises a lot because demand for rice is price inelastic: it is a staple food with few close substitutes.

(c) $\%\Delta Q_d = \frac{48-50}{50} \times 100 = -4\%$ and $\%\Delta P = \frac{1.00-0.80}{0.80} \times 100 = +25\%$, so $PED = \frac{-4}{25} = -0.16$. Demand is very price inelastic: rice is a necessity, so households keep buying it and spend more of their income on it.

(d) In the right panel the maximum price P_{max} is below the new equilibrium price P_2.

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At P_{max} quantity supplied falls to Q_s (44 thousand tonnes) and quantity demanded rises to Q_d (49.5 thousand tonnes), so there is a shortage of 5.5 thousand tonnes a month. The price cannot rise to clear the market, so rice is shared out in other ways: queues, "first come, first served" or rationing. Some rice may be sold illegally above P_{max} on a black market.

(e) A strong answer explains the theory, uses the diagram and the data, then weighs the arguments.

- **The case for.** Demand is very inelastic ($PED = -0.16$), so the price rise from 0.80 dollars to 1.00 dollars mostly raises spending, not saving. Poor households spend a large share of their income on rice and are hit hardest. A cap at 0.85 dollars lowers the price for everyone who can still buy rice, and it costs the government almost nothing to announce.
- **Shortage and black markets.** The shortage of 5.5 thousand tonnes is about 11% of what consumers want. Rice goes to those who queue first or know the sellers, not to those in most need, and black-market prices may rise above 1.00 dollars.
- **Supply falls further.** Country R imports most of its rice and importers pay the world price. If they must sell below what they pay, they import less, and the shortage grows. Local farmers also receive less, so in the long run, when supply is more elastic, they grow less rice.
- **Stakeholders.** Consumers who get rice gain; those who cannot get it lose. Importers and farmers lose income. The government must pay to enforce the cap and to fight the black market.
- **Alternatives.** The government could pay importers the gap between the world price and 0.85 dollars (about 0.15×48 million kg $= 7.2$ million dollars a month), release rice from a **buffer stock** 缓冲库存, cut any import tariff, or give targeted **cash transfers** 现金转移 or food vouchers to poor households. Transfers protect the poor while the price still signals that rice is scarce.
- **Short run and long run.** The ban was temporary (India eased it in 2024). A short, time-limited cap combined with government imports could protect consumers through a temporary shock. A long-lasting cap would damage supply.

Judgement: a maximum price on its own is unlikely to protect the poorest consumers, because the shortage it creates falls hardest on them. Targeted transfers, with a buffer stock released during the shock, protect them at a known budget cost. If the government does cap the price, the cap should be temporary and the government should fund imports so that supply does not fall.

What examiners reward: precise definitions, a diagram that you refer to in the text, the extract's own numbers (the price rise, the PED, the shortage), more than one stakeholder, and a conclusion that answers the question.

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Sources for this lesson

- International Baccalaureate, *Economics guide* (first assessment 2022).
- R. Thaler and C. Sunstein, *Nudge* (2008; final edition 2021).
- Food and Agriculture Organization (FAO), *All Rice Price Index* and *Food Price Monitoring*, 2023–2024.
- International Cocoa Organization, *Quarterly Bulletin of Cocoa Statistics*, 2024.

Common errors

- Writing "demand increases" when only the price changed; a price change is a movement along the curve.
- Forgetting "able" in the definition of demand: wanting a good is not enough.
- Reading PED from the slope alone; PED changes along a straight-line demand curve.
- Mixing up the total revenue test: with inelastic demand, a price rise **raises** revenue.
- Saying consumers pay all of a tax; incidence depends on the elasticities of both curves.
- Drawing a maximum price above equilibrium; to bind, it must be below.

Key terms

- **Demand**: the quantity consumers are willing and able to buy at each price over a period.
- **Equilibrium**: the price at which quantity demanded equals quantity supplied.
- **Consumer surplus**: the difference between what consumers are willing to pay and what they pay.
- **Price elasticity of demand**: the responsiveness of quantity demanded to a change in price.
- **Incidence**: how the burden of a tax is shared between consumers and producers.
- **Maximum price**: a legal upper limit on price, set below equilibrium.
- **Nudge**: a change to how a choice is presented that changes behaviour without removing options.

Check yourself

1. On the model, find the excess demand at $P = 15$.
2. The price rises from 20 to 25. Calculate PED and the change in total revenue.
3. Why did the Bing Dwen Dwen shortage push up resale prices?
4. A tax of 6 is placed on the model market. Who bears more of the tax, and why?
5. Give one reason why commodity prices are volatile.

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6. Explain one unintended consequence of the Berlin rent freeze.

Answers: 1. $Q_d = 110$, $Q_s = 80$, so excess demand is 30. 2. Q_d falls from 100 to 90: $-10\% \div 25\% = -0.4$; revenue rises from 2,000 to 2,250. 3. Supply could not rise quickly during the holiday, so at the official price there was excess demand; buyers who missed out paid more on the resale market, where the price could rise to clear it. 4. Consumers bear 4 and producers 2, because demand is more inelastic than supply. 5. Both supply and demand are price inelastic, so a small shift (such as a poor harvest) causes a large price change. 6. Landlords offered fewer flats for rent, so the shortage of rental housing grew.

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Market failure and equity (2.8-2.9, 2.12)

International Baccalaureate · IB Diploma · Economics · HL

Market failure and equity

Why it matters. For almost 500 years, fishing boats from Europe and North America caught cod on the Grand Banks off Newfoundland, in Canada. The cod were so plentiful that early sailors said you could catch them by lowering a basket into the sea. In the 1960s and 1970s large factory trawlers arrived, using huge nets and freezing their catch on board. Each boat had every reason to catch as much as it could: a fish left in the sea would only be caught by someone else. By 1992 the cod stock had collapsed to around 1% of its earlier size, and the Canadian government banned cod fishing completely. About 30,000 people lost their jobs in one of the largest single lay-offs in Canadian history. Decades later, the cod have still not fully recovered. The market had worked exactly as designed, with each fisher maximising their own profit, and the result was a disaster for everyone. This unit explains why markets sometimes fail, and what governments can do about it.

In this unit you will:

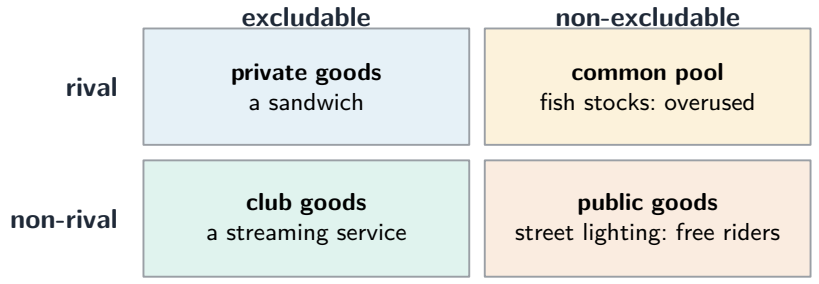
- explain negative and positive externalities with marginal social cost and benefit diagrams;
- calculate the welfare loss caused by an externality;
- explain common pool resources and the tragedy of the commons;
- explain public goods and the free-rider problem;
- measure inequality with the Lorenz curve and Gini coefficient, and evaluate policies.

This unit covers syllabus sections 2.8 (externalities and common pool resources), 2.9 (public goods) and 2.12 (the market's inability to achieve equity). The externality model uses the same market as Unit 2, written as prices:

- demand, or **marginal private benefit** 边际私人收益 (MPB): $P = 70 - \frac{Q}{2}$;
- supply, or **marginal private cost** 边际私人成本 (MPC): $P = \frac{Q}{4} - 5$;
- market equilibrium: $Q = 100$, $P = 20$.

Market failure 市场失灵 happens when a free market does not allocate resources efficiently: it produces too much or too little of a good from society's point of view.

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non-rival + non-excludable → free-rider problem → the market under-provides or provides none

Classify goods by rivalry and excludability.

Externalities and common pool resources

An **externality** 外部性 is a cost or benefit that falls on a **third party**, someone outside the transaction (2.8).

Type	What happens	Real example
negative production externality	**marginal social cost** 边际社会成本 (MSC) is above MPC	a coal power station's smoke harms people's health
negative consumption externality	MSB is below MPB	drivers in a city centre cause congestion for others
positive production externality	MSC is below MPC	a firm trains workers who later work for other firms
positive consumption externality	**marginal social benefit** 边际社会收益 (MSB) is above MPB	vaccination protects people who are not vaccinated

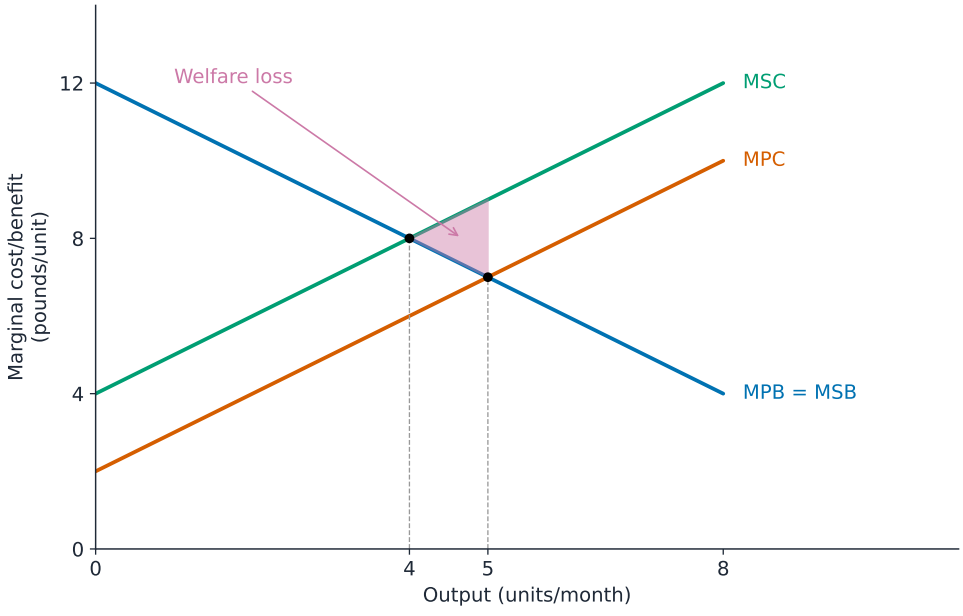
The **social optimum** 社会最优 is where MSB = MSC. A free market produces where MPB = MPC, so when there is an externality, it produces the wrong amount.

> **Worked example: a negative production externality.** Production causes an external cost of 6 per unit, so $MSC = MPC + 6 = \frac{Q}{4} + 1$.

1. Social optimum: $70 - \frac{Q}{2} = \frac{Q}{4} + 1$, so $\frac{3Q}{4} = 69$, $Q = 92$ and $P = 24$.
2. The market produces 100, so it **over-produces** by 8 units.
3. On each of those 8 units, the cost to society is greater than the benefit. The **welfare loss** 福利损失 is the triangle between MSC and MSB over the extra units: $\frac{1}{2} \times 8 \times 6 = 24$.



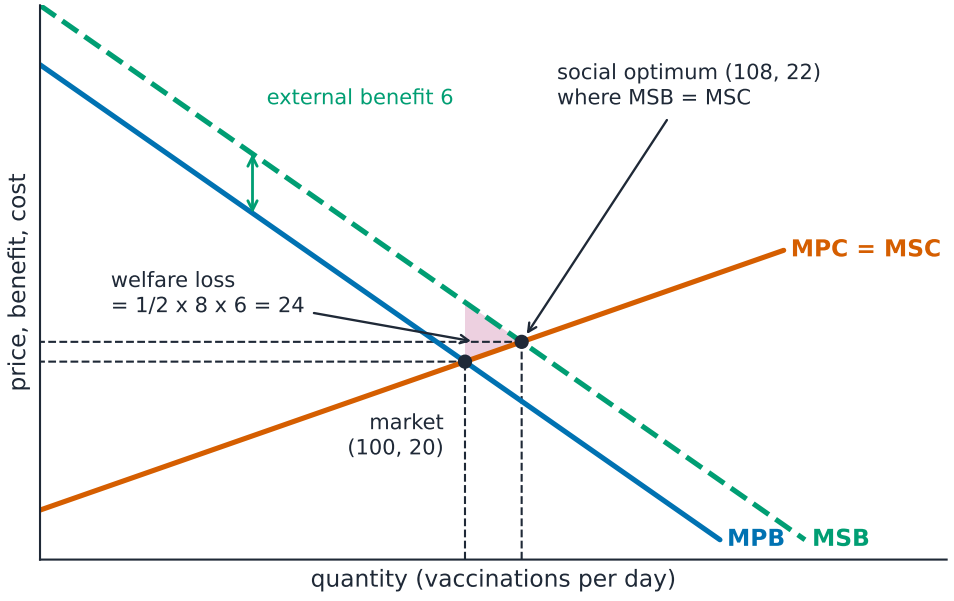
A trawler's net: fish stocks are a common pool resource, rivalrous but hard to exclude anyone from, so they tend to be overfished.



Negative production externality: the market produces where MPC = MSB, more than the social optimum.

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Worked example: a positive consumption externality. Consumption creates an external benefit of 6 per unit, so $MSB = 76 - \frac{Q}{2}$. The social optimum is where $76 - \frac{Q}{2} = \frac{Q}{4} - 5$, so $Q = 108$ and $P = 22$. The market stops at 100, so it **under-consumes** by 8, and the welfare loss is again $\frac{1}{2} \times 8 \times 6 = 24$. Measles shows why this matters: about 95% of a population must be vaccinated to stop the disease spreading, but individuals weigh only their own private benefit.



Positive consumption externality on the shared model: the market stops at 100, but the social optimum is 108, where MSB = MSC.

Policies to correct externalities.

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Policy	How it works	Real example	A weakness
Pigouvian tax 庇古税	a tax equal to the external cost moves MPC up to MSC	Sweden's carbon tax since 1991	the government must estimate the external cost
subsidy	a payment equal to the external benefit raises output	free childhood vaccinations	costs government money; risk of overspending
regulation	a legal limit or ban	China's limits on coal burning around Beijing after 2013	the same rule for all firms, whatever their costs
tradable permits 可交易排污许可证	the government caps total pollution; firms buy and sell permits	the EU Emissions Trading System (2005); China's national carbon market (2021)	the cap must be set right; too many permits make the price collapse
education and nudges	information changes behaviour	warnings on cigarette packets	slow, uncertain effect

Worked example: a corrective tax of 3. If the external cost is 3, a tax of 3 shifts supply to $Q_s = 20 + 4(P - 3) = 8 + 4P$. Then $140 - 2P = 8 + 4P$, so $P = 22$ and $Q = 96$. Consumers pay 2 more (20 to 22), producers keep 19, which is 1 less, and the government collects $3 \times 96 = 288$. Output falls to the social optimum.

Common pool resources 公共池塘资源 are **rival** (one person's use leaves less for others) but **non-excludable** (it is hard to stop anyone using them): fish in the sea, groundwater, clean air, forests. Each user ignores the cost they impose on all the others, so the resource is over-used. The ecologist Garrett Hardin called this the **tragedy of the commons** 公地悲剧 (1968), and the Grand Banks cod are a textbook case. Responses include quotas, licences, property rights and international agreements. The political economist Elinor Ostrom, the first woman to win the Nobel Prize in Economics (2009), showed that local communities can also manage commons well with their own rules.

Public goods

A **public good** 公共物品 is both:

- **non-rival** 非竞争性: one person's use does not reduce what is available to others;
- **non-excludable** 非排他性: people cannot be stopped from using it, even if they do not pay.

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Examples: national defence, street lighting, flood defences, a lighthouse.

	Excludable	**Non-excludable**
rival	private goods: a sandwich, a phone	common pool resources: fish stocks, groundwater
non-rival	club goods: streaming services, a toll road	public goods: street lights, national defence

Non-excludability creates the **free-rider problem** 搭便车问题: people can enjoy the good without paying, so few will pay voluntarily. A private firm cannot earn enough revenue, so the market provides too little or none at all. The government therefore provides public goods from taxes.



A lighthouse is the classic public good: one ship's use does not reduce another's, and no passing ship can be made to pay.

The lighthouse is the classic example, but real history is more interesting. In a famous 1974 article, the economist Ronald Coase showed that many British lighthouses were built and run by private owners, who collected fees from ships when they entered nearby ports. A good can be "non-excludable" at sea but excludable at the harbour. Whether a good is public can depend on technology and institutions.

The market's inability to achieve equity

A market distributes goods to those willing **and able** to pay. It rewards people for the resources they own and the skills that are scarce, not for need. So a market can be efficient and still very unequal (2.12). **Equity** 公平 means fairness. It is different from **equality** 平等, which means everyone gets the same.

Measuring inequality. The **Lorenz curve** 洛伦兹曲线 plots the cumulative share of

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income against the cumulative share of the population, from the poorest. The diagonal line is perfect equality; the further the curve bows below it, the more unequal the distribution. The **Gini coefficient** 基尼系数 is the area between the line of equality and the Lorenz curve (A), divided by the whole area under the line of equality (A + B). It runs from 0 (perfect equality) to 1 (one person has everything).

> **Worked example: a Gini coefficient from quintiles.** The five 20% groups of a country, from poorest to richest, earn 5%, 10%, 15%, 20% and 50% of income.

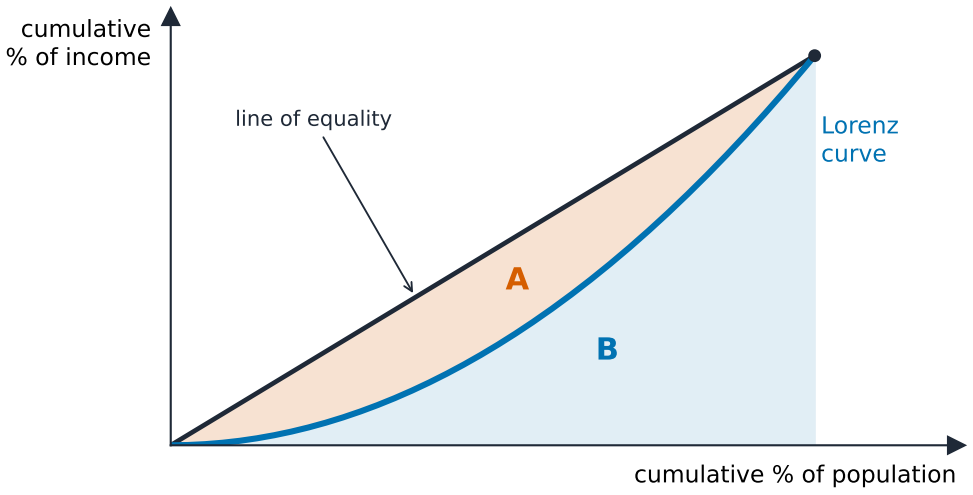
1. Cumulative shares give the Lorenz points (20, 5), (40, 15), (60, 30), (80, 50) and (100, 100).
2. The area under the curve, as five trapezoids of width 20: $50 + 200 + 450 + 800 + 1{,}500 = 3{,}000$.
3. The area under the line of equality is $\frac{1}{2} \times 100 \times 100 = 5{,}000$, so $A = 5{,}000 - 3{,}000 = 2{,}000$.
4. $Gini = \frac{2{,}000}{5{,}000} = 0.40$.

For comparison, World Bank estimates put South Africa's Gini at about 0.63, among the highest in the world; China's official estimate has been about 0.47 in recent years; and the Nordic countries are about 0.27.



Wealth and poverty side by side: a market rewards what people own and can sell, which need not be equitable.

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Gini $= A/(A+B)$ · 0 = equal, 1 = most unequal

The further the Lorenz curve bows from the diagonal, the more unequal income is; Gini = A/(A+B).

Poverty 贫困 can be **absolute** (people cannot meet basic needs; the World Bank's international poverty line was 2.15 dollars a day, raised to 3.00 dollars a day in 2025) or **relative** (people have much less than is normal in their society, for example below 60% of median income).

Policies to reduce inequality, each with a trade-off:

- **progressive taxation**: higher rates on higher incomes; may reduce incentives to work or invest;
- **transfer payments**: pensions, unemployment benefits, child benefits; cost government money and may create dependency if badly designed;
- **public provision**: free education and health care raise poor families' opportunities; costly, and quality depends on funding;
- **minimum wage**: raises low pay; may reduce employment if set too high.

Data-response practice (Paper 2 style)

Extract. The European Union's Emissions Trading System (EU ETS) started in 2005. It sets a cap on the total carbon dioxide that power stations, factories and airlines inside the EU may emit, and firms must hold one permit for each tonne. Firms that cut emissions cheaply can sell spare permits; firms that pollute more must buy them. Too many permits were issued at first, so for much of 2012–2017 the price stayed below €10 per tonne and firms had little reason to change. After the EU removed surplus permits, the price passed €100 per tonne for the first time in February 2023. Because firms outside the EU pay no such price, the EU is adding

a carbon charge on some imports such as steel and cement, with payments due from 2026. China's national carbon market began trading in July 2021. It covers the power sector and is the world's largest carbon market by emissions covered, but its permit price has been far below the EU's.

Firm K, an EU steel maker, emits 1.0 million tonnes of CO_2 a year but holds permits for only 0.8 million tonnes. It can cut 0.2 million tonnes at a cost of €60 per tonne, and the permit price is €90 per tonne.

Questions

- (a) Define *negative externality.* [2]
- (b) Using an externality diagram, explain why a market for electricity from coal produces more than the social optimum. [4]
- (c) Explain how a **cap and trade** 总量管制与交易 scheme reduces emissions. [4]
- (d) Calculate the cost to Firm K of each way to cover its extra 0.2 million tonnes, and state which it will choose. [2]
- (e) Using information from the text and your knowledge of economics, evaluate the use of tradable permits, compared with a **carbon tax** 碳税, to reduce carbon emissions. [15]

Model answers

(a) A negative externality is a cost that falls on a third party, outside the transaction, and is not paid by the buyer or the seller. It makes marginal social cost greater than marginal private cost.

(b) Burning coal releases CO_2, which harms third parties through climate change. This external cost puts MSC above MPC (see the diagram above). The market produces where MPB = MPC, but the social optimum is where MSB = MSC, at a lower output and a higher price. Every unit between the two quantities costs society more than it is worth, so there is a welfare loss: the triangle between MSC and MSB over the extra output.

(c) The government sets a cap: the total number of permits, so total emissions cannot exceed it. Permits can be traded, which gives them a price. A firm that emits one more tonne must buy a permit or give one up, so pollution now has a private cost and MPC moves towards MSC. Firms that can cut emissions cheaply sell permits to firms for which cutting is expensive, so the total cut is reached at the lowest cost. Lowering the cap each year raises the permit price and cuts emissions further.

(d) Cutting costs $0.2 \times 60 = 12$, that is €12 million; buying permits costs $0.2 \times 90 = 18$, that is €18 million. Firm K cuts its own emissions and saves €6 million. A permit price above the firm's cost of cutting is what makes it cut.

(e) A strong answer explains both tools, uses the data, then weighs them.

- **Certainty of quantity.** A permit scheme fixes the total emissions (the cap), and the market finds the price. A carbon tax fixes the price, and the quantity is uncertain, because the government does not know how strongly firms will respond.

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For a climate target in tonnes, the cap is the more direct tool.

- **Cost-effectiveness.** Both tools give every firm the same price per tonne, so the cheapest cuts happen first: Firm K cuts, because €60 is below €90. Permits do this without the government needing to know each firm's costs.
- **Price instability.** The EU price stayed below €10 for years because too many permits were issued. That gave firms little reason to invest, and the price must be stable for firms to plan long-lived investments such as new furnaces. A carbon tax gives a known, steady price. Sweden has used one since 1991, and it is now among the highest in the world. The EU had to remove permits to make its price work, which shows the risk of government failure in setting the cap.
- **Revenue and fairness.** Auctioned permits and a tax both raise revenue that could cut other taxes or help poor households with higher energy bills. Permits given away free reward existing polluters.
- **Carbon leakage** 碳泄漏. If only one region prices carbon, production can move to places without a price, with no fall in world emissions. The EU's import charge tries to stop this, but it raises costs for trading partners and may cause trade disputes.
- **Monitoring.** Both tools need emissions to be measured accurately. Permits also need a working market. China's low permit price shows that the design (how tight the cap is, and the penalties) matters as much as the choice of tool.

Judgement: tradable permits are the better tool when the aim is a fixed emissions target and the cap is set tight and lowered over time; a carbon tax is better when price stability matters most and the government cannot judge the right cap. In practice the EU combined them: a tighter cap with a reserve that removes surplus permits gives a price floor, which is close to a tax. Either way, the result depends on a strict cap or a high enough rate, and on how other countries respond.

What examiners reward: a fully labelled externality diagram (MPB, MSB, MPC, MSC, both quantities, the welfare-loss triangle), the extract's own numbers (the €10 and €100 prices, Firm K's €60 and €90), at least two stakeholders, and a conclusion that compares the two tools.

Sources for this lesson

- International Baccalaureate, *Economics guide* (first assessment 2022).
- G. Hardin, "The Tragedy of the Commons", *Science* (1968); E. Ostrom, *Governing the Commons* (1990).
- R. Coase, "The Lighthouse in Economics", *Journal of Law and Economics* (1974).
- M. Kurlansky, *Cod: A Biography of the Fish That Changed the World* (1997).
- World Bank, Poverty and Inequality Platform (Gini estimates and poverty lines).

Common errors

- Defining an externality without saying that it affects a **third party**.
- Labelling the axes or curves wrongly: use MPB, MSB, MPC and MSC, and mark both quantities.
- Shading the wrong welfare-loss triangle: it lies between MSB and MSC over the units the market gets wrong.
- Mixing up public goods (non-rival) and common pool resources (rival).
- Treating equity and equality as the same thing.
- Recommending a policy without saying how it works on the diagram and what its weaknesses are.

Key terms

- **Market failure**: when a free market does not allocate resources efficiently.
- **Externality**: a cost or benefit that falls on a third party outside the transaction.
- **Social optimum**: the output where marginal social benefit equals marginal social cost.
- **Common pool resource**: a resource that is rival but non-excludable.
- **Public good**: a good that is non-rival and non-excludable.
- **Free-rider problem**: people use a good without paying, so the market under-provides it.
- **Gini coefficient**: a measure of income inequality from 0 (equal) to 1 (completely unequal).

Check yourself

1. Give one example each of a negative production externality and a positive consumption externality.
2. On the model with an external cost of 6, find the social optimum and the welfare loss.
3. Why did the Grand Banks cod collapse, even though each fisher acted rationally?
4. Is a streaming service a public good? Explain using rivalry and excludability.
5. Quintile shares are 10%, 15%, 20%, 25% and 30%. Calculate the Gini coefficient.
6. Give one argument for and one against progressive taxation.

Answers: 1. For example, pollution from a factory; vaccination. 2. $Q = 92$, $P = 24$; welfare loss $\frac{1}{2} \times 8 \times 6 = 24$. 3. Cod were a common pool resource: each boat gained from catching more and ignored the cost to all other boats, so the stock was overfished (the tragedy of the commons). 4. No: it is non-rival, but it is excludable, because non-payers can be shut out; it is a club good. 5. Lorenz points (20, 10), (40, 25), (60, 45), (80, 70); area under the curve $100 + 350 + 700 + 1{,}150 + 1{,}700 = 4{,}000$; $Gini = (5{,}000 - 4{,}000) \div 5{,}000 = 0.20$. 6. For: it reduces inequality and funds

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public services; against: high top rates may reduce incentives to work, invest or stay in the country.

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Information and market power (2.10-2.11)

International Baccalaureate · IB Diploma · Economics · HL

Information and market power

Why it matters. In 1970 the American economist George Akerlof published a short paper called "The Market for 'Lemons'", about used cars. His idea was simple: sellers know whether their car is good or a "lemon" (a car full of hidden faults), but buyers cannot tell. Buyers therefore offer only an average price, owners of good cars refuse to sell at that price, and the market fills up with lemons. Three journals rejected the paper; one editor said it was too trivial to publish. In 2001 Akerlof shared the Nobel Prize in Economics for it. Half a century later, in April 2021, China's market regulator fined Alibaba 18.2 billion yuan because the platform had told sellers they could not also sell on rival platforms. Both cases show markets that fail with no pollution in sight: one because information is unequal, the other because one firm has too much power. This unit studies both.

In this unit you will:

- explain adverse selection and moral hazard, and the responses to them;
- use revenue, cost and profit, and the MR = MC rule;
- analyse perfect competition, monopoly, monopolistic competition and oligopoly;
- use game theory to explain collusion and price wars;
- evaluate government responses to market power.

This unit covers the two HL market failures, **asymmetric information** 信息不对称 (2.10) and **market power** 市场力量 (2.11). Market power needs the four **market structures** 市场结构, so the unit also teaches perfect competition, monopoly, monopolistic competition and oligopoly.



Market structures range from perfect competition to monopoly

Must-know for this topic:

Idea	Key relationship
information gaps	adverse selection before the deal; moral hazard after it
profit rule	every firm produces where MR = MC

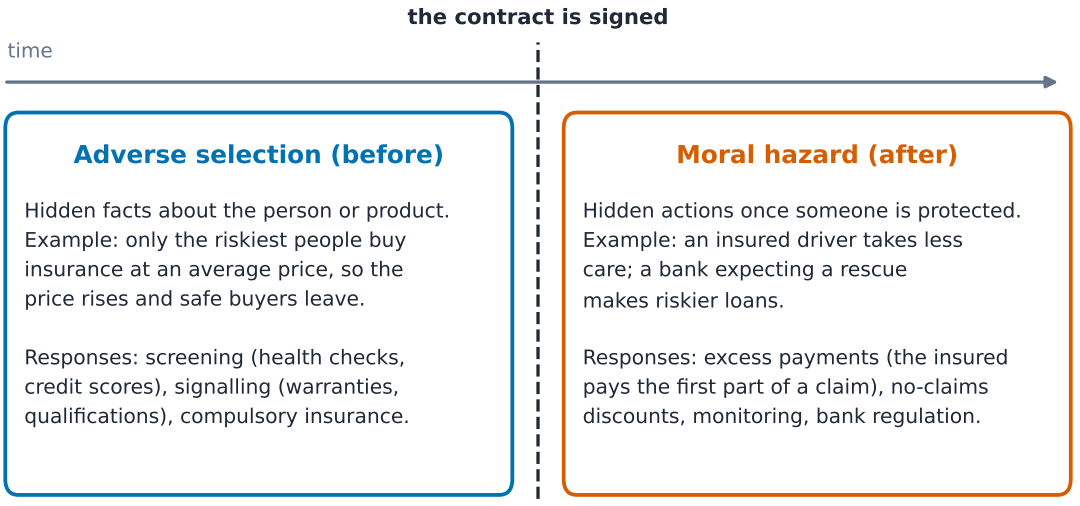
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Idea	Key relationship
profit	abnormal if P > ATC; normal if P = ATC; a loss if P < ATC
efficiency	allocative: P = MC; productive: output at the lowest ATC
perfect competition	P = MR; entry and exit bring normal profit in the long run
monopoly	MR = MC at $Q = 40$, $P = 50$; profit 300; deadweight loss 200
natural monopoly	AC still falling where demand meets it; regulate the price
monopolistic competition	short-run profit; long run P = ATC with excess capacity
oligopoly	interdependence; game theory; collusion or competition
concentration	CR4 = shares of the four largest firms added

Asymmetric information

Asymmetric information (2.10) means one side of a deal knows more than the other. The seller of a used car knows its faults. A person buying health insurance knows their own health. A borrower knows how likely they are to repay. When information is unequal, the market can fail. Some trades that would help both sides do not happen, and some trades that happen are bad ones.

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Adverse selection comes before the contract; moral hazard comes after it

Adverse selection

Adverse selection 逆向选择 happens before the contract. One side hides facts about itself or its product. Think of a used-car market where buyers cannot tell good cars from bad ones ("lemons"). Buyers will only pay an average price. Owners of good cars will not sell at that price, so they leave the market. Now the average car is worse, so buyers offer even less. In the end mostly bad cars are left. Insurance works the same way: at one average price, the riskiest people buy most and the safest people buy less.

Moral hazard

Moral hazard 道德风险 happens after the contract. Once someone is protected, they take more risk, because someone else pays for the damage. An insured driver may drive less carefully. A bank that expects the government to rescue it may make riskier loans.

Responses to asymmetric information

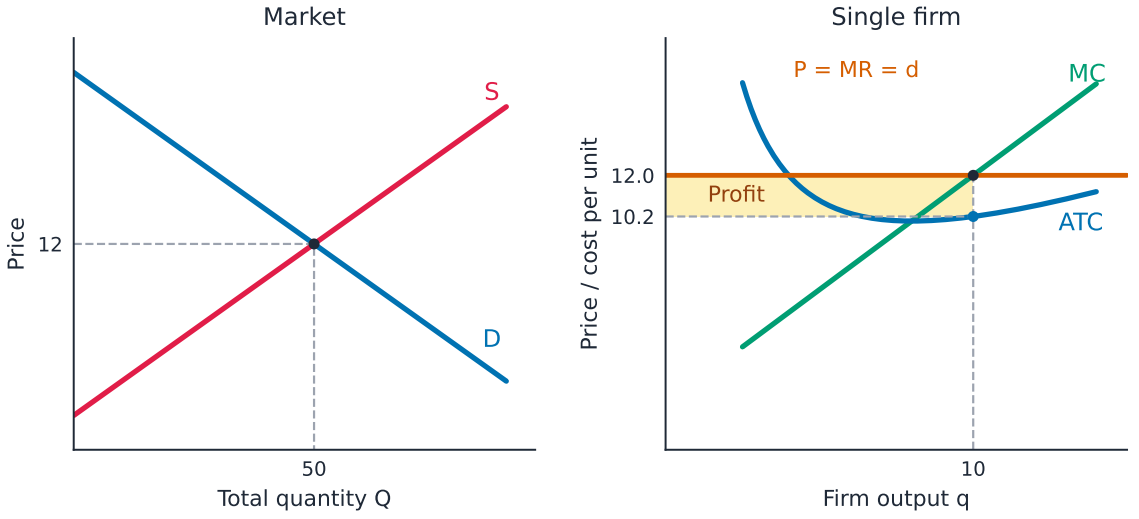
- **Screening** 筛选: the side with less information collects it. Insurers ask for health checks; banks check credit scores.
- **Signalling** 信号传递: the side with more information proves its quality. Sellers offer a **warranty** 保修; workers show qualifications.
- **Government regulation** 政府监管: rules that force sellers to tell the truth (food labels, car inspection reports), licences for doctors and lawyers, and compulsory insurance so the low-risk people stay in.
- **Contract design**: an **excess** 免赔额 (the insured person pays the first part of any claim) and no-claims discounts keep some risk with the insured, which reduces moral hazard.

Each response has a limit. Screening costs money. A signal can be faked. Regulation needs inspectors who can be trusted.

Revenue, costs and profit

The profit-maximising rule

Every firm in this topic is assumed to want the most profit. It compares the extra revenue and the extra cost of one more unit:



Market price becomes the firm's horizontal MR line; the profit rectangle uses ATC at the chosen output

- **Total revenue** 总收益 (TR) $= P \times Q$.
- **Average revenue** 平均收益 (AR) $= TR/Q$, which is the price. So the AR curve is the firm's demand curve.
- **Marginal revenue** 边际收益 (MR) is the extra revenue from selling one more unit.
- **Marginal cost** 边际成本 (MC) is the extra cost of producing one more unit, and **average total cost** 平均总成本 (ATC) is total cost $/Q$.

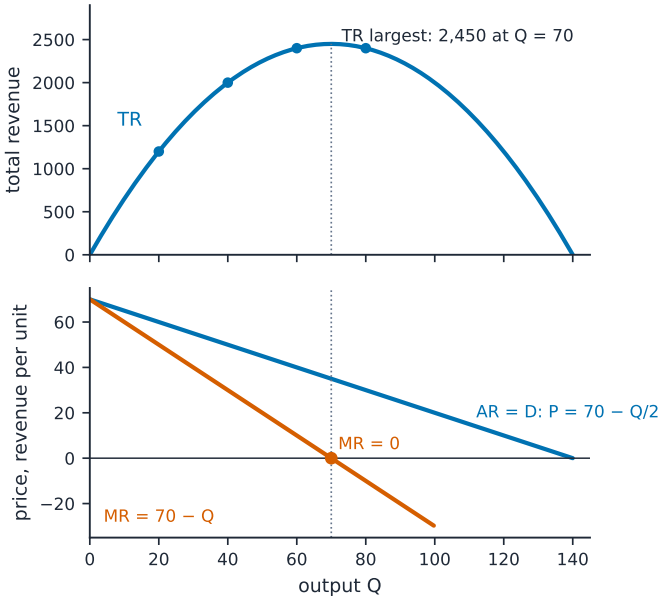
The rule for **profit maximisation** 利润最大化 is to produce where **MR = MC**. Below that output, one more unit adds more to revenue than to cost, so profit rises. Above it, one more unit adds more to cost, so profit falls.

> **Worked example.** A firm faces the demand curve $P = 70 - Q/2$.

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Output Q	Price P	$TR = P \times Q$
20	60	1,200
40	50	2,000
60	40	2,400
80	30	2,400

TR rises by 800 from 20 to 40 units, but only by 400 from 40 to 60 units. MR falls because the firm must lower the price on all its units to sell one more. For a straight-line demand curve, the MR line starts at the same point and is twice as steep: here $\text{MR} = 70 - Q$. MR is zero at $Q = 70$, where TR is largest.



MR falls twice as fast as AR, and TR peaks where MR = 0

Three kinds of profit

Economists count the owner's next-best use of their money and time as a cost. **Normal profit** 正常利润 is the least profit that keeps the owner in this business. It is already inside ATC. So:

- **abnormal profit** 超额利润: price above ATC ($P > ATC$);
- **normal profit**: price equal to ATC ($P = ATC$);
- **loss** 亏损: price below ATC ($P < ATC$).

Profit (or loss) per day $= (P - ATC) \times Q$.

Two kinds of efficiency

- **Allocative efficiency** 配置效率: $P = MC$. The value buyers put on the last unit equals the cost of making it, so society gets the right amount.
- **Productive efficiency** 生产效率: the firm produces at the lowest point of its ATC curve, so nothing is wasted in production.

Compare each market structure against these two tests.

Perfect competition

Characteristics

Perfect competition 完全竞争 is a model with:

- very many small firms and buyers;
- **homogeneous** 同质的 (identical) products, such as one farmer's wheat and another's;
- no **barriers to entry** 进入壁垒, so firms can enter or leave freely;
- perfect information for everyone.

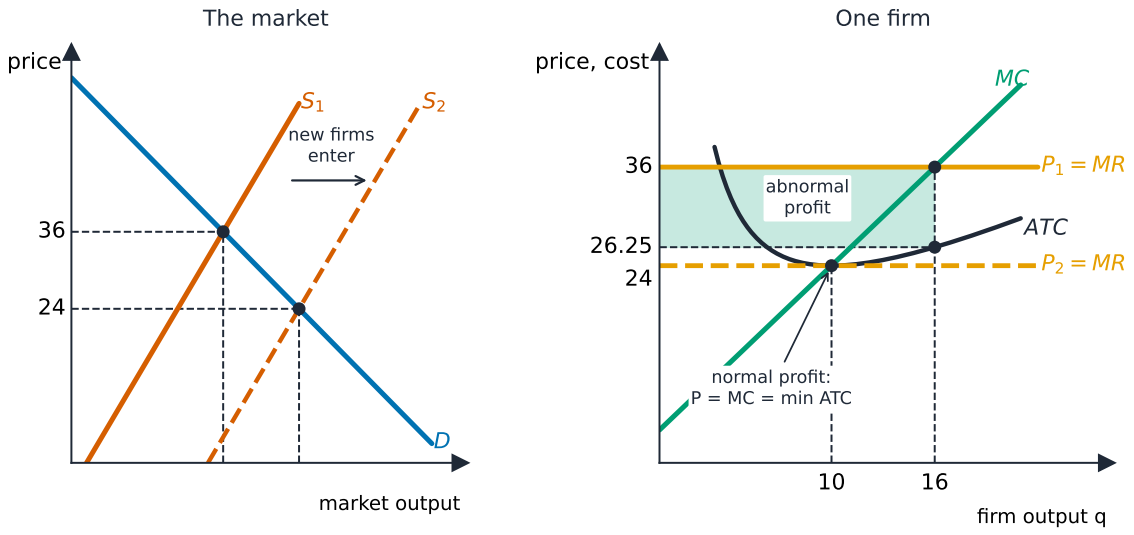
No single firm can change the market price. If it charged more, buyers would go to another firm. Each firm is a **price-taker** 价格接受者: the market's price is its demand curve, and also its AR and MR ($P = AR = MR$).

Short run and long run

> **Worked example.** One firm's costs give MC $= 4 + 2q$ and ATC $= 100/q + 4 + q$.

1. *Short run.* The market price is 36. MR = MC: $36 = 4 + 2q$, so $q = 16$. ATC at 16 is $100/16 + 4 + 16 = 26.25$. Abnormal profit $= (36 - 26.25) \times 16 = 156$ per day.
2. *Entry.* There are no barriers, so new firms join. Market supply shifts right (S1 to S2) and the price falls.
3. *Long run.* Entry stops when profit is normal. That happens at the lowest ATC: $q = 10$, ATC $= 10 + 4 + 10 = 24$. At $P = 24$, MR = MC gives $24 = 4 + 2q$, so $q = 10$ and $P = ATC$.

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Abnormal profit attracts new firms until the price falls to the lowest ATC

It also works the other way. If the price is below ATC, firms make losses. Some leave the market, supply shifts left, and the price rises until the remaining firms earn normal profit.

In the long run, $P = MC$ (allocatively efficient) and output is at the lowest ATC (productively efficient). This is why perfect competition is the benchmark for judging the other structures. Real markets are rarely perfect, but some farm markets come close.

Monopoly

Characteristics and barriers to entry

A **monopoly** 垄断 is one firm supplying the whole market, with no close **substitutes** 替代品. In practice, a firm with a very large share can act like a monopoly (UK competition law uses a 25% share as one test). A monopolist is a **price-maker** 价格制定者: it faces the downward-sloping market demand curve, so it chooses a price and accepts the quantity buyers then want.

Its power lasts only while **barriers to entry** keep rivals out:

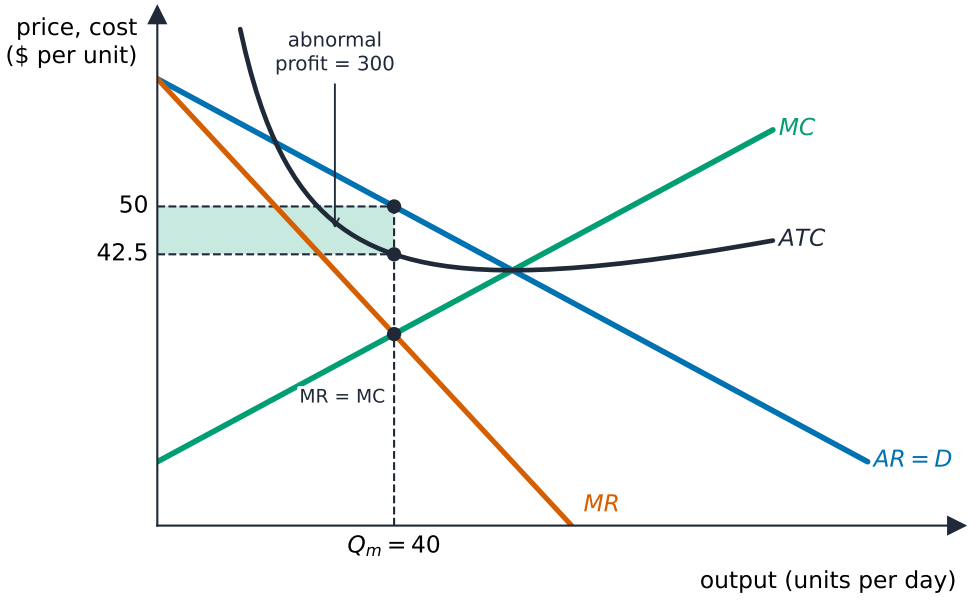
- **economies of scale** 规模经济: a big firm's low cost per unit means a small entrant cannot compete;
- legal barriers: **patents** 专利, licences and copyrights;
- control of an essential resource, such as a mine or a port;
- strong brands and heavy advertising;
- **network effects** 网络效应: a platform is more useful when everyone else already uses it, as with social media and online shopping sites.

The monopoly diagram

The monopolist uses the same rule as every firm. With demand (AR) $P = 70 - Q/2$, MR $= 70 - Q$ and MC $= 10 + Q/2$:

$$70 - Q = 10 + \frac{Q}{2} \quad \Rightarrow \quad 60 = 1.5Q \quad \Rightarrow \quad Q_m = 40$$

The firm charges the highest price buyers will pay for 40 units, read from the demand curve: $P_m = 70 - 40/2 = 50$. Its ATC is $900/Q + 10 + Q/4$, so at 40 units ATC $= 22.5 + 10 + 10 = 42.5$. Abnormal profit $= (50 - 42.5) \times 40 = 300$ per day. Barriers to entry stop new firms from competing it away, so the profit can last into the long run.



The monopolist produces where MR = MC and sets the price from the demand curve

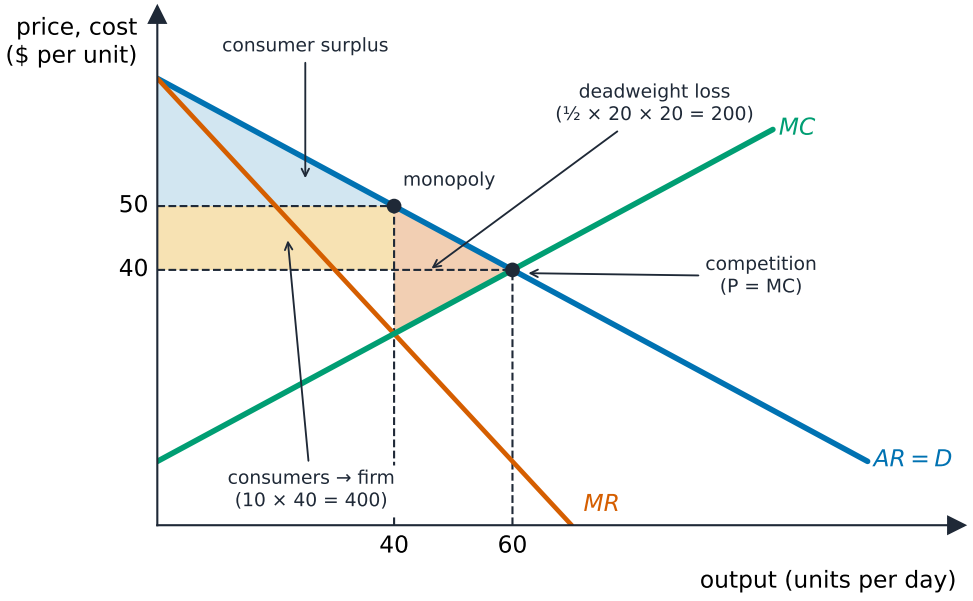
Notice that MR = MC happens where MC is 30, but the price is 50. A monopolist always sets the price above marginal cost.

Monopoly and efficiency

Compare the monopoly with a competitive market facing the same demand and cost. Under competition, output goes to where $P = MC$: $70 - Q/2 = 10 + Q/2$, so $Q = 60$ and $P = 40$.

- The monopolist produces 20 fewer units and charges 10 more.
- Consumers lose $(50 - 40) \times 40 = 400$ per day to the firm as a higher price.
- The units from 40 to 60 are not made, though buyers value them above their cost. This is the **deadweight loss** 无谓损失: $\frac{1}{2} \times (60 - 40) \times (50 - 30) = 200$ per day.

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Compared with competition, monopoly takes 400 from consumers and destroys 200 of welfare

So a monopoly is allocatively inefficient ($P = 50 > MC = 30$). It is also productively inefficient: its ATC is lowest at 60 units (ATC = 40), but it produces only 40. Without competition, managers may also let costs rise above the lowest possible level. This is called **X-inefficiency** X 非效率.

The case for large firms

Size can also help consumers:

- **Economies of scale** can make costs so low that even the monopoly price is below what small competing firms could charge.
- **Abnormal profit** can pay for **research and development** 研发 (R&D): new medicines, phones and software often come from large, profitable firms. This is **dynamic efficiency** 动态效率, improvement over time.
- A monopoly that is open to a world market may still face strong foreign competition.

An evaluation compares these gains with the deadweight loss, and asks whether the barriers protect real advantages or just protect profit.

Natural monopoly

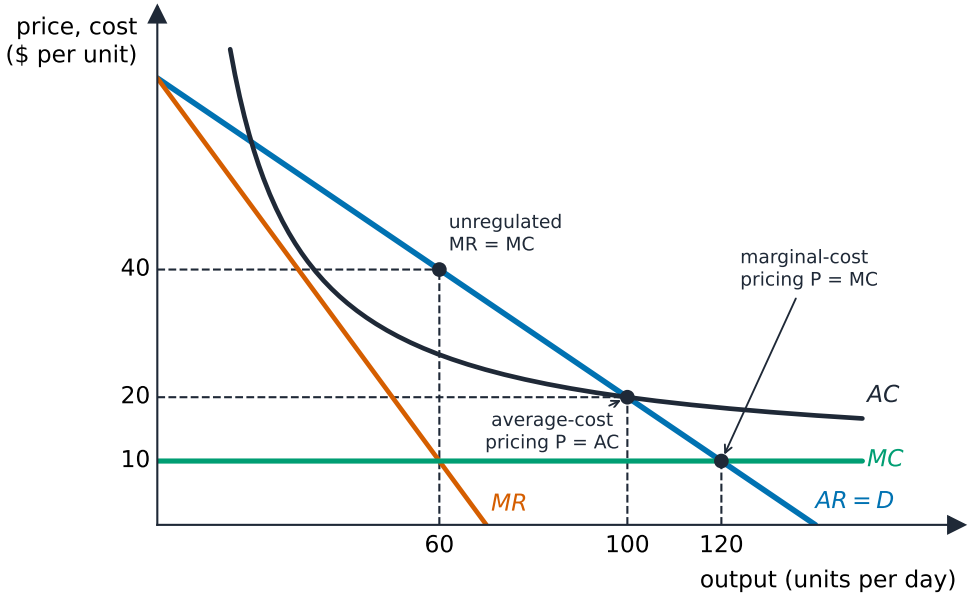
A **natural monopoly** 自然垄断 is an industry where one firm can supply the whole market at a lower cost than two or more firms. The reason is a very large fixed cost: one water network, one electricity grid, one railway line. Average cost keeps falling across the whole market demand. Splitting the firm would raise costs, so governments regulate it instead.



A power grid: one network can serve a whole region at lower average cost than two competing ones, a natural monopoly

Worked example. Demand is $P = 70 - Q/2$, MC is a constant 10, and the fixed cost is 1,000 per day, so AC $= 10 + 1000/Q$.

Rule	Output	Price	Result
unregulated: MR = MC	60	40	abnormal profit $= (40 - 10) \times 60 - 1000 = 800$
marginal-cost pricing: $P = MC$	120	10	allocatively efficient, but a loss of 1,000 (the fixed cost)
average-cost pricing: $P = AC$	100	20	normal profit; most of the efficiency gain



Regulating a natural monopoly: $P = MC$ is efficient but makes a loss; $P = AC$ breaks even

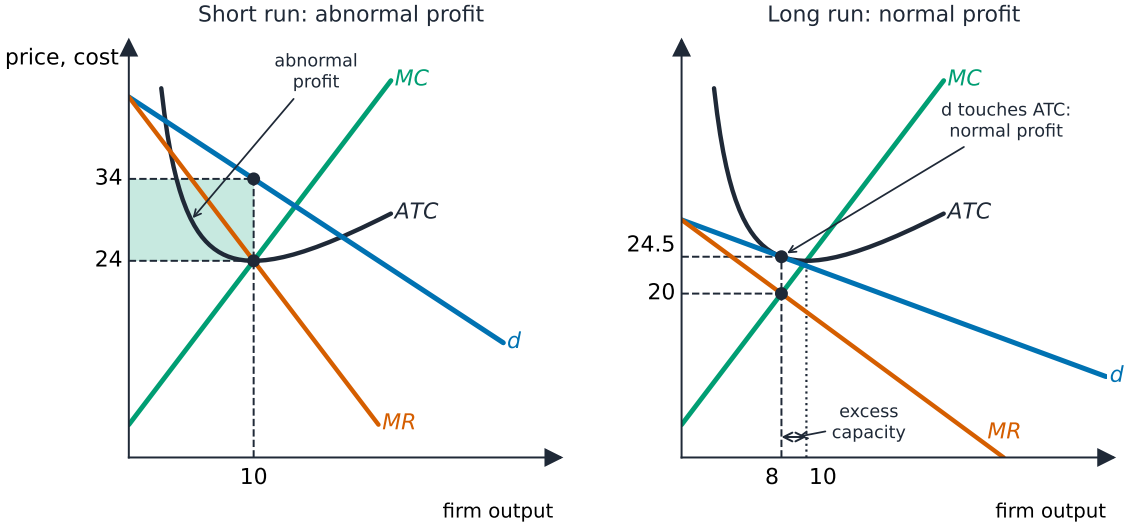
Marginal-cost pricing needs a **subsidy** 补贴 of 1,000 a day, or the firm closes. Average-

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cost pricing needs no subsidy and still raises output from 60 to 100. Many governments choose this, or own the firm themselves.

Monopolistic competition

Monopolistic competition 垄断竞争 has many firms, low barriers to entry and **product differentiation** 产品差异化: each firm's product is a little different. Milk-tea shops, hair salons and restaurants are examples. Each firm has a few loyal customers, so it faces its own downward-sloping demand curve (d). But there are many close substitutes, so demand is quite elastic. Firms compete with **non-price competition** 非价格竞争: brands, advertising, location, service and new flavours.



New firms take customers until each firm's demand curve just touches ATC

Worked example. One shop has MC $= 4 + 2q$ and ATC $= 100/q + 4 + q$.

1. *Short run.* Demand is $P = 44 - q$, so MR $= 44 - 2q$. MR = MC gives $q = 10$ and $P = 34$. ATC is 24, so abnormal profit $= (34 - 24) \times 10 = 100$.
2. *Long run.* The profit attracts new shops nearby. Each shop loses customers, so its demand curve shifts left. Entry stops when demand just touches the ATC curve: here at $q = 8$, where $P = ATC = 24.5$ and profit is normal.

In the long run the firm is still inefficient. Its price (24.5) is above MC (20), so it is not allocatively efficient. It produces 8 units, not the 10 where ATC is lowest, so it is not productively efficient either. This gap is **excess capacity** 过剩产能: the shop could serve more customers at a lower cost per customer. In return, consumers get more variety.

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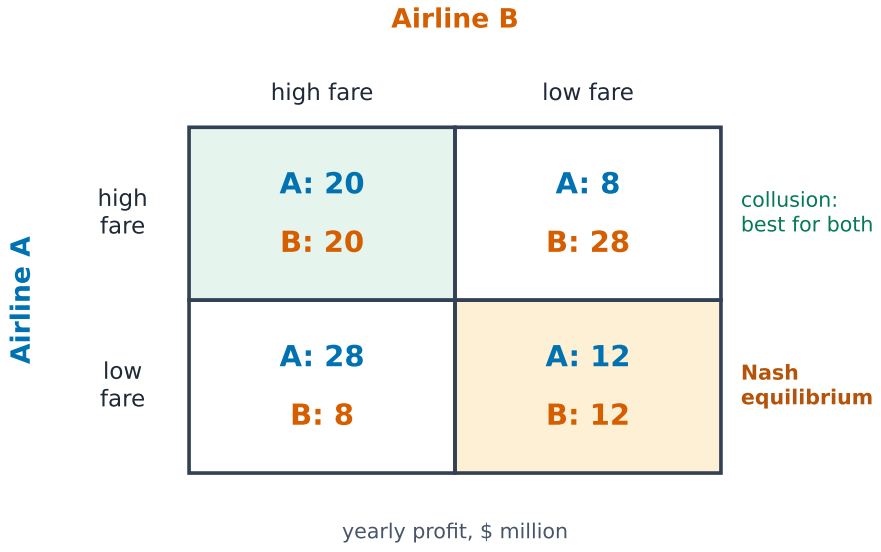
Oligopoly

Characteristics

An **oligopoly** 寡头垄断 is a market with a few large firms and high barriers to entry. Products may be the same (oil, steel) or differentiated (cars, phones, airlines). The key feature is **interdependence** 相互依存: each firm's best choice depends on what its rivals do. If one airline cuts its fares, the others lose passengers unless they cut too.

Game theory

Game theory 博弈论 studies choices that depend on what others choose. A payoff matrix shows each firm's profit for each pair of choices.



Each airline does better with a low fare whatever the other does, so both end on 12

Read it from Airline A's side:

- If B sets a high fare, A earns 20 with a high fare or 28 with a low fare. Low is better.
- If B sets a low fare, A earns 8 with a high fare or 12 with a low fare. Low is better again.

So a low fare is A's **dominant strategy** 占优策略: its best choice whatever B does. The same is true for B. Both choose low and earn 12 each. Neither can gain by changing alone, so this is the **Nash equilibrium** 纳什均衡. But both would earn 20 if both kept fares high. This "prisoner's dilemma" explains both sides of oligopoly: the reward for working together, and the temptation for each firm to cheat.

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Collusion and competition

- **Collusion** 共谋: firms agree to limit output or fix prices, moving towards the monopoly outcome. A formal agreement is a **cartel** 卡特尔. OPEC, a group of oil-exporting countries, sets output targets for its members. Cartels between firms are illegal in most countries, including China.
- **Tacit collusion** 默契共谋: no agreement is made, but firms follow each other. One firm acts as **price leader** 价格领导者 and the others copy its prices.
- **Non-collusive oligopoly**: firms compete. A **price war** 价格战 can push prices close to cost. Because price cuts are quickly copied, most oligopolies prefer non-price competition: advertising, brands and new models.

Cartels tend to break down. Each member can gain by secretly producing more than its quota, exactly as in the game above.

Measuring concentration

A **concentration ratio** 集中度 adds the market shares of the largest firms. If the five largest firms have shares of 40%, 25%, 15%, 10% and 10%, the four-firm ratio is $CR4 = 40 + 25 + 15 + 10 = 90\%$: a highly concentrated market. The ratio has limits. It ignores foreign rivals and imports. It does not show whether the largest firm has 40% or 85% of a CR4 of 90. And it says nothing about how firms actually behave.

Comparing the market structures

The four structures form a range, from many small price-takers to a single price-maker. As you move along it:

- barriers to entry rise, so abnormal profit can last longer;
- control over price grows, so price moves further above marginal cost and efficiency falls;
- but firms grow larger, so economies of scale and spending on research may rise.

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	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
number of firms	very many	many	a few	one
product	identical	differentiated	identical or differentiated	unique
barriers to entry	none	low	high	very high
control over price	none (price-taker)	some	considerable	great (price-maker)
long-run profit	normal	normal	often abnormal	often abnormal
allocatively efficient?	yes ($P = MC$)	no	usually no	no
productively efficient?	yes	no (excess capacity)	usually no	no

Government responses to market power

Market power is a market failure because output is too low and the price too high ($P > MC$). Governments respond in several ways:

- **Competition law** 竞争法: bans cartels and the abuse of a dominant position, and can block **mergers** 并购 that would create too much power. In 2017 the European Commission fined Google 2.42 billion euros for favouring its own shopping service in search results.
- **Regulation**: price caps and quality targets for natural monopolies such as water and electricity.
- **Fines** that are large enough to make breaking the law unprofitable.
- **Government ownership** 国有化 (nationalisation) of natural monopolies.
- **Trade liberalisation** 贸易自由化: removing tariffs lets foreign firms compete with a domestic monopoly.

Each response has costs. Regulators may lack information about the firm's true costs (asymmetric information again). Breaking up a firm may lose economies of scale. State-owned firms may suffer from X-inefficiency. A good answer weighs the efficiency gain against these costs.

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Sources for this lesson

- International Baccalaureate, *Economics guide* (first assessment 2022).
- G. Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism", *Quarterly Journal of Economics* (1970).
- State Administration for Market Regulation (China), decision on Alibaba Group, 10 April 2021.
- European Commission, *Google Shopping* decision (27 June 2017).

Common errors

- Mixing up the timing: adverse selection happens **before** a contract, moral hazard **after** it.
- Drawing the MR curve with the same slope as demand; for a straight-line demand curve MR is twice as steep.
- Reading the monopoly price off the MC curve; it is read from the demand (AR) curve at the profit-maximising output.
- Saying a perfectly competitive firm makes abnormal profit in the long run; entry removes it.
- Calling any big firm a monopoly; check barriers to entry and substitutes.
- Ignoring the case for large firms (economies of scale, R&D) when evaluating market power.

Key terms

- **Asymmetric information**: one side of a deal knows more than the other.
- **Adverse selection**: hidden information before a contract drives good products or low-risk buyers out of a market.
- **Moral hazard**: after a contract, one side takes more risk because someone else bears the cost.
- **Barriers to entry**: obstacles that stop new firms entering a market.
- **Natural monopoly**: an industry in which one firm can supply the whole market at lower cost than two or more.
- **Nash equilibrium**: an outcome in which no player can gain by changing their choice alone.

Check yourself

1. Explain why, in Akerlof's used-car market, good cars leave the market.
2. Give one example of moral hazard and one response to it.
3. A firm faces $P = 70 - Q/2$. What is MR, and at what output is total revenue highest?

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4. In the monopoly example, find the output, price and deadweight loss, and explain why the monopoly is allocatively inefficient.
5. In the airline game, why do both airlines end up with low fares, though both would earn more with high fares?
6. A natural monopoly is regulated to price at average cost. Why might a government prefer this to marginal-cost pricing?

Answers: 1. Buyers cannot tell good cars from bad, so they offer an average price; owners of good cars will not sell at that price, so they leave, and the average quality falls further. 2. For example, an insured driver drives less carefully; an excess or a no-claims discount keeps some of the risk with the driver. 3. $MR = 70 - Q$; total revenue is highest at $Q = 70$, where MR $= 0$. 4. $Q = 40$, $P = 50$, deadweight loss 200 per day; price (50) is above marginal cost (30). 5. A low fare is each airline's dominant strategy: whatever the rival does, cutting the fare earns more, so the Nash equilibrium is (12, 12), not the collusive (20, 20). 6. Marginal-cost pricing makes a loss equal to the fixed cost (1,000 a day), which needs a subsidy; average-cost pricing covers costs and still raises output from 60 to 100.

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Macroeconomic activity, objectives and policy (3.1-3.7)

International Baccalaureate · IB Diploma · Economics · HL

Macroeconomic activity, objectives and policy

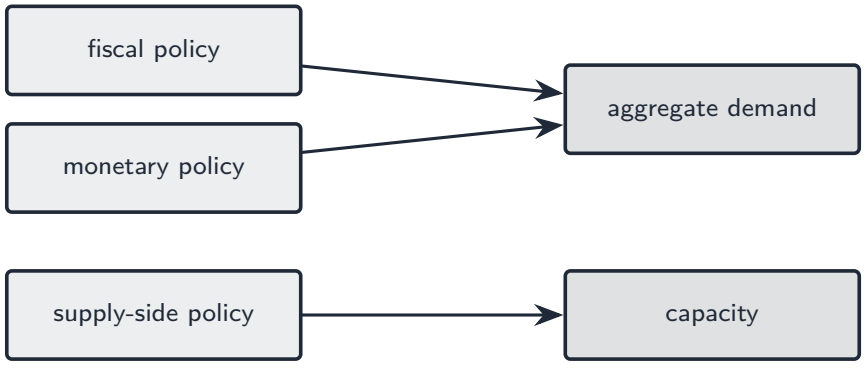
Why it matters. In April 2020 the United States lost more than 20 million jobs in a single month, and its unemployment rate jumped from 4.4% to 14.8%, the highest since the Great Depression of the 1930s. The government sent cheques to most households, and the Federal Reserve cut its interest rate to almost zero. Two years later the problem was the opposite: in June 2022 US inflation reached 9.1%, its highest in more than 40 years, as spending recovered faster than supply chains and energy prices soared after Russia's invasion of Ukraine. The Federal Reserve then raised its rate eleven times, from near zero to over 5% by July 2023. In three years one economy swung from the deepest fall in output in living memory to the highest inflation in a generation, and its policymakers turned every lever they had. Macroeconomics explains why output, jobs and prices move together like this, and what policy can and cannot do about it.

In this unit you will:

- measure economic activity with GDP and other indicators, and describe the business cycle;
- use aggregate demand and aggregate supply to explain output gaps, and the HL multiplier;
- explain the objectives of low unemployment, low and stable inflation, growth and sustainable debt;
- measure inequality and poverty and evaluate policies to reduce them;
- evaluate monetary, fiscal and supply-side policies.

This unit covers sections 3.1 to 3.7 of IB Economics Unit 3, *Macroeconomics*. One model runs through the worked examples: real GDP in billions of dollars, aggregate demand $P = 90 - Y/2$, short-run aggregate supply $P = 20 + Y/2$ and full-employment output of 80.

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Fiscal and monetary policy act on demand; supply-side on capacity

Must-know for this topic:

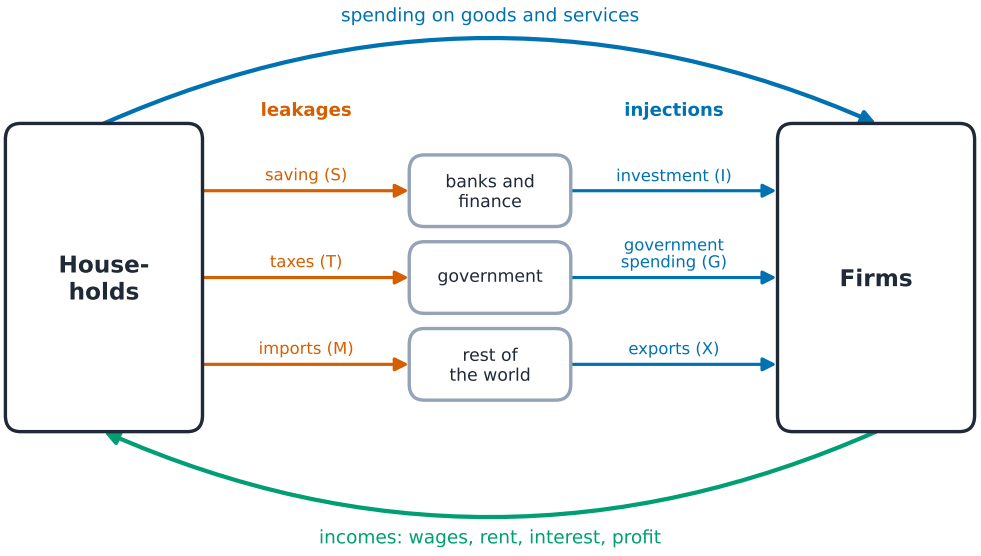
Idea	Key relationship
GDP	output = income = expenditure; real GDP = nominal GDP ÷ deflator ×100
aggregate demand	AD $= C + I + G + (X - M)$
equilibrium	AD meets SRAS at $Y = 70$, $P = 55$; full employment 80, so a recessionary gap of 10
multiplier (HL)	$k = \frac{1}{1 - MPC} = \frac{1}{MPS + MPT + MPM}$
objectives	low unemployment, low and stable inflation, growth, equity, sustainable debt
Phillips curve (HL)	short-run trade-off; vertical in the long run at the natural rate
policy	monetary (interest rates), fiscal (G and T), supply-side (LRAS)

Measuring economic activity

■ The circular flow of income

Households own the **factors of production** 生产要素 (land, labour, capital and enterprise). They sell them to firms and earn incomes. They spend these incomes on firms' goods and services. Money therefore flows in a circle.

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Leakages leave the flow of income; injections come back in

Some money leaves the circle. These are **leakages** 漏出: saving (S), taxes (T) and spending on imports (M). Other money enters it. These are **injections** 注入: investment (I), government spending (G) and export revenue (X). If injections are larger than leakages, national income grows. If leakages are larger, income falls.

■ Three ways to measure output

Gross domestic product 国内生产总值 (GDP) is the value of all final goods and services produced in a country in one year. The circular flow shows three ways to measure it, and in principle they give the same answer:

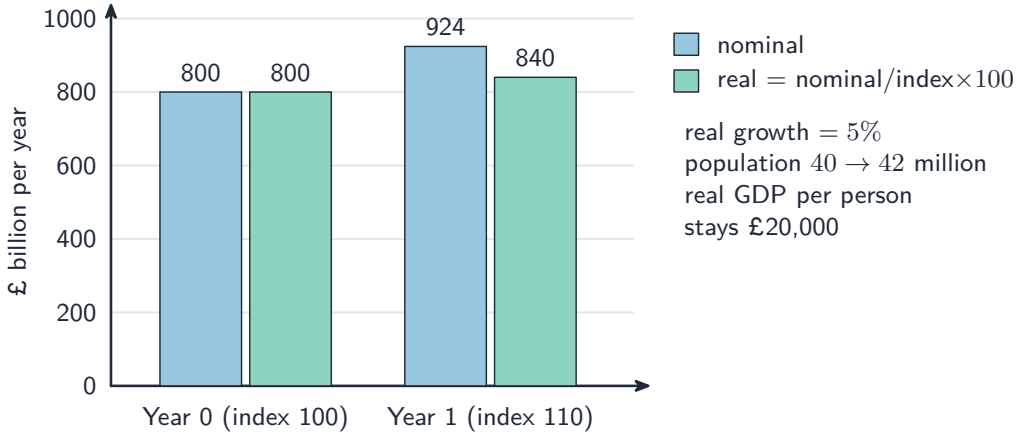
- the **output method**: add the value of what each industry produces;
- the **income method**: add all incomes (wages, rent, interest, profit);
- the **expenditure method**: add all spending, $C + I + G + (X - M)$.

Gross national income 国民总收入 (GNI) is GDP plus income that residents earn abroad, minus income that foreigners earn in the country. It matters for countries with many workers abroad or much foreign-owned industry.

■ Nominal and real, totals and per person

- **Nominal GDP** 名义国内生产总值 uses each year's own prices.
- **Real GDP** 实际国内生产总值 removes the effect of price changes: real GDP = nominal GDP ÷ price deflator ×100.
- **GDP per capita** 人均国内生产总值 divides by the population, which is better for comparing living standards.

- **Purchasing power parity** 购买力平价 (PPP) converts currencies at rates that buy the same basket of goods in each country. A dollar buys more haircuts in Chengdu than in London, so PPP figures compare real living standards more fairly.



Real GDP removes price rises; per-capita figures also divide by population

> **Worked example.** Nominal GDP is 500 billion when the deflator is 125, and 540 billion a year later when the deflator is 130.

- Real GDP in year 1 $= 500 \div 125 \times 100 = 400$.
- Real GDP in year 2 $= 540 \div 130 \times 100 \approx 415.4$.
- Real growth $= (415.4 - 400) \div 400 \times 100 \approx 3.8\%$, although nominal GDP rose by 8%.

■ Limits of GDP and other measures

GDP is not the same as well-being. It leaves out unpaid work at home and the **informal economy** 非正规经济. It says nothing about how income is shared. It counts the output of a polluting factory but not the damage the pollution does. It ignores leisure time and the quality of goods.

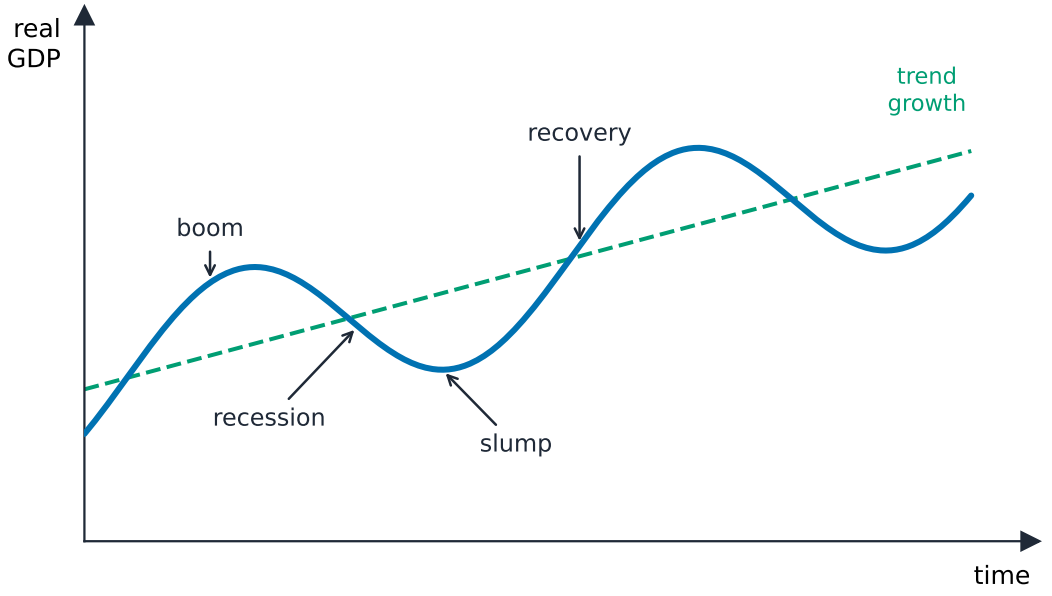
So economists also use other measures:

- the **Human Development Index** 人类发展指数 (HDI), which combines income per head (GNI per capita at PPP), health (life expectancy) and education (years of schooling);
- the OECD Better Life Index, the Happy Planet Index and the Genuine Progress Indicator, which add measures such as the environment, health, work-life balance and how satisfied people say they are.

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The business cycle

Real GDP does not grow smoothly. It moves up and down around its long-term **trend** 趋势 in a pattern called the **business cycle** 经济周期.



Real GDP rises and falls around its long-term trend

- In a **boom** 繁荣, output is above trend, unemployment is low and inflation tends to rise.
- In a **recession** 衰退, real GDP falls. Often this means two quarters in a row of falling output. Unemployment rises.
- At the bottom (the slump), output is furthest below trend.
- In the **recovery** 复苏, output and jobs grow again.

The gap between actual and potential output is the **output gap** 产出缺口.

Aggregate demand and aggregate supply

Aggregate demand

Aggregate demand 总需求 (AD) is total planned spending on a country's goods and services at each price level:

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

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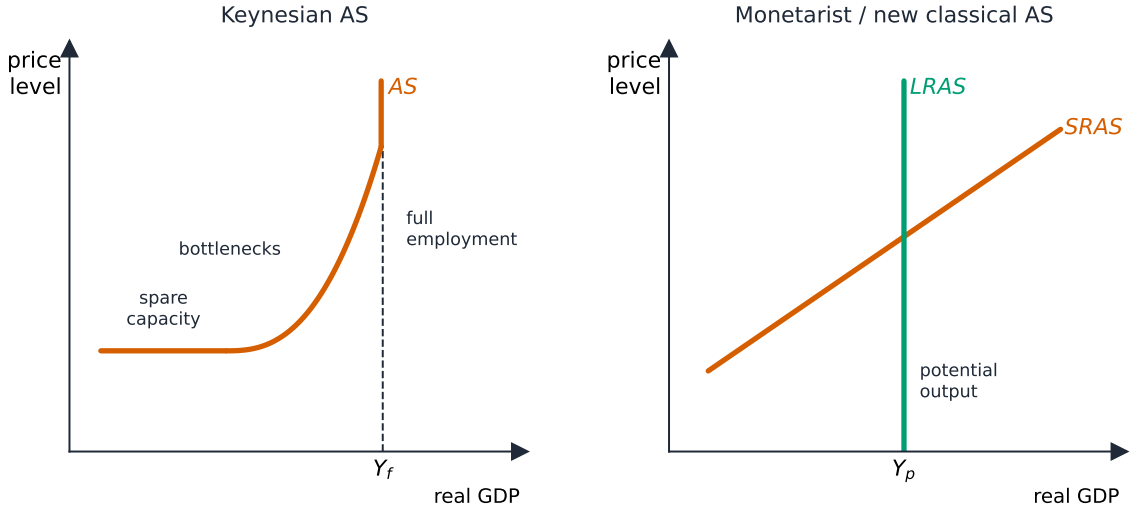
Component	What changes it
consumption (C)	income, interest rates, confidence, wealth, household debt
investment (I)	interest rates, business confidence, technology, profits
government spending (G)	government priorities, the state of the economy
net exports (X − M)	incomes abroad, the exchange rate, trade policy

The AD curve slopes down. A higher price level makes people's money and savings worth less, raises interest rates and makes exports dearer, so real spending falls. A change in the price level is a movement along AD. A change in any component (at the same price level) shifts AD.

Aggregate supply

Short-run aggregate supply 短期总供给 (SRAS) slopes up: when the price level rises and wages stay fixed for a while, production becomes more profitable. SRAS shifts when firms' costs change: wages, oil and raw material prices, business taxes, or a supply shock such as a drought.

Economists disagree about the long run.



Keynesian and monetarist views of aggregate supply

- In the **monetarist** 货币主义 (new classical) view, the **long-run aggregate supply** 长期总供给 (LRAS) curve is vertical at **potential output** 潜在产出. In the long run wages adjust, so the economy returns to full employment by itself. Demand changes only move the price level.

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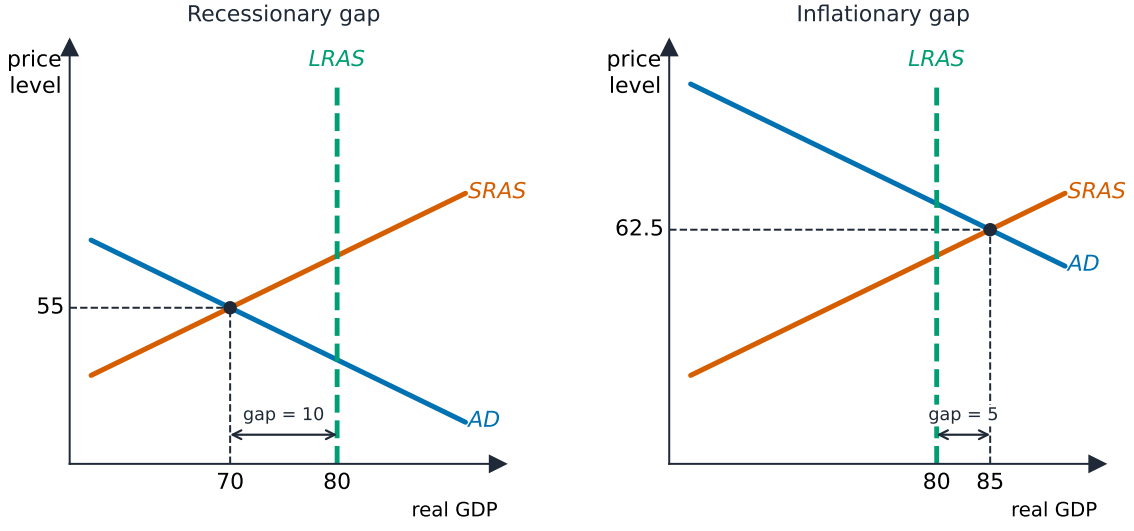
- In the **Keynesian** 凯恩斯主义 view, the economy can stay stuck below full employment. When there is a lot of spare capacity, AS is flat: more demand raises output without raising prices. Near full capacity, bottlenecks push prices up, and at full employment AS is vertical.

LRAS (and the vertical part of Keynesian AS) shifts right when the quantity or quality of factors of production increases: more workers, better education, new technology, more capital, better institutions.

■ Equilibrium and output gaps

> **Worked example.** AD is $P = 90 - Y/2$ and SRAS is $P = 20 + Y/2$. Full-employment output is 80.

- Equilibrium: $90 - Y/2 = 20 + Y/2$, so $Y = 70$ and $P = 55$.
- Output is 10 below full employment. This is a **recessionary gap** 衰退性缺口 (also called a deflationary gap), with cyclical unemployment.
- If AD rises to $P = 105 - Y/2$: $105 - Y/2 = 20 + Y/2$, so $Y = 85$ and $P = 62.5$. Output is 5 above full employment. This is an **inflationary gap** 通胀性缺口: the price level is pushed up.

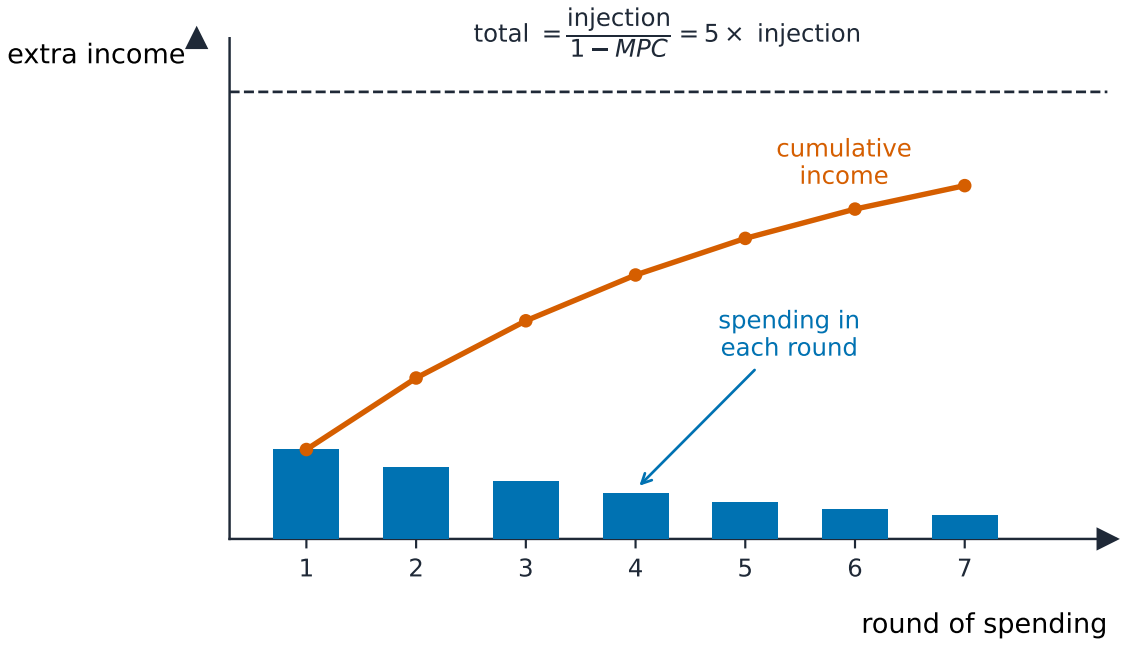


A recessionary gap and an inflationary gap on the same SRAS and LRAS

In the monetarist view, both gaps close by themselves in the long run. With a recessionary gap, unemployed workers accept lower wages, SRAS shifts right and output returns to 80. Keynesians reply that wages rarely fall, so a recession can last for years unless the government acts.

The multiplier (HL)

An injection of spending becomes someone else's income. They spend part of it, which becomes another person's income, and so on. So the final rise in national income is larger than the first injection. The **multiplier** 乘数 measures how much larger:



One injection multiplies into a larger overall rise in income

$$k = \frac{1}{1 - MPC} = \frac{1}{MPS + MPT + MPM}$$

The **marginal propensity to consume** 边际消费倾向 (MPC) is the share of extra income that is spent at home. The rest leaks out as saving (MPS), tax (MPT) or imports (MPM). Together these leakages are the marginal propensity to withdraw (MPW).

> **Worked example.** Out of each extra dollar of income, households save 0.1, pay 0.2 in tax and spend 0.2 on imports.

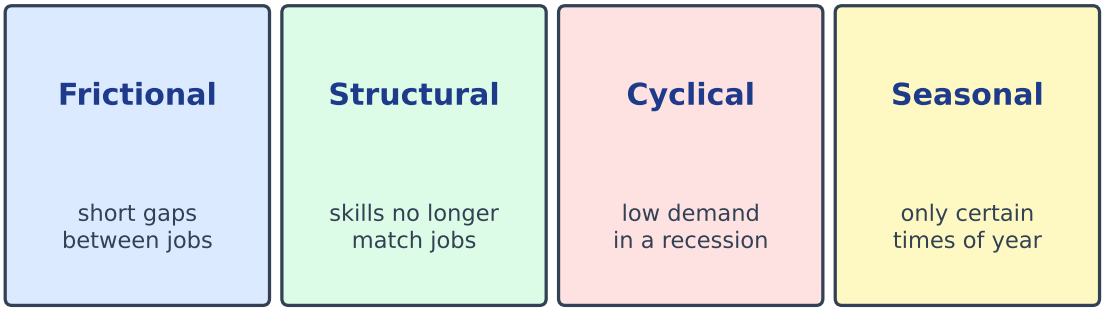
1. $MPS + MPT + MPM = 0.1 + 0.2 + 0.2 = 0.5$, so $MPC = 0.5$.
2. $k = 1 \div 0.5 = 2$.
3. The government spends an extra 10 billion on new railways. National income rises by $2 \times 10 = 20$ billion.

The multiplier works in both directions: a fall of 10 billion in investment cuts national income by 20 billion. A country that imports a lot has a high MPM, so its multiplier is small.

Macroeconomic objectives

Low unemployment

A person is **unemployed** 失业 if they are of working age, have no job, and are actively looking for work (the ILO definition).



Exam: name the type + cause — match policy to cause; results depend on vacancies and spare capacity

The four types of unemployment: frictional (between jobs), structural (skills no longer match), cyclical (low demand in a recession) and seasonal

$$\text{unemployment rate} = \frac{\text{number unemployed}}{\text{labour force}} \times 100$$

The **labour force** 劳动力 is everyone who is employed plus everyone who is unemployed. With 2.4 million unemployed in a labour force of 40 million, the rate is $2.4 \div 40 \times 100 = 6\%$.

The official rate can hide problems. It leaves out **discouraged workers** 丧志工人 who have stopped looking, and people working part-time who want more hours. It also hides big differences between regions, ages and ethnic groups.

Type	Cause	Example
cyclical (demand-deficient)	AD falls in a recession	factory jobs cut as orders fall
structural	skills or location no longer match the jobs	coal miners after mines close
frictional	time spent moving between jobs	a graduate searching for a first job
seasonal	demand changes with the season	ski instructors in summer

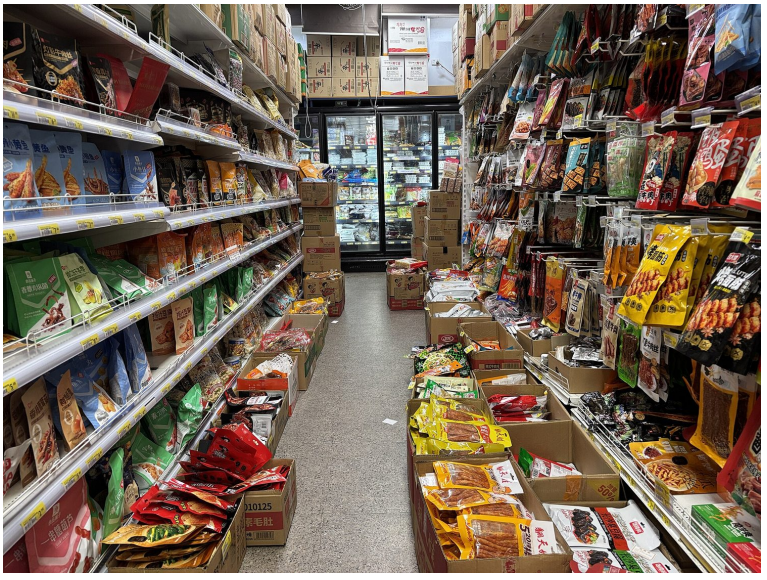
The **natural rate of unemployment** 自然失业率 is the rate when there is no cyclical unemployment: only structural, frictional and seasonal unemployment remain. Un-

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employment costs the jobless (lost income, lost skills, stress and poor health) and the whole economy (lost output, lower tax revenue, higher benefit spending, and possibly crime and social tension).

■ Low and stable inflation

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 fall in the rate of inflation: prices still rise, but more slowly. Inflation is measured with a **consumer price index** 消费者价格指数 (CPI), the weighted average price of a basket of goods that a typical household buys.



A CPI follows prices across a household consumption basket, not just one product.

> **Worked example.** A basket has three groups. Food has a weight of 50, housing 30 and transport 20 (the weights add to 100). One year later the price index of food is 110, housing 100 and transport 120 (base year = 100).

$$CPI = \frac{50 \times 110 + 30 \times 100 + 20 \times 120}{100} = \frac{5500 + 3000 + 2400}{100} = 109$$

So the inflation rate is 9%. The CPI has limits. A household's own basket may be different, quality improvements are hard to count, and people switch to goods whose prices rose less.

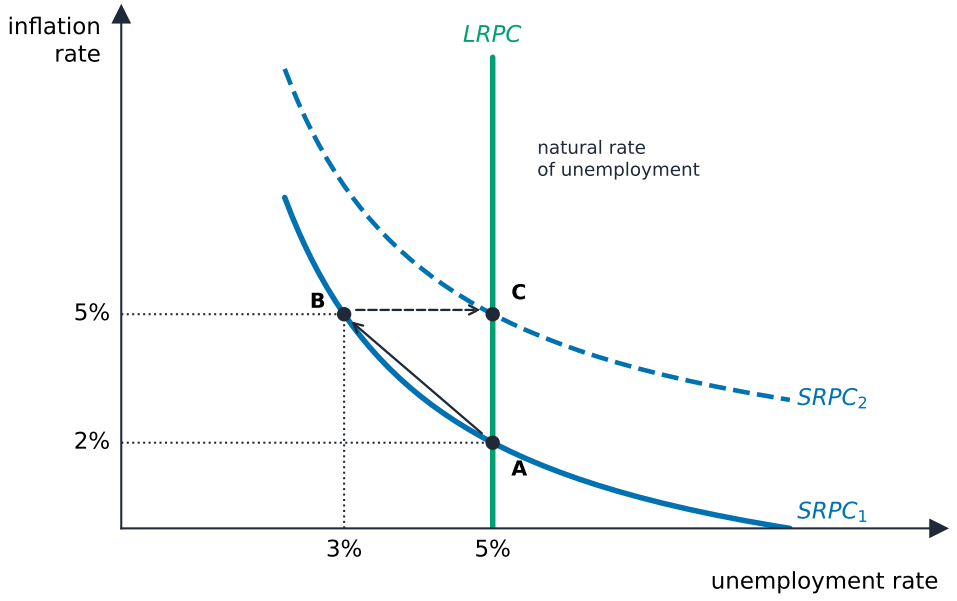
- **Demand-pull inflation** 需求拉动型通胀: AD grows faster than the economy can produce (an inflationary gap).
- **Cost-push inflation** 成本推动型通胀: firms' costs rise (oil, wages, imported materials) and SRAS shifts left. Prices rise while output falls.

High inflation hurts people on fixed incomes and savers, makes planning hard, and makes exports less competitive. Deflation is also harmful: consumers delay spending

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because goods will be cheaper later, the real value of debts rises, and firms cut output and jobs. This is why most central banks aim for low, steady inflation of about 2%.

■ Unemployment and inflation together (HL)



Pushing unemployment below the natural rate buys only a short-run gain

The **short-run Phillips curve** 短期菲利普斯曲线 (SRPC) shows a trade-off: lower unemployment comes with higher inflation. Follow the points in the diagram:

1. At A, unemployment is at its natural rate (5%) and inflation is 2%.
2. The government raises AD. Unemployment falls to 3%, but inflation rises to 5% (point B).
3. Workers now expect 5% inflation and ask for higher wages. The SRPC shifts up to SRPC2, and unemployment returns to 5% with inflation still at 5% (point C).

So the **long-run Phillips curve** 长期菲利普斯曲线 (LRPC) is vertical at the natural rate. To lower unemployment for good, a government must lower the natural rate itself, with supply-side policy. **Stagflation** 滞胀 (high unemployment and high inflation together, as after the oil price shocks of the 1970s) is a cost-push problem that the simple trade-off cannot explain.

■ Economic growth

Economic growth 经济增长 is an increase in real GDP. In the short run, growth can come from more AD using spare capacity. In the long run it needs more or better factors of production, shown by LRAS (or the production possibilities curve) shifting right. Growth raises incomes and tax revenue and can reduce poverty, but it can also harm the environment and widen inequality. So the goal is sustainable growth.

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Sustainable government debt

Government debt 政府债务 is the total the government owes after years of budget deficits. It is usually measured as a percentage of GDP. Debt is easier to carry when the economy grows faster than the interest rate on the debt. High debt brings costs: interest payments take money from schools and hospitals, lenders may demand higher interest rates, and **credit rating agencies** 信用评级机构 may lower the country's rating, which makes borrowing dearer still.

The economics of inequality and poverty

Measuring inequality

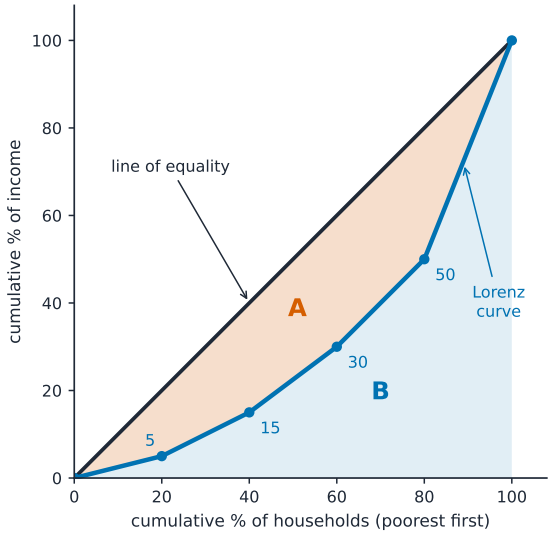
Income 收入 is a flow (money earned each year). **Wealth** 财富 is a stock (the value of what people own). Wealth is usually far more unequal than income.

The **Lorenz curve** 洛伦兹曲线 plots the share of income received by the poorest 20%, 40%, and so on. The straight line is perfect equality. The further the curve sags below it, the more unequal the country. The **Gini coefficient** 基尼系数 is area A divided by the whole area under the line of equality (A + B). It runs from 0 (perfect equality) to 1 (one person has everything).

> **Worked example.** The five quintiles (fifths) of households earn 5%, 10%, 15%, 20% and 50% of national income.

Poorest ... of households	20%	40%	60%	80%	100%
cumulative share of income	5%	15%	30%	50%	100%

Area B is a row of five trapezia, each 0.2 wide: $B = 0.2 \times \frac{(0+0.05)+(0.05+0.15)+(0.15+0.30)+(0.30+0.50)+(}{2}$ 0.30. The whole triangle is 0.5, so $A = 0.5 - 0.30 = 0.20$ and Gini $= 0.20 \div 0.50 = 0.40$.



The quintile shares give a Gini coefficient of 0.40

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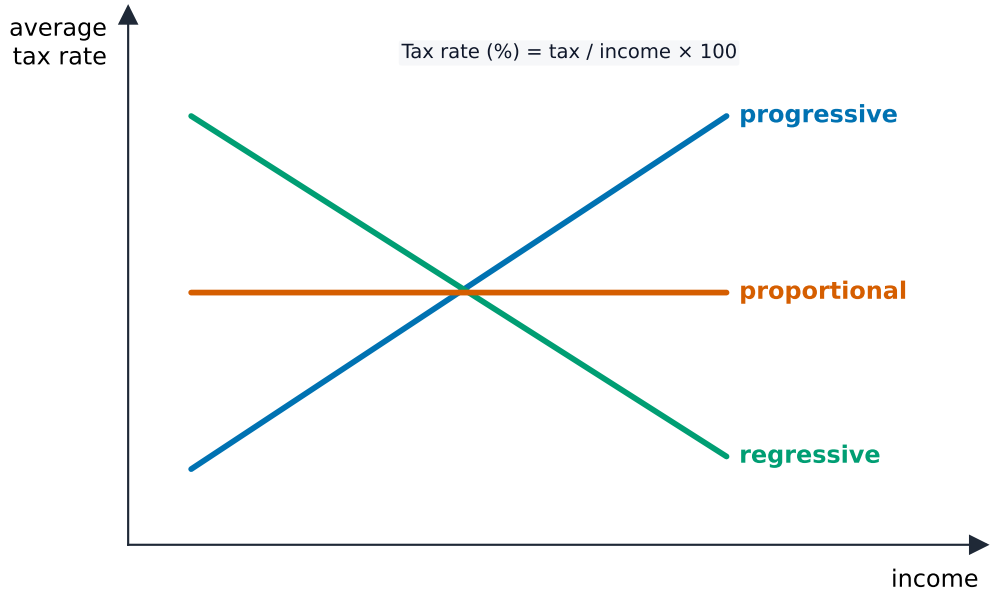
Poverty

- **Absolute poverty** 绝对贫困: income too low to buy basic needs. The World Bank's international poverty line is 3.00 US dollars a day per person (at 2021 PPP prices).
- **Relative poverty** 相对贫困: income far below others in the same country, often below 50% or 60% of the median income.
- The **Multidimensional Poverty Index** 多维贫困指数 (MPI) counts lack of health, education and living standards (such as clean water, electricity and cooking fuel), not only income.

Causes of inequality and poverty include differences in education and skills, inherited wealth, discrimination, unemployment, weak social protection, and tax systems that favour the rich. Globalisation and new technology have also raised the pay of highly skilled workers faster than others.

Policies to reduce inequality

- **Progressive taxes** 累进税: richer people pay a higher share of their income. A **regressive tax** 累退税 takes a larger share from the poor (indirect taxes such as VAT often do). A proportional tax takes the same share from everyone.
- **Transfer payments** 转移支付: pensions, unemployment benefits and child benefits.
- Spending on education and health, so that poor children get the same chances.
- A minimum wage, and laws against discrimination.



Under a progressive tax the average rate rises with income; under a regressive tax it falls; under a proportional tax it stays the same.

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Worked example (HL). Income tax is 0% on the first 10,000, 20% on income from 10,000 to 40,000, and 40% on income above 40,000. A person earns 50,000.

- Tax $= 0 + 0.2 \times 30{,}000 + 0.4 \times 10{,}000 = 6{,}000 + 4{,}000 = 10{,}000$.
- The **average tax rate** 平均税率 $= 10{,}000 \div 50{,}000 = 20\%$.
- The **marginal tax rate** 边际税率 (the rate on the next dollar) is 40%.

Because the average rate rises with income, this tax is progressive. Redistribution has costs: high marginal rates may reduce the reward for working or investing, and generous benefits can discourage some people from taking jobs. This is the trade-off between **equity** 公平 and **efficiency** 效率.

Monetary policy

The central bank and its tools

Monetary policy 货币政策 is run by the **central bank** 中央银行, such as the People's Bank of China or the US Federal Reserve. Many central banks have an **inflation target** 通胀目标, often 2%. Their tools:



The European Central Bank: central banks set policy interest rates to steer aggregate demand and inflation

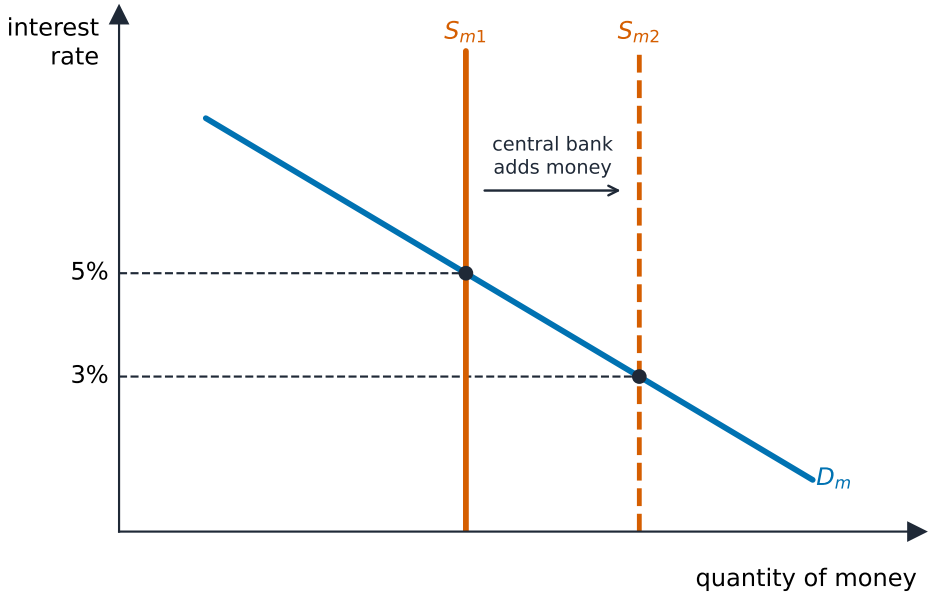
- the **policy interest rate** 政策利率 (the rate at which the central bank lends to commercial banks);
- **open market operations** 公开市场操作: buying or selling government bonds to change the money supply;
- **minimum reserve requirements** 存款准备金率: the share of deposits banks must keep and cannot lend. Lowering it lets banks lend more;

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- **quantitative easing** 量化宽松 (QE): large-scale bond buying with newly created money, used when interest rates are already near zero.

The money market

The interest rate is the price of money. The central bank controls the **money supply** 货币供给, shown as a vertical line. People's demand for money slopes down: at a high interest rate, holding cash means giving up a lot of interest.

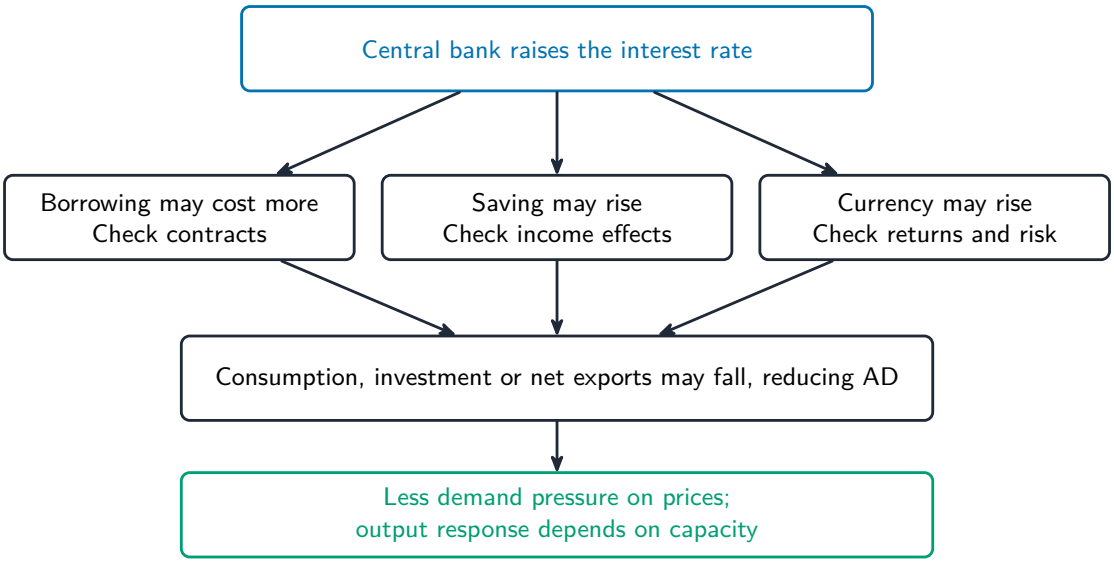


More money supply lowers the equilibrium interest rate

The **real interest rate** 实际利率 is the nominal rate minus inflation. A loan at 5% when inflation is 3% costs only 2% in real terms.

How monetary policy reaches AD

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A rise in the interest rate reaches aggregate demand through several channels

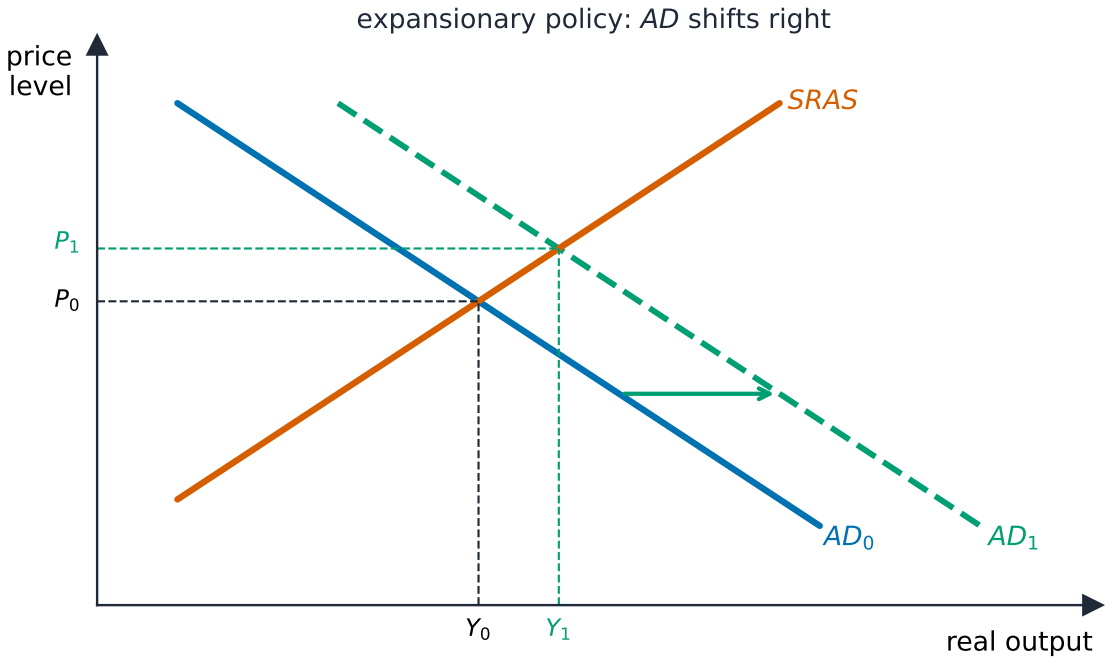
Contractionary 紧缩性 (tight) monetary policy raises interest rates to fight inflation. Borrowing costs more, so households buy fewer homes and cars and firms invest less. Saving becomes more attractive. A higher rate also attracts money from abroad, so the currency rises and net exports fall. AD shifts left. **Expansionary** 扩张性 (loose) monetary policy cuts rates to fight a recession and works the other way.

Strengths: central banks can act quickly, change rates in small steps, and are independent of politics. Limits: the full effect takes 18 months or more. In a deep recession, low confidence means people will not borrow even at very low rates. Rates cannot go far below zero, so QE is needed. And a rate rise cannot fix cost-push inflation without also cutting output.

Fiscal policy

Fiscal policy 财政政策 uses government spending and taxation to influence AD.

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Expansionary fiscal policy shifts AD right, raising output and prices

- Government revenue: **direct taxes** 直接税 (on income and profits), **indirect taxes** 间接税 (on spending, such as VAT), the sale of goods and services, and the sale of state-owned firms.
- Government spending: **current spending** 经常性支出 (wages of teachers and doctors, medicines), **capital spending** 资本性支出 (roads, schools, railways) and **transfer payments** (pensions, benefits).
- A **budget deficit** 预算赤字 means spending is greater than revenue; a **budget surplus** 预算盈余 means revenue is greater.

Expansionary fiscal policy raises G or cuts taxes. AD shifts right, by more than the first change because of the multiplier. **Contractionary fiscal policy** cuts G or raises taxes to cool an inflationary gap.

Automatic stabilisers 自动稳定器 work without any new decision. In a recession, tax revenue falls and benefit spending rises by itself, which supports AD. In a boom, the opposite happens and AD is held back.

> **Worked example (HL).** The economy has the recessionary gap of 10 from the model above, and the multiplier is 2. If AD shifts right by $k \times \Delta G$, an extra 10 billion of G shifts AD right by 20 billion, from $P = 90 - Y/2$ to $P = 100 - Y/2$. The new equilibrium is $100 - Y/2 = 20 + Y/2$, so $Y = 80$ and $P = 60$: full employment, with a higher price level. Output rises by only 10, not 20, because part of the extra spending goes into higher prices.

Strengths: fiscal policy can target spending at particular regions or groups, works

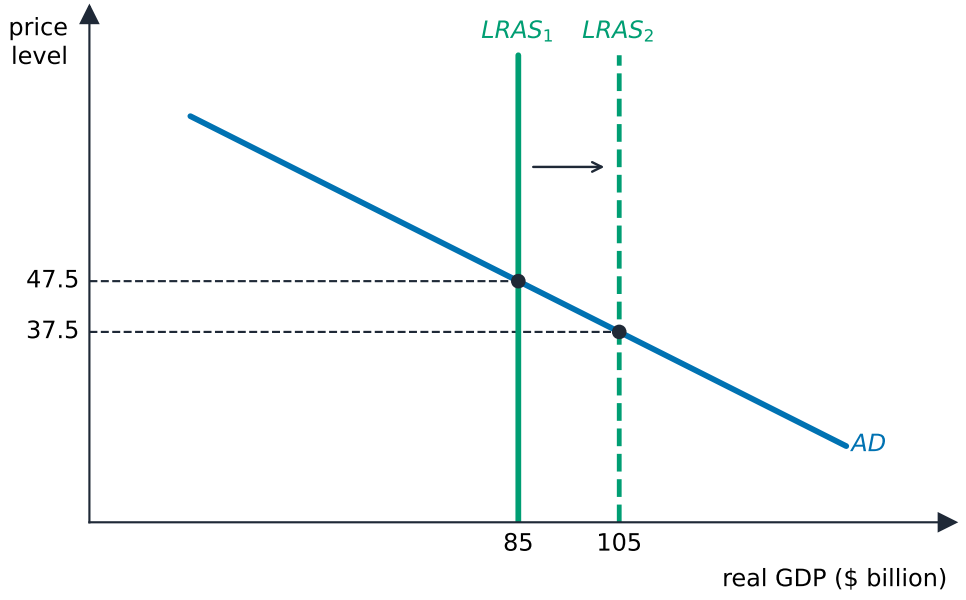
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well in a deep recession, and capital spending also raises LRAS. Limits: **crowding out** 挤出效应 (government borrowing may raise interest rates and reduce private investment), long time lags (laws and projects take time), political pressure against cutting spending, and rising debt.

Supply-side policies

Supply-side policies 供给侧政策 aim to raise the economy's productive capacity, shifting LRAS to the right.

> **Worked example.** LRAS shifts from 85 to 105 along AD $P = 90 - Y/2$. The price level falls from $90 - 85/2 = 47.5$ to $90 - 105/2 = 37.5$ while real GDP rises by 20. Unlike demand-side policy, this gives growth without inflation.



Supply-side policy raises output and lowers the price level

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Interventionist (the government acts)	Market-based (markets work more freely)
spending on education and training	lower income and business taxes to raise incentives
spending on healthcare	weaker trade union power, more flexible labour laws
infrastructure: roads, ports, broadband	lower or no minimum wage
grants for research and development	deregulation: removing unneeded rules
industrial policy: support for chosen industries	privatisation: selling state-owned firms
	competition policy: more rivals, lower prices

Strengths: supply-side policies can lower unemployment (especially structural), reduce inflation and raise long-run growth at the same time. Limits: most take years to work, education and infrastructure cost a lot of money, and market-based policies such as weaker labour laws can widen inequality.

Sources for this lesson

- International Baccalaureate, *Economics guide* (first assessment 2022).
- US Bureau of Labor Statistics, *The Employment Situation* (April 2020) and *Consumer Price Index* (June 2022).
- Board of Governors of the Federal Reserve System, FOMC statements, March 2022 to July 2023.
- International Monetary Fund, *World Economic Outlook* database.
- A. W. Phillips, "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957", *Economica* (1958).

Common errors

- Confusing nominal and real GDP; use the price index to remove inflation before comparing years.
- Saying a fall in the price level shifts AD; it is a movement along AD. Only a change in C, I, G or (X − M) at the same price level shifts it.
- Drawing LRAS anywhere other than at full-employment output, or forgetting to label the output gap.
- Writing "deflation" when inflation has only fallen (disinflation); deflation means prices fall.

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- Using the multiplier with the wrong leakages: at HL, $k = 1/(MPS + MPT + MPM)$.
- Treating monetary, fiscal and supply-side policy as interchangeable: they work through different channels, at different speeds, with different side effects.

Key terms

- **Gross domestic product (GDP)**: the total value of final goods and services produced in an economy in a year.
- **Aggregate demand**: total planned spending on an economy's output at each price level: $C + I + G + (X - M)$.
- **Output gap**: the difference between actual output and full-employment (potential) output.
- **Multiplier**: the ratio of the final change in national income to the initial change in spending.
- **Natural rate of unemployment**: the rate of unemployment when the labour market is in equilibrium, made up of frictional, structural and seasonal unemployment.
- **Monetary policy**: the central bank's use of interest rates and the money supply to influence aggregate demand.
- **Supply-side policy**: policy that aims to increase the economy's productive capacity (LRAS).

Check yourself

1. Nominal GDP is 540 billion and the GDP deflator is 130. Calculate real GDP.
2. On the model, find the equilibrium output and price level, and the size of the output gap.
3. The MPS is 0.1, the MPT 0.2 and the MPM 0.2. Calculate the multiplier and the final change in income from an extra 10 billion of government spending.
4. 2.4 million people are unemployed in a labour force of 40 million. What is the unemployment rate?
5. Why did US inflation rise to 9.1% in 2022? Give one demand-side and one supply-side cause.
6. Give one strength and one limit of using higher interest rates to fight inflation.

Answers: 1. $540 \div 130 \times 100 = 415.4$ billion. 2. $90 - Y/2 = 20 + Y/2$, so $Y = 70$ and $P = 55$; a recessionary gap of $80 - 70 = 10$. 3. $k = 1 \div (0.1 + 0.2 + 0.2) = 2$; the final change in income is 20 billion. 4. $2.4 \div 40 = 6\%$. 5. Demand side: spending recovered quickly, helped by government support payments; supply side: supply-chain delays and higher energy prices after Russia's invasion of Ukraine. 6. Strength: the central bank can act quickly and independently; limit: it works with long time lags and can cause a recession, and it does little against cost-push inflation

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from energy prices.

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The global economy (4.1-4.10)

International Baccalaureate · IB Diploma · Economics · HL

The global economy

Why it matters. On 23 March 2021 a container ship called the *Ever Given*, 400 metres long and carrying about 18,000 containers, was blown sideways in a sandstorm and stuck fast across the Suez Canal in Egypt. About 12% of world trade passes through the canal. For six days nothing could move: more than 350 ships queued at either end, carrying oil, cars, furniture, coffee and phone parts, and some shipping firms sent their ships the long way round Africa, adding about two weeks to the journey. Lloyd's List estimated that goods worth almost 10 billion US dollars were held up for each day of the blockage. Factories in Europe waited for parts made in Asia, and shop shelves felt it weeks later. One stuck ship showed how closely the world's economies depend on each other through trade. This unit explains why countries trade, why they sometimes restrict it, how exchange rates and the balance of payments work, and why some countries develop faster than others.

In this unit you will:

- explain absolute and comparative advantage and the gains from trade;
- analyse tariffs, quotas and subsidies with diagrams and numbers, and evaluate protection;
- explain trading blocs, trade creation and trade diversion;
- analyse exchange rates and the balance of payments, including the HL Marshall–Lerner condition and terms of trade;
- measure development and evaluate barriers and strategies.

This unit covers sections 4.1 to 4.10 of IB Economics Unit 4, *The global economy*. The trade examples use one market, with demand $Q_d = 140 - 2P$ and domestic supply $Q_s = 20 + 4P$, at a world price of 12.

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Container shipping: comparative advantage and trade let countries specialise and gain

In 1980 China opened its first special economic zone in Shenzhen, then a small town near Hong Kong. Foreign firms could build factories there and export to the world. Today Shenzhen is a city of more than 17 million people, and China is the world's largest exporter of goods. Over the same years, hundreds of millions of Chinese people left extreme poverty. This topic asks how trade causes growth like this, who loses from it, and why some countries still struggle to develop.

Must-know for this topic:

Idea	Key relationship
comparative advantage	specialise in the good with the lower opportunity cost
tariff (worked model)	world price 12 → imports 48; tariff of 4 → price 16, imports 24, revenue 96, deadweight loss 48
integration	free trade area → customs union → common market → economic and monetary union
exchange rates	floating, fixed or managed; demand and supply of a currency
balance of payments	current account + capital account + financial account = 0 (with errors and omissions)
Marshall–Lerner (HL)	a depreciation helps the current account if PED for exports + PED for imports > 1

Idea	Key relationship
terms of trade (HL)	$ToT = \dfrac{\text{index of export prices}}{\text{index of import prices}} \times 100$
development	sustainable development; HDI; barriers; strategies

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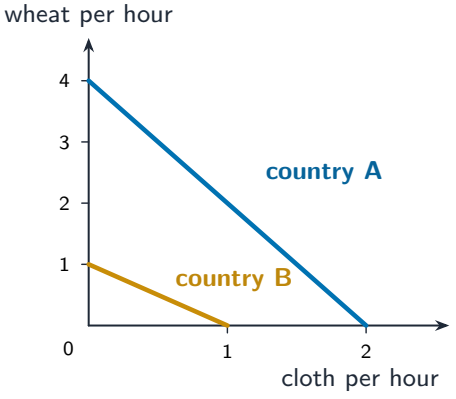
International trade

Why countries trade

International trade gives consumers lower prices and more choice. Firms can sell to bigger markets and gain **economies of scale** 规模经济. Competition from abroad pushes local firms to be more efficient. Trade also spreads new technology and ideas.

Absolute and comparative advantage

A country has an **absolute advantage** 绝对优势 in a good if it can make more of it with the same resources. It has a **comparative advantage** 比较优势 if it can make the good at a lower **opportunity cost** 机会成本. Trade is based on comparative advantage, not absolute advantage.



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

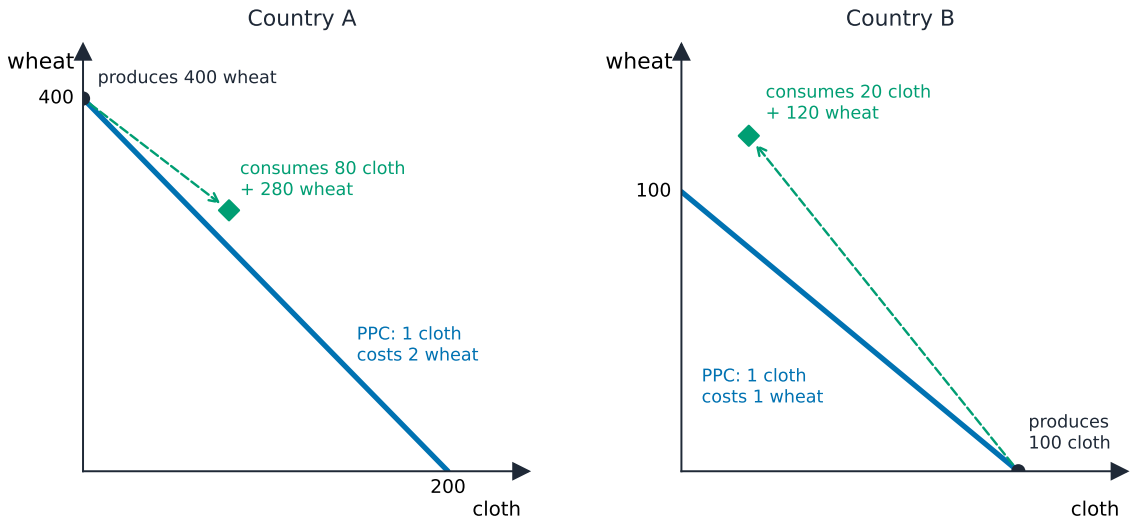
Output per labour hour; the trade ratio 1.5 wheat per cloth sits between the two opportunity costs.

Worked example. In one day, one worker makes:

	Wheat	Cloth	Opportunity cost of 1 cloth	Opportunity cost of 1 wheat
Country A	4	2	2 wheat	0.5 cloth
Country B	1	1	1 wheat	1 cloth

1. A has an absolute advantage in BOTH goods: it makes more of each.
2. But one cloth costs A 2 wheat and costs B only 1 wheat. So B has the comparative advantage in cloth.
3. One wheat costs A only 0.5 cloth and costs B 1 cloth. So A has the comparative advantage in wheat.
4. A specialises in wheat and B in cloth. Any trade price between 1 and 2 wheat per cloth helps both: A gets cloth for less than 2 wheat, and B gets more than 1 wheat for each cloth.

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With 100 workers each and a price of 1.5 wheat per cloth, both countries consume outside their own PPC

Suppose each country has 100 workers and they trade 120 wheat for 80 cloth (1.5 wheat per cloth). A makes 400 wheat and ends with 280 wheat and 80 cloth; working alone, it could have 80 cloth and only 240 wheat. B makes 100 cloth and ends with 20 cloth and 120 wheat; alone, it could have 20 cloth and only 80 wheat. Both gain.

The theory has limits. It assumes no transport costs, constant opportunity costs, and workers who can move easily from one industry to another. In reality, the workers in a closing cloth factory may not find new jobs quickly. And a country may become too dependent on one or two goods.

The World Trade Organization

The **World Trade Organization** 世界贸易组织 (WTO), set up in 1995 and now with more than 160 members, sets rules for world trade. It runs rounds of talks to lower trade barriers, and it settles **trade disputes** 贸易争端 between members. Critics say its rules favour rich countries, and its dispute system has been weak since its appeals body stopped working in 2019.

Trade protection

Trade protection 贸易保护 means government action that limits imports to help domestic producers. Most tools make foreign goods dearer or scarcer.

Types of protection

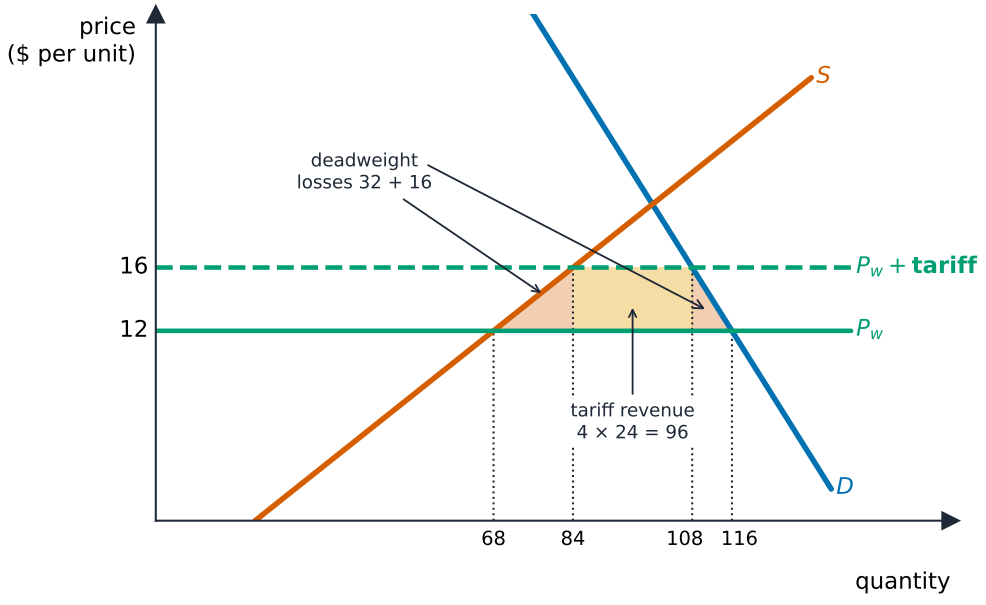
- **Tariffs** 关税: taxes on imports.
- **Quotas** 配额: limits on the quantity of a good that can be imported.
- **Production subsidies** 生产补贴: payments to domestic producers, which lower their costs.

- **Export subsidies** 出口补贴: payments to firms for each unit they export.
- **Administrative barriers** 行政壁垒: slow customs checks, strict product standards, or long paperwork that make importing harder.

The effects of a tariff (HL calculation)

Worked example. Domestic demand is $Q_d = 140 - 2P$ and domestic supply is $Q_s = 20 + 4P$. The country can import as much as it wants at the world price of 12.

1. *Free trade.* At $P = 12$: $Q_d = 140 - 24 = 116$ and $Q_s = 20 + 48 = 68$. Imports $= 116 - 68 = 48$.
2. *Tariff of 4.* The domestic price rises to 16: $Q_d = 108$ and $Q_s = 84$. Imports $= 108 - 84 = 24$.
3. *Government revenue* $= 4 \times 24 = 96$.
4. *Deadweight loss.* Domestic firms now make 16 extra units that foreign firms made more cheaply: $\frac{1}{2} \times 4 \times (84 - 68) = 32$. Consumers give up 8 units they valued above the world price: $\frac{1}{2} \times 4 \times (116 - 108) = 16$. Total: 48.



A tariff of 4 halves imports, raises 96 for the government and wastes 48

Who gains and who loses? Consumers lose: they pay more and buy less. Domestic producers gain: they sell more at a higher price. The government gains revenue. Foreign producers lose sales. Society as a whole loses the deadweight loss of 48.

A **quota** of 24 units would raise the domestic price to 16 in the same way. But there is no tariff revenue. The extra 4 per unit goes to whoever holds the import licences, often foreign firms. A **production subsidy** of 4 per unit would raise domestic output to 84 while the price stays at 12, so consumers do not lose. But the government pays

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$4 \times 84 = 336$.

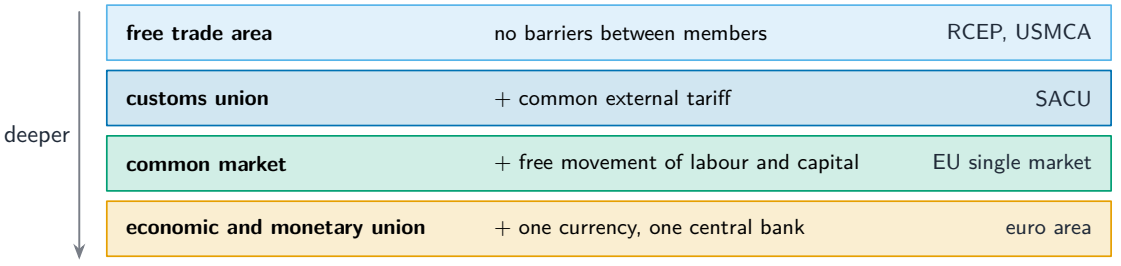
Arguments for and against protection

For protection	Against protection
protect an **infant industry** 幼稚产业 until it can compete	higher prices and less choice for consumers
protect jobs in industries facing cheap imports	other countries may **retaliate** 报复, leading to a trade war
stop **dumping** 倾销 (selling abroad below cost)	protected firms have little reason to become efficient
national security: food, energy, weapons	resources stay in industries without a comparative advantage
raise tax revenue (important in some low-income countries)	higher costs for firms that use imported inputs
diversification 多元化 away from a few exports	it can lead to corruption around licences

Many economists accept some of these arguments in a few cases, such as a real infant industry for a limited time. They reject most others, because the losses to consumers are usually larger than the gains to producers.

Economic integration

Countries can agree to lower barriers with each other. This is **economic integration** 经济一体化.



Each stage adds to the last

- A **bilateral** 双边 agreement is between two countries. A **multilateral** 多边 agreement is among many (such as the WTO's rules).
- A **preferential trade agreement** 优惠贸易协定 lowers barriers on some goods only.

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Trading blocs 贸易集团 go further, in stages:

Stage	What members do	Example
free trade area 自由贸易区	no barriers between members; each keeps its own barriers against others	RCEP (China and 14 Asia-Pacific countries), USMCA
customs union 关税同盟	a free trade area plus a **common external tariff** 共同对外关税	Southern African Customs Union
common market 共同市场	a customs union plus free movement of labour and capital	the EU single market
economic and monetary union 经济与货币联盟	a common market plus one currency and one central bank	the euro area

Integration brings bigger markets, economies of scale, more competition and more investment. But it can also cause **trade diversion** 贸易转移: a member buys from a higher-cost partner inside the bloc instead of a lower-cost country outside it. When integration lets a member buy from a lower-cost partner instead of its own higher-cost producers, that is **trade creation** 贸易创造, which raises efficiency.

A monetary union removes exchange-rate costs and risks, and makes prices easy to compare. But each member loses its own interest rate and exchange rate. In the euro crisis after 2010, countries such as Greece could not devalue or cut interest rates to escape recession.

Exchange rates

■ What sets the exchange rate

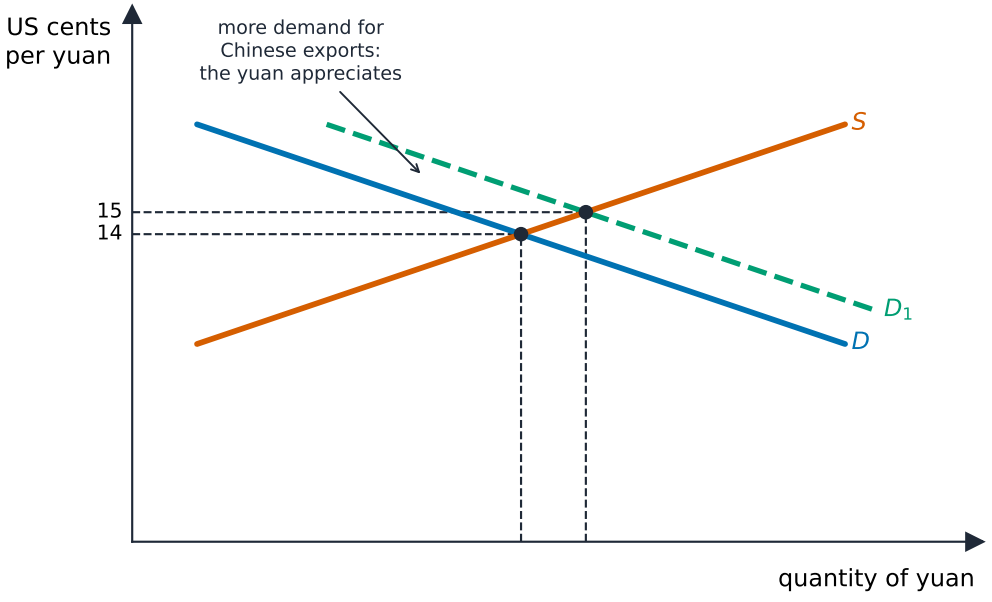
The **exchange rate** 汇率 is the price of one currency in another currency. Under a **floating exchange rate** 浮动汇率, demand and supply in the foreign exchange market set it.

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A currency exchange board: exchange rates are set by the demand for and supply of each currency

- Demand for yuan comes from foreigners buying Chinese exports, tourists visiting China, and foreign investors buying Chinese assets.
- Supply of yuan comes from Chinese people and firms buying imports, travelling abroad, and investing abroad.



More demand for Chinese exports raises the demand for yuan, so the yuan appreciates

A rise in a currency's value is an **appreciation** 升值; a fall is a **depreciation** 贬值.

The exchange rate changes when:

- foreign demand for a country's exports changes;
- interest rates change (higher rates attract **hot money** 热钱, short-term money looking for the best return);
- inflation differs between countries (high inflation makes exports less competitive);
- investors **speculate** 投机 that a currency will rise or fall;
- the central bank buys or sells its own currency.

■ Effects of a change

If the yuan appreciates, Chinese exports become dearer abroad and imports become cheaper in China. Exporters may lose sales, but import prices and inflation fall. A depreciation does the opposite: it helps exporters but raises the price of imported fuel and food.

> **Worked example (HL).** One US dollar buys 7.00 yuan. A Chinese phone is priced at 2,100 yuan. In the US it costs $2{,}100 \div 7.00 = 300$ dollars. If the yuan appreciates to 6.00 per dollar, the same phone costs $2{,}100 \div 6.00 = 350$ dollars.

■ Fixed and managed systems

- Under a **fixed exchange rate** 固定汇率, the government or central bank sets the currency's value against another currency and buys or sells to keep it there. The Hong Kong dollar has been fixed to the US dollar since 1983. A deliberate cut in a fixed rate is a **devaluation** 法定贬值; a deliberate rise is a **revaluation** 法定升值.
- A **managed exchange rate** 有管理的浮动汇率 floats, but the central bank steps in to limit big moves. The People's Bank of China sets a daily central rate and lets the yuan move only within a band around it.

Fixed rates give certainty to traders and investors. But the central bank must hold large **foreign currency reserves** 外汇储备, and it gives up control of its own interest rate. Floating rates adjust by themselves, but they can swing sharply and make planning hard.

The balance of payments

The **balance of payments** 国际收支 records all of a country's money transactions with the rest of the world in one year.

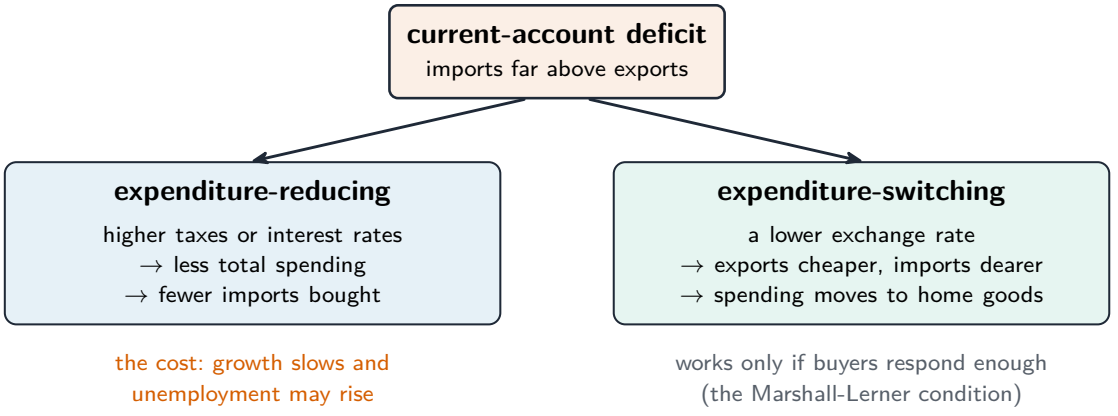
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Account	What it records
current account 经常账户	trade in goods and in services; **primary income** 初次收入 (wages, profits, interest and dividends from abroad); **secondary income** 二次收入 (transfers such as money workers send home, and foreign aid)
capital account 资本账户	small items such as debt forgiveness and the sale of patents or land
financial account 金融账户	**foreign direct investment** 外国直接投资 (FDI), **portfolio investment** 证券投资 (buying shares and bonds), changes in reserve assets

The accounts must add to zero. So a current account deficit is matched by a surplus on the capital and financial accounts: the country pays for extra imports by borrowing or by selling assets to foreigners.

Current account deficits and surpluses

A small deficit can be harmless, for example if it pays for imported machines that raise output later. A large, long-lasting deficit is a problem. The country builds up foreign debt, may need higher interest rates to attract money, and its currency may fall suddenly.



Two routes out of a deficit: spend less overall, or switch spending to home goods

Policies to reduce a deficit:

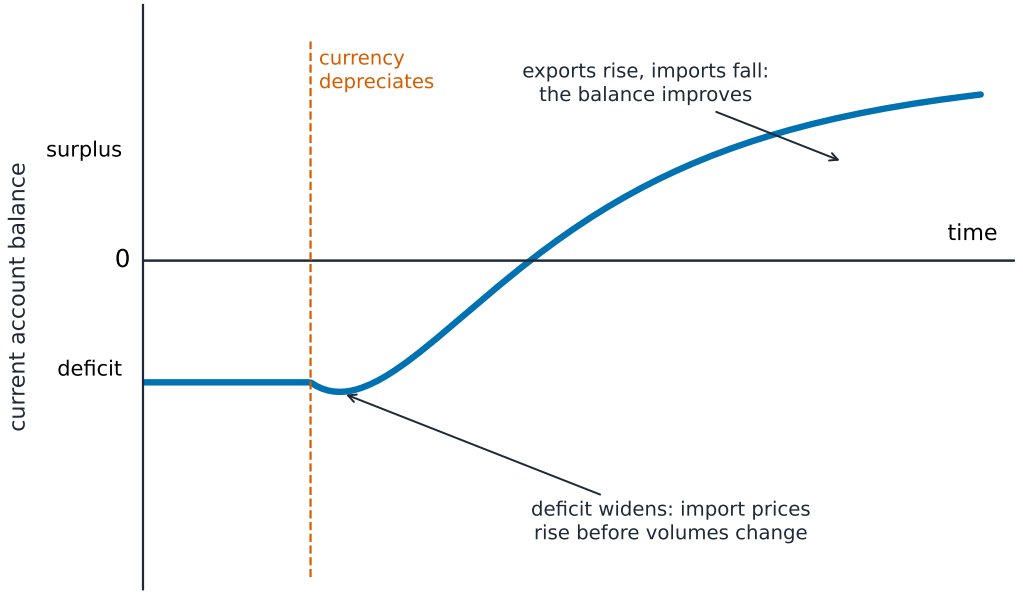
- **Expenditure-switching policies** 支出转换政策 move spending from imports to domestic goods: protection, or a lower exchange rate.
- **Expenditure-reducing policies** 支出削减政策 cut total spending, and so imports: contractionary fiscal or monetary policy. These can cause unemployment.
- **Supply-side policies** make exports more competitive over the long run.

A persistent surplus can also cause problems: a rising currency, less consumption at home, and trade disputes with deficit countries.

■ Marshall–Lerner and the J-curve (HL)

A depreciation makes exports cheaper and imports dearer. It improves the current account only if buyers respond enough. The **Marshall–Lerner condition** 马歇尔-勒纳条件 says this happens when the price elasticity of demand for exports plus the price elasticity of demand for imports is greater than 1.

In the short run, demand is inelastic. Contracts are already signed, and buyers take time to find new suppliers. So right after a depreciation the country pays more for the same imports, and the deficit gets worse. Later, volumes adjust and the balance improves. The path looks like a "J".

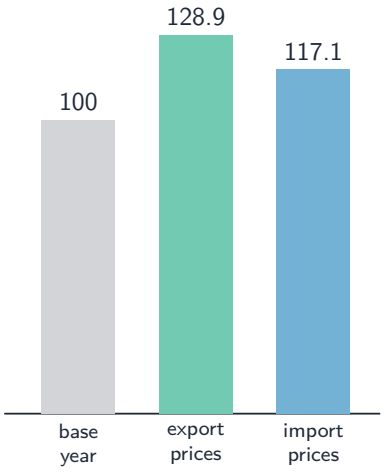


After a depreciation the current account gets worse before it gets better

■ The terms of trade (HL)

The **terms of trade** 贸易条件 compare the prices of a country's exports with the prices of its imports:

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$$\frac{128.9}{117.1} \times 100 \approx 110.1$$

each unit of exports buys about 10% more imports

but dearer exports from domestic inflation may sell less

Terms of trade from two indices

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

Worked example. From the base year, a country's export price index rises to 128.9 and its import price index to 117.1. The terms of trade are $128.9 \div 117.1 \times 100 \approx 110.1$. They have improved by about 10%: each unit of exports now buys about 10% more imports.

Better terms of trade are not always good news. If exports become dearer because of domestic inflation, sales may fall. For many low-income countries that export **primary products** 初级产品 (food, metals, oil), prices swing a lot. Over the long run their terms of trade have often fallen against manufactured goods, so they must export more just to buy the same imports.

Economic development

■ Sustainable development

Economic development 经济发展 is broader than growth. It means better living standards: less poverty, better health and education, more freedom and choice. **Sustainable development** 可持续发展 meets the needs of people today without harming the ability of future generations to meet their own needs. In 2015 the United Nations agreed 17 **Sustainable Development Goals** 可持续发展目标 (SDGs) for 2030, including no poverty, zero hunger, quality education, clean water and climate action. Poverty and environmental damage are linked: very poor people may have no choice but to cut forests or overuse land.

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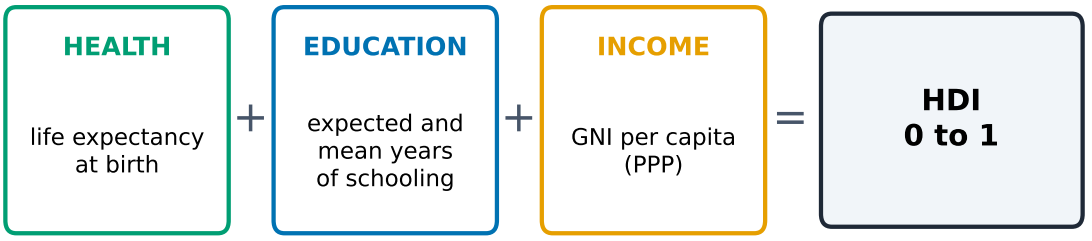


A busy market in a fast-growing economy: growth raises output, development asks whether lives improve

Measuring development

Type	Measures	Limits
single indicators	GDP or GNI per capita at PPP; life expectancy; infant mortality; years of schooling	each shows only one side of development
composite indicators 综合指标	the **Human Development Index** 人类发展指数 (HDI): income (GNI per capita at PPP), health (life expectancy) and education (years of schooling), on a scale from 0 to 1	HDI hides inequality and the environment
adjusted indices	the **Inequality-adjusted HDI** 不平等调整后人类发展指数 (IHDI) and the **Gender Inequality Index** 性别不平等指数 (GII)	data can be old or poor in low-income countries

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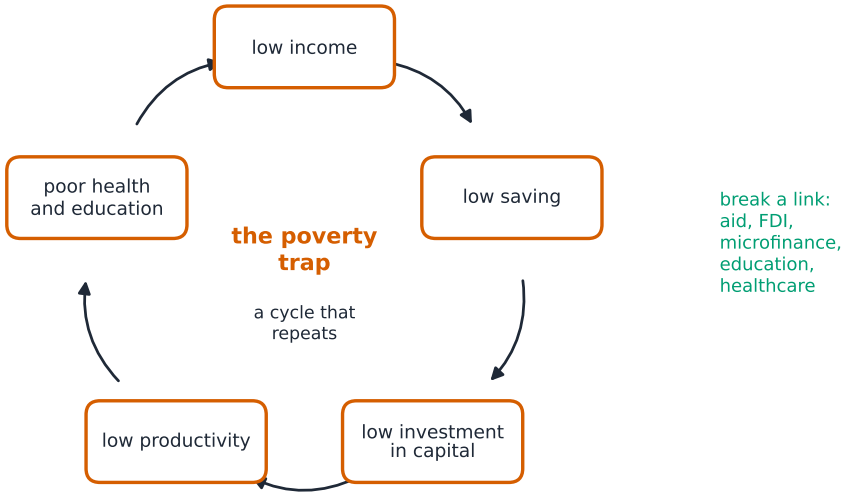


GDP alone misses health and schooling; the GII adds gender inequality

The Human Development Index combines health, education and income

A country whose HDI rank is much higher than its GNI rank turns its income into health and education well. A country whose HDI rank is much lower may have high income from oil but poor public services or great inequality.

Barriers to development



Each link in the poverty trap keeps the next one weak

- The **poverty trap** 贫困陷阱: people with low incomes cannot save, so there is little money for investment, so productivity and incomes stay low.

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- **Economic barriers**: high inequality; poor infrastructure (roads, power, internet); little access to credit and markets; a large informal economy that pays no taxes; **capital flight** 资本外逃 (rich people moving money abroad); and unsustainable foreign debt.
- **Dependence on primary products**: for example, copper makes up most of Zambia's exports, so a fall in the world copper price cuts national income sharply.
- **Geography**: being **landlocked** 内陆的 raises transport costs; tropical disease and climate shocks hurt health and farming.
- **Political and social barriers**: weak institutions, corruption, poor legal and property rights, political instability and conflict, and **gender inequality** 性别不平等 (when girls cannot go to school, half the country's talent is wasted).

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Strategies for development

Strategy	How it helps	Problems
export promotion 出口导向	uses comparative advantage; China, South Korea and Singapore grew this way	depends on world demand; may need cheap labour
import substitution 进口替代	protects new domestic industries (Latin America, 1950s–1980s)	firms stayed inefficient; high prices for consumers
diversification	less risk from one export price	needs skills and investment
foreign direct investment (FDI) by **multinational corporations** 跨国公司	brings capital, jobs, technology and skills	profits leave the country; firms may use low wages or weak environmental rules
foreign aid 对外援助	grants and cheap loans for health, schools and emergencies	can be tied to the donor's goods; corruption; dependency
multilateral help (World Bank, IMF)	long-term loans; help in a crisis	loan conditions may force spending cuts
debt relief 债务减免	frees money for schools and hospitals	may encourage new borrowing
microfinance 小额信贷	small loans to people banks ignore, often women (the Grameen Bank)	high interest rates; loans may pay for consumption, not business
fair trade 公平贸易	guaranteed minimum prices for farmers	reaches only a small share of producers
better institutions, education and health	raise productivity and attract investment	take many years and need good government

Most successful countries have used a mix: market reforms and open trade, together with strong government investment in education, health and infrastructure. Every strategy should be judged by the barrier it removes, and by whether the gains are equal and sustainable.

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Sources for this lesson

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- D. Ricardo, *On the Principles of Political Economy and Taxation* (1817), chapter 7.

Common errors

- Confusing absolute and comparative advantage; trade depends on **lower opportunity cost**, not on being better at everything.
- Shading the wrong areas on a tariff diagram: the deadweight loss is two triangles, one for production and one for consumption.
- Saying a weaker currency always improves the current account; at first the J-curve can make it worse, and the Marshall–Lerner condition must hold.
- Treating the balance of payments as "in deficit overall"; the accounts always sum to zero, but the current account alone can be in deficit.
- Using GDP growth as the only sign of development; development also includes health, education, equality and freedom.
- Listing development strategies without explaining their problems.

Key terms

- **Comparative advantage**: the ability to produce a good at a lower opportunity cost than another country.
- **Tariff**: a tax on imported goods.
- **Trade diversion**: when a trading bloc causes imports to switch from a cheaper outside producer to a more expensive member.
- **Exchange rate**: the price of one currency in terms of another.
- **Current account**: the record of a country's trade in goods and services, primary income and secondary income.
- **Terms of trade**: the average price of a country's exports relative to the average price of its imports, as an index.
- **Human Development Index**: a composite measure of development based on health, education and income.

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Check yourself

1. In one labour hour Country A can make 4 wheat or 2 cloth; Country B can make 1 wheat or 1 cloth. Which country has the comparative advantage in cloth?
2. On the model, a tariff of 4 raises the price from 12 to 16. Find imports before and after, the tariff revenue and the deadweight loss.
3. Give one argument for protection and one argument against it.
4. Explain the difference between trade creation and trade diversion.
5. Why can a depreciation make the current account worse before it makes it better?
6. Why might a country rank much higher on GNI per capita than on HDI?

Answers: 1. Country B: its opportunity cost of 1 cloth is 1 wheat, against 2 wheat for Country A. 2. Imports fall from $116-68=48$ to $108-84=24$; revenue $4\times 24=96$; deadweight loss $\frac{1}{2}\times 16\times 4+\frac{1}{2}\times 8\times 4=32+16=48$. 3. For: protecting an infant industry until it can compete; against: higher prices for consumers and a welfare loss, and the risk of retaliation. 4. Trade creation: joining a bloc lets a country buy from a cheaper member producer instead of its own, more expensive one; trade diversion: it switches imports from a cheaper non-member to a more expensive member. 5. In the short run demand for imports and exports is inelastic, so the country pays more for the same imports before volumes adjust (the J-curve). 6. Its income may be high but unequally shared, or not spent on health and education, so life expectancy and schooling are low.

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