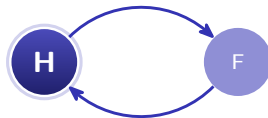


The Macroeconomy

A-Level Economics ■ Topic 4

A-Level Economics



What we will cover

- 1 National income
- 2 The circular flow
- 3 Aggregate demand & supply
- 4 Growth & the business cycle
- 5 Unemployment
- 6 Inflation



output of the whole economy

1

Measuring the economy

What does national output measure?

Macroeconomics 宏观经济学 studies output, jobs and prices across the economy.

Gross domestic product 国内生产总值 (GDP) measures final domestic production during a period.

Explain which production belongs in domestic GDP

Compare bread baked locally, shoes made abroad, and teaching services supplied by a government school. Does every item need a private market sale to count?

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Compare bread baked locally, shoes made abroad, and teaching services supplied by a government school. Does every item need a private market sale to count?

Locally produced bread and government teaching services count. Imported shoes are foreign production. Government services can count even when pupils do not pay a market price. Intermediate inputs must not be counted again alongside final output.

Count the bread once, not every sale

One domestic production chain; £ per batch

A farmer sells grain for £20, a miller sells its flour for £35, and a baker sells the bread to households for £60. No other bought inputs or product taxes. What does this chain add to GDP?

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Producer	Sales	Bought inputs	Value added 增加值
Farmer	20	0	20
Miller	35	20	15
Baker	60	35	25

Value added = output value – intermediate inputs. Total £60, equal to final bread sales. Adding £115 counts the grain and flour again.

GDP and GNI answer different questions

GDP locates production; **gross national income** 国民总收入 (GNI) measures residents' primary income, including net income from abroad.

Illustrative annual accounts; £ billion, same price basis

GDP is 800. Residents receive 50 in primary income from abroad; non-residents receive 70 from domestic production. Calculate GNI.

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GDP is 800. Residents receive 50 in primary income from abroad; non-residents receive 70 from domestic production. Calculate GNI.

$$\text{GNI} = \text{GDP} + \text{income received} - \text{income paid}$$

$$\text{GNI} = 800 + 50 - 70 = 780 \text{ (£ billion/year)}$$

A foreign-owned factory's domestic output counts in GDP. Its income paid to non-residents enters the GNI adjustment. Residency matters, rather than citizenship; export sales are not primary income from abroad.

Gross to net: allow for capital used up

Capital depreciation 资本折旧 is consumption of fixed capital through wear and obsolescence. **Net national income** 国民净收入 (NNI) deducts it from GNI.

Continue the same annual accounts; £ billion

GNI is 780 and consumption of fixed capital is 60. Find NNI. Does this adjustment remove inflation?

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Continue the same annual accounts; £ billion

GNI is 780 and consumption of fixed capital is 60. Find NNI. Does this adjustment remove inflation?

$$\text{NNI} = \text{GNI} - \text{capital depreciation}$$

$$\text{NNI} = 780 - 60 = 720 \text{ (£ billion/year)}$$

No: gross/net is a capital-use adjustment. Nominal/real is a price adjustment. Keep the period and price basis consistent before subtracting.

Market prices to basic prices: use the correct signs

Market prices 市场价格 include taxes on products less subsidies on products. **Basic prices** 基本价格 remove that net tax component.

Separate annual accounts; £ billion

GDP at market prices is 500; taxes on products are 80 and subsidies on products are 20. Find GDP at basic prices, then check by reversing the adjustment.

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GDP at market prices is 500; taxes on products are 80 and subsidies on products are 20. Find GDP at basic prices, then check by reversing the adjustment.

$$\text{GDP}_b = \text{GDP}_m - \text{product taxes} + \text{product subsidies}$$

$$\text{GDP}_b = 500 - 80 + 20 = 440 \text{ (£ billion/year)}$$

$$\text{GDP}_m = \text{GDP}_b + \text{product taxes} - \text{product subsidies}$$

$$\text{GDP}_m = 440 + 80 - 20 = 500 \text{ (£ billion/year)}$$

This step does not subtract personal income tax or capital depreciation.

Remove price changes before measuring output growth

Given a GDP price index with base year = 100

	Year 0	Year 1
Nominal 名义 GDP (£ billion/year)	800	924
GDP price index	100	110

Find Year 1 **real** 实际 GDP at Year 0 prices.

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Find Year 1 **real** 实际 GDP at Year 0 prices.

$$\text{Real GDP} = \frac{\text{nominal GDP}}{\text{GDP price index}} \times 100$$

$$\text{Real GDP}_1 = \frac{924}{110} \times 100 = 840 \text{ (£ billion/year)}$$

Calculate real growth from the comparable output figures

Continue the same two-year series

Real GDP at Year 0 prices rises from £800 billion/year to £840 billion/year. Calculate real growth. Why not simply subtract the price rise from nominal growth?

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$$\text{Real growth} = \frac{\text{real GDP}_1 - \text{real GDP}_0}{\text{real GDP}_0} \times 100\%$$

$$\text{Real growth} = \frac{840 - 800}{800} \times 100\% = 5\%$$

Nominal growth is 15.5% and the price rise is 10%. Subtracting gives 5.5%, an approximation rather than the exact result. The real calculation allows for prices multiplying quantities.

More output need not mean more output per person

Use the same economy, now with population data

Real GDP rises from £800 billion to £840 billion. Population rises from 40 million to 42 million. Does real GDP **per capita** 人均 rise?

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$$\text{Real GDP per capita} = \frac{\text{real GDP}}{\text{population}}$$

$$\text{Year 0 per capita} = \frac{800 \text{ billion } \text{£/year}}{40 \text{ million people}} = \text{£}20,000/\text{person/year}$$

$$\text{Year 1 per capita} = \frac{840 \text{ billion } \text{£/year}}{42 \text{ million people}} = \text{£}20,000/\text{person/year}$$

Real output and population both rise 5%; the average is unchanged. This average still does not tell us who receives the income.

A slower positive growth rate still means higher output

Illustrative real GDP index

Year 0 output is 100. It grows 4% in Year 1 and 2% in Year 2. A report says “growth fell, so output fell”. Test this claim.

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$$Y_t = Y_{t-1}(1 + g_t/100)$$

$$Y_1 = 100(1 + 4/100) = 104$$

$$Y_2 = 104(1 + 2/100) = 106.08$$

Growth falls by 2 percentage points, but output rises in both years. A forecast of slower growth is also not evidence of an observed fall in output.

Equal averages can hide different living conditions

Two illustrative economies, same year and comparable prices

Each has real GDP per person of £20,000. In A, the poorest fifth receives 10% of income; in B, it receives 3%. B also has longer working hours and more air pollution. Can the average alone rank living standards?

Equal averages can hide different living conditions

Two illustrative economies, same year and comparable prices

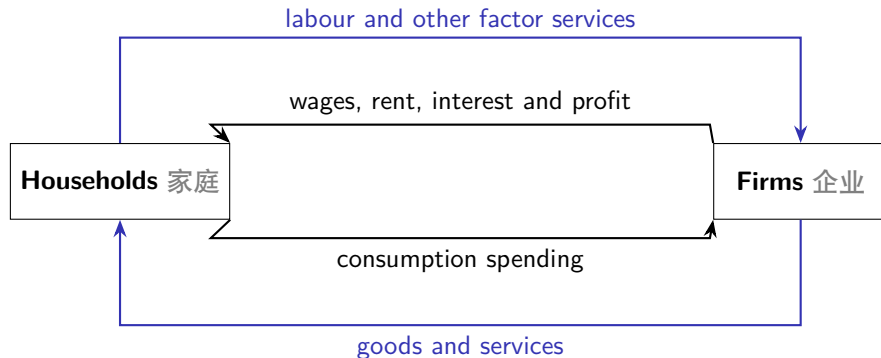
Each has real GDP per person of £20,000. In A, the poorest fifth receives 10% of income; in B, it receives 3%. B also has longer working hours and more air pollution. Can the average alone rank living standards?

National income 国民收入 statistics help measure output and resources for services. They are not a complete **standard of living** 生活水平 measure.

Check **distribution** 分配, leisure, health, environmental damage and access to services. Most unpaid household services are outside GDP; paid versions can count.

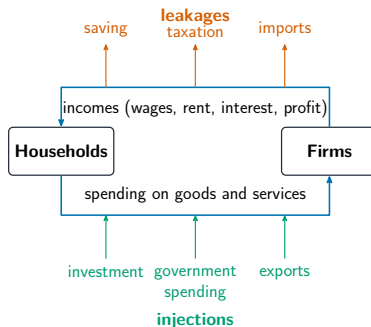
Production in the **informal economy** 非正规经济 is included in principle within the GDP production boundary, but difficult to measure fully. “Untaxed” does not mean “excluded by definition”.

Separate the real flows from the money flows



A worker supplies labour; the firm pays a wage. A household buys bread; the firm supplies bread. In each transaction the real flow and payment go in opposite directions.

Trace where money leaves and enters the domestic flow



The **circular flow of income** 收入循环流 links income and spending. **Leakages** 漏出: **saving** 储蓄 (S), **taxation** 税收 (T), **imports** 进口 (M). **Injectors** 注入: **investment** 投资 (I), **government spending** 政府支出 on output (G), **exports** 出口 (X).

A **closed economy** 封闭经济 has no foreign trade: $X = M = 0$. An **open economy** 开放经济 includes international transactions. Government can exist in either.

Classify the transaction before adding spending

Identify the direct entry in this simple spending model

A firm buys a newly made machine; a saver buys an existing share; the state buys teaching services; the state pays a pension; a household buys imported shoes.
Which enter I , G , C or M ?

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A firm buys a newly made machine; a saver buys an existing share; the state buys teaching services; the state pays a pension; a household buys imported shoes. Which enter I , G , C or M ?

Transaction	Reasoning
New machine	I : spending on newly produced capital.
Existing share	Asset ownership changes; not new capital production.
Teaching services	G : government purchases current services.
Pension	Transfer, not payment for current output; later household spending may enter C .
Imported shoes	Enter C and M ; subtract imports to avoid counting foreign output.

Build a balanced flow from the given amounts

Planned annual flows; £ billion, fixed prices

Income $Y = 300$, saving $S = 35$, taxes $T = 25$, imports $M = 30$; investment $I = 30$, government purchases $G = 40$, exports $X = 20$. No transfer payments. Find consumption and check equilibrium.

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$$C = Y - S - T = 300 - 35 - 25 = 240 \text{ (£ billion/year)}$$

$$J = I + G + X = 30 + 40 + 20 = 90 \text{ (£ billion/year)}$$

$$L = S + T + M = 35 + 25 + 30 = 90 \text{ (£ billion/year)}$$

$$AE = C + I + G + X - M = 240 + 30 + 40 + 20 - 30$$

$$AE = 300 \text{ (£ billion/year)} = Y$$

Planned injections J equal leakages L : **equilibrium** 均衡.

Explain disequilibrium through unplanned inventories

Change one planned flow in the previous model

At current income of £300 billion/year, planned investment rises from 30 to 40; other planned flows initially stay fixed. What happens before firms adjust output?

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Change one planned flow in the previous model

At current income of £300 billion/year, planned investment rises from 30 to 40; other planned flows initially stay fixed. What happens before firms adjust output?

$$AE = C + I + G + X - M = 240 + 40 + 40 + 20 - 30$$

$$AE = 310 \text{ (£ billion/year)}$$

$$\text{Unplanned inventory change} = Y - AE = 300 - 310 = -10 \text{ (£ billion/year)}$$

Sales exceed current output; inventories fall unexpectedly. Firms may increase production and jobs if spare capacity allows. At capacity, extra demand may mainly raise prices. Saving, taxes and imports can change as income changes.

Check the adjustment, then explain its meaning

New annual data; £ billion, same price basis

GDP at market prices is 600; product taxes 90, product subsidies 10; primary income received 30, paid 50; capital depreciation 40. Find GDP at basic prices and NNI at market prices. Explain why they are different adjustments.

Check the adjustment, then explain its meaning

New annual data; £ billion, same price basis

GDP at market prices is 600; product taxes 90, product subsidies 10; primary income received 30, paid 50; capital depreciation 40. Find GDP at basic prices and NNI at market prices. Explain why they are different adjustments.

$$\text{GDP}_b = \text{GDP}_m - \text{product taxes} + \text{product subsidies}$$

$$\text{GDP}_b = 600 - 90 + 10 = 520 \text{ (£ billion/year)}$$

$$\text{NNI}_m = \text{GDP}_m + \text{income received} - \text{income paid} - \text{depreciation}$$

$$\text{NNI}_m = 600 + 30 - 50 - 40 = 540 \text{ (£ billion/year)}$$

Basic prices remove net product taxes; GNI/NNI adjust resident income and capital use. Neither result alone measures real growth.

2

Aggregate demand and supply

Build aggregate demand at a stated price level

Aggregate demand 总需求 (AD) is planned spending on domestic output at each price level. It is a relationship, not just one total.

Illustrative planned spending; £ billion/year

Consumption 消费 $C = 150$, investment $I = 30$, government purchases $G = 40$, exports $X = 25$, imports $M = 35$. Find spending on domestic output. Why subtract imports?

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

$$AD = 150 + 30 + 40 + (25 - 35) = 210 \text{ (£ billion/year)}$$

Net exports 净出口 are -10 : imports can exceed exports. Some consumption, capital and government purchases are imports; subtracting M removes foreign production.

A movement along AD is different from a shift

Hold other influences constant

Case A: the domestic price level falls. Case B: households become more confident about future income. Which changes spending along the same AD curve, and which changes spending at a given price level?

A movement along AD is different from a shift

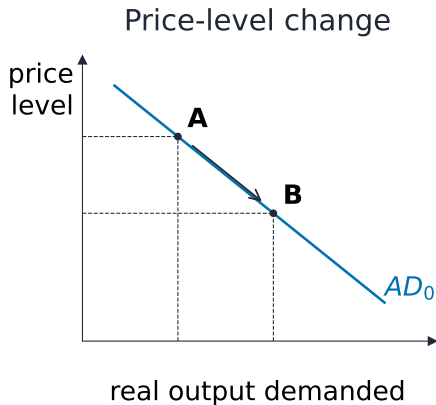
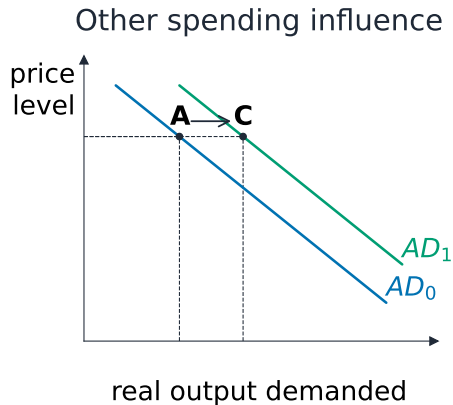
Hold other influences constant

Case A: the domestic price level falls. Case B: households become more confident about future income. Which changes spending along the same AD curve, and which changes spending at a given price level?

A lower price level can raise the purchasing power of money balances and make domestic goods cheaper relative to foreign goods. Real output demanded rises along AD.

Greater confidence can raise consumption at each price level: AD shifts right. The direction of the output change can be the same, but the cause and the diagram are different.

Compare movement and shift on the graph



A to B follows AD_0 after a price change; A to C shifts to AD_1 at the same price level.

Explain two components through their spending decisions

Identify a mechanism, not just a direction

A household receives a tax cut. A firm expects higher future sales. Explain how these could raise AD, then give one condition that could weaken each response.

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A tax cut raises disposable income; households may buy more goods and services, raising C . They may instead save or repay debt, and some new spending may be on imports.

Higher expected sales may encourage new machinery purchases, raising I . Spare existing capacity, expensive credit or uncertainty can weaken the investment response.

Separate a price response from a supply-cost change

Aggregate supply 总供给 (AS) links the price level to real output supplied. **Short-run aggregate supply** 短期总供给 (SRAS) slopes upward when some input costs adjust slowly.

Compare two changes

A: output prices rise while wage rates and input prices initially stay fixed. B: imported fuel becomes more expensive at every output price. What happens to SRAS?

Separate a price response from a supply-cost change

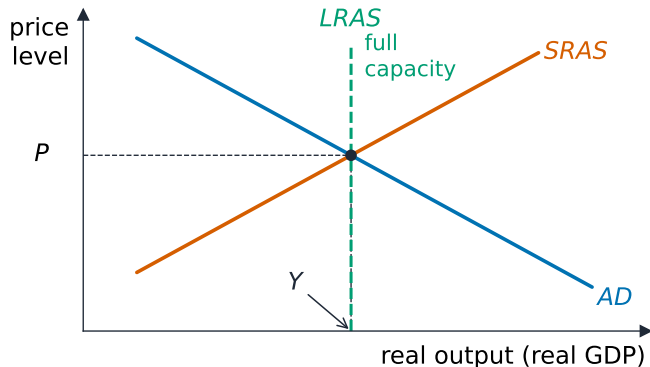
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A raises the incentive to produce: movement up the same SRAS. B raises production costs: less output is profitable at each price level, so SRAS shifts left/up. Higher productivity can shift SRAS right by reducing unit costs.

Locate current equilibrium and the capacity limit



The intersection determines the **price level** 价格水平 and **real output** 实际产出. Here current equilibrium happens to be at full capacity; an AD/SRAS intersection need not always lie on LRAS.

Read an AD increase through both axes

Separate short-run model with spare capacity

Begin at the intersection of AD_0 and SRAS. An increase in planned spending shifts demand to AD_1 . Predict the directions of the price level and real output before reading the labelled equilibria.

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Begin at the intersection of AD_0 and SRAS. An increase in planned spending shifts demand to AD_1 . Predict the directions of the price level and real output before reading the labelled equilibria.

With upward-sloping SRAS, both the price level and real output rise. Firms may need more workers to make extra output; the employment response also depends on productivity and hours.

The size of the changes depends on spare capacity and the slope of supply. The same increase in AD does not always create the same inflation pressure.

Higher costs can raise prices while reducing output

Return to the original AD curve

Fuel costs rise and SRAS shifts left. Compare the new intersection with the original one. Is this the same output effect as an AD increase?

Higher costs can raise prices while reducing output

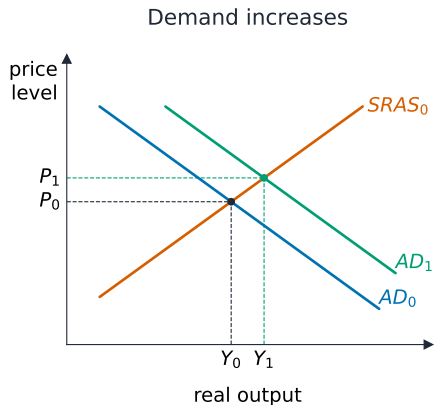
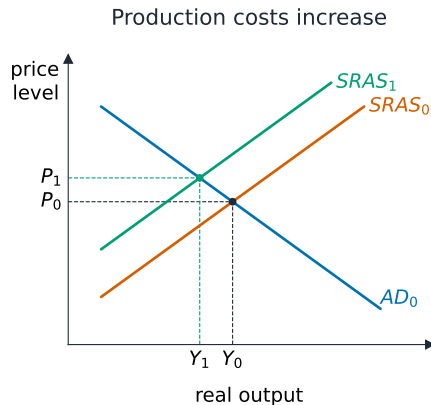
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The price level rises while real output falls. Employment may fall as firms reduce production. This is a cost-push pressure rather than extra demand for output.

One upward shift shows a higher price level relative to the original period. Persistent inflation requires prices to keep rising over time; one shock does not prove that the same inflation rate continues forever.

Compare the two changes from the same starting point



With upward SRAS: demand raises P , Y ; higher costs raise P but lower Y .

Long-run supply depends on productive capacity

Long-run aggregate supply 长期总供给 (LRAS) describes supply after adjustment.

Productive capacity 生产能力 depends on available resources, skills, technology and **productivity** 生产率.

Distinguish capacity from current spending

A new power network reduces repeated factory outages. Separately, households spend more this month. Which can increase capacity, and does extra capacity guarantee extra current output?

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Reliable electricity can raise sustainable production and shift LRAS right. Extra consumption initially shifts AD. Added capacity does not guarantee that demand is high enough to use it. Some spending, such as new infrastructure, can affect both demand now and capacity later.

An AD increase need not always raise the price level

Compare the two syllabus LRAS representations

A vertical LRAS marks a capacity limit. A three-section supply curve shows a flat spare-capacity section, an upward section, and a vertical capacity section. Compare an AD increase in the flat and vertical sections.

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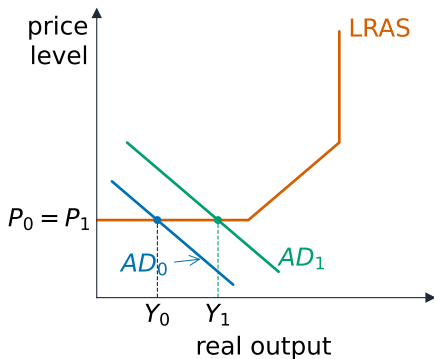
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In the flat section, output can rise at the same price level. In the vertical section, demand raises the price level without raising real output. In between, both can rise.

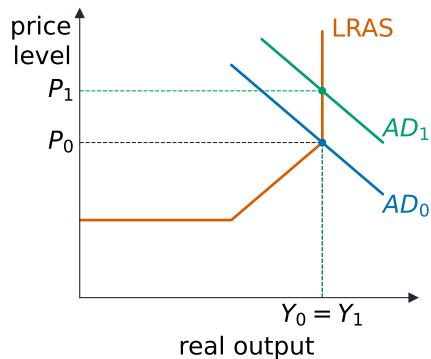
Macroeconomic equilibrium 宏观经济均衡 is the intersection being analysed; identify the supply representation, capacity position and time period before predicting outcomes.

Compare spare capacity with the capacity limit

Spare capacity: flat section



At capacity: vertical section



Flat LRAS: Y rises, P unchanged. Vertical LRAS: P rises, Y unchanged.

3

Growth and the cycle

Distinguish actual output from productive capacity

Economic growth 经济增长 is an increase in real output over time. **Actual growth** 实际增长 is the observed increase; **potential growth** 潜在增长 expands what the economy can sustainably produce.

Apply the distinction to two changes

Idle factories restart and produce more with the existing workforce and machines. Separately, better machinery raises possible production, but firms have not yet received more orders. Which change shows actual growth? Which shows potential growth?

Distinguish actual output from productive capacity

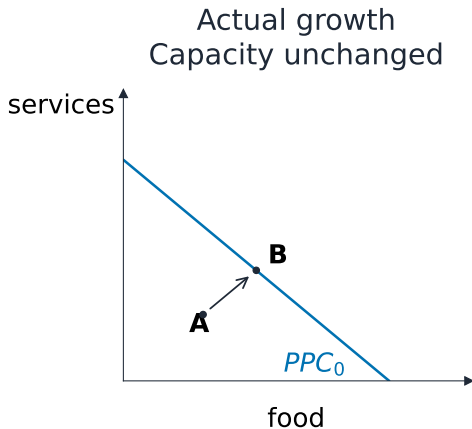
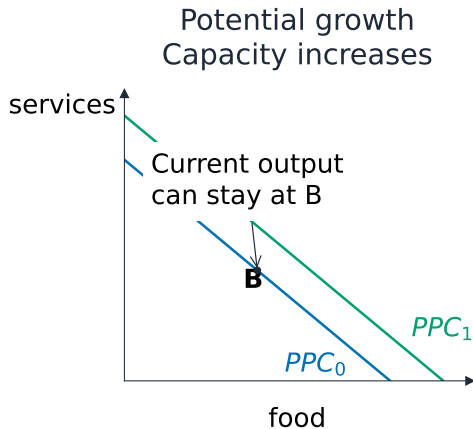
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Restarting raises actual output by using spare capacity. Better machinery can expand capacity and shift LRAS right. Capacity can grow before actual output does; actual output can rise without capacity expanding.

Use the PPC to separate the two kinds of growth



Production possibility curve 生产可能性曲线 (PPC): feasible output combinations.
A to B uses capacity; expanding the PPC does not itself raise current output.

Explain how a growth cause changes production

Compare resources and productivity

One economy gains more working-age residents. Another trains existing workers to reduce defects. Explain how each could increase productive capacity, and why neither guarantees higher real output per person.

Explain how a growth cause changes production

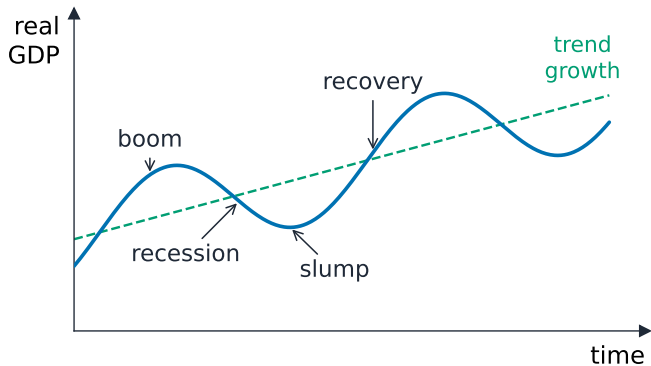
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More available workers can increase labour input; training can raise useful output per worker. Capacity also depends on suitable capital, energy and jobs that use these skills.

Output must rise faster than population for real output per person to rise. Check whether new capacity is used and how its gains are distributed.

Read the business cycle as changing real output



The **business cycle** 经济周期 includes **boom** 繁荣, **recession** 衰退, **slump** 萧条 and **recovery** 复苏. Read the slope to judge whether output is rising or falling; being below the trend does not itself mean output is falling.

Check a downturn from the output data

Separate illustrative annual real-output index

Output is 104 in Year 1, 102 in Year 2 and 103 in Year 3. Calculate the changes. Does recovery in Year 3 mean output has already regained its Year 1 level?

Check a downturn from the output data

Separate illustrative annual real-output index

Output is 104 in Year 1, 102 in Year 2 and 103 in Year 3. Calculate the changes. Does recovery in Year 3 mean output has already regained its Year 1 level?

$$g_t = \frac{Y_t - Y_{t-1}}{Y_{t-1}} \times 100\%$$

$$g_2 = \frac{102 - 104}{104} \times 100\% \approx -1.92\%$$

$$g_3 = \frac{103 - 102}{102} \times 100\% \approx 0.98\%$$

Output falls, then rises; 103 remains below 104. Annual data alone cannot establish a particular quarterly recession rule.

Judge growth through who gains and what it costs

Compare two illustrative growth paths

A raises output by using idle low-pollution factories. B raises output through longer working hours and more polluting production. Both report higher real GDP. Give a benefit, a cost and evidence needed before judging living standards.

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Higher output can support incomes, jobs and tax-funded services. Check employment and real income per person, rather than assuming gains reach everyone.

B may lose leisure and face health or environmental costs. Check distribution, resource depletion and sustainability. Growth that expands supply differs from extra demand pressing against existing capacity; inflation is a possible consequence, not an automatic one.

4

Unemployment

Who belongs in the labour force?

Unemployment 失业 means having no job while available for work and actively seeking it. The **labour force** 劳动力 is employed people plus unemployed people, not the whole population.

Illustrative population: classify before calculating

Of 750 working-age people, 540 have jobs, 60 have no job but are available and seeking work, and 150 are neither working nor seeking work. There are also 250 children. Which groups belong in the denominator?

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The labour force is $540 + 60 = 600$ people. The 150 inactive people and 250 children are outside it. Students and retired people are not automatically unemployed: classify them by their actual work and search status.

Calculate the unemployment rate

Use the same population

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$$\text{unemployment rate} = \frac{U}{E + U} \times 100\%$$

$$\text{unemployment rate} = \frac{60 \text{ people}}{540 \text{ people} + 60 \text{ people}} \times 100\% = 10\%$$

The rate describes unemployment within the labour force. The alternative $60/1000 = 6\%$ describes a share of the total population, including children and inactive people.

A falling rate does not prove more jobs

Change only search status

Initially $E = 540$, $U = 60$. Forty unemployed people become discouraged and stop seeking work. Nobody gains or loses a job. Find the new rate. Has employment risen?

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The 40 move outside the labour force: $U = 20$ and $E + U = 560$.

$$\text{unemployment rate} = \frac{U}{E + U} \times 100\%$$

$$\text{unemployment rate} = \frac{20}{540 + 20} \times 100\% \approx 3.57\%$$

Employment stays at 540. Read employment, participation and search status alongside the headline unemployment rate.

Two measures answer different questions

Measure	What is counted?	What can mislead?
Claimant count 申领救济人数	People claiming specified unemployment benefits; administrative records.	Non-claimants and ineligible jobseekers are missed. Changed benefit rules can change the count without changed jobs.
Labour force survey 劳动力调查	A sample classified by work, availability and active search under a common definition.	Sampling error, inaccurate replies and differences in implementation affect estimates. Discouraged non-searchers are outside measured unemployment.

A common survey definition helps comparisons, but does not make estimates exact. Someone working fewer hours than they want can still be classified as employed.

Explain the cause, then name the type

Illustrative situation	Cause and classification
A worker searches between jobs.	Frictional unemployment 摩擦性失业: matching a worker to a vacancy takes time.
A declining industry closes locally.	Structural unemployment 结构性失业: available workers do not match new jobs by skill or location.
Orders fall across the economy.	Cyclical unemployment 周期性失业: weak AD reduces firms' sales and demand for labour.

Search may be brief; mismatch may persist. Neither duration nor which type is largest is fixed by the label alone.

Seasonal and technological unemployment

Distinguish two further causes

A resort lays off staff each winter. A factory automates packing and dismisses packers whose skills do not match its new technician vacancies. Explain the cause in each case.

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Seasonal unemployment 季节性失业: predictable changes in seasonal demand remove resort jobs in winter.

Technological unemployment 技术性失业: machines replace particular labour tasks. It can overlap with structural unemployment when workers need different skills to fill the new jobs.

Automation can also create jobs and lower costs elsewhere. Displaced workers do not necessarily gain those jobs immediately; overlapping causes must not be counted twice.

Trace unemployment's costs through the economy

Affected group	Causal explanation	What changes the harm?
Workers and families	Lost earnings reduce spending; prolonged joblessness can harm skills and health.	Savings, benefits, duration and chances of another job.
Firms and economy	Unused willing labour means forgone production; lower household spending can weaken sales further.	Scale of idle resources and whether vacancies match workers.
Government	Lower taxable earnings reduce receipts; eligible benefit claims raise spending.	Tax and benefit rules, number affected and duration.

Production can lie inside the PPC when usable resources are idle. This is a mechanism, not proof that every jobseeker could immediately produce every good.

Which unemployment is more damaging?

Compare two illustrative cases, not just definitions

A: 2000 workers lose jobs after a local industry closes; nearby vacancies need different skills. B: 20000 workers lose jobs across industries during a demand downturn. Is structural unemployment necessarily worse?

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A: 2000 workers lose jobs after a local industry closes; nearby vacancies need different skills. B: 20000 workers lose jobs across industries during a demand downturn. Is structural unemployment necessarily worse?

A may cause persistent regional harm if retraining and moving are difficult. B affects ten times as many workers and may cause a larger immediate loss of income and output.

Compare numbers, duration, concentration and routes back to work. Without duration and income-loss data, a definite ranking is unjustified. Stronger AD helps weak sales; training helps a mismatch, but neither guarantees a suitable job. Full policy analysis follows in Unit 5.

5

Price stability

Read price levels and inflation separately

Annual CPI: 100, 104, then 107

Are prices falling in the final year? Calculate each annual inflation rate before classifying the change.

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$$\pi_t = \frac{\text{CPI}_t - \text{CPI}_{t-1}}{\text{CPI}_{t-1}} \times 100\%$$

$$\pi_1 = \frac{104 - 100}{100} \times 100\% = 4\%$$

$$\pi_2 = \frac{107 - 104}{104} \times 100\% \approx 2.88\%$$

Disinflation 反通货膨胀: prices rise more slowly. **Inflation** 通货膨胀 is a sustained rise in the general price level; **deflation** 通货紧缩 is a sustained fall.

Build a weighted consumer price index

Consumer price index 消费者价格指数 (CPI) tracks prices of a household consumption basket. A **weight** 权重 reflects the share of spending, not the number of products.

Illustrative two-category basket; common base year = 100

Food weight 0.60, price index 120. Transport weight 0.40, price index 110. Find the CPI. Why is the simple average of the indices unsuitable?

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Food weight 0.60, price index 120. Transport weight 0.40, price index 110. Find the CPI. Why is the simple average of the indices unsuitable?

$$\text{CPI} = \sum_i w_i P_i$$

$$\text{CPI} = (0.60 \times 120) + (0.40 \times 110) = 116$$

The weights sum to 1. The simple average 115 would give equal weight to unequal spending shares. These category indices already compare prices with the same base.

An index-point change is not a percentage rate

Keep the same basket weights

Next year food's index is 126 and transport's is 121. Last year's CPI was 116. Calculate the new CPI and the annual inflation rate.

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$$\text{CPI}_t = \sum_i w_i P_{i,t}$$

$$\text{CPI}_t = (0.60 \times 126) + (0.40 \times 121) = 124$$

$$\pi_t = \frac{\text{CPI}_t - \text{CPI}_{t-1}}{\text{CPI}_{t-1}} \times 100\%$$

$$\pi_t = \frac{124 - 116}{116} \times 100\% \approx 6.90\%$$

The index rose 8 points; the price level rose about 6.90%, not 8%.

Whose price changes does the CPI represent?

Different households, same category price indices

Food index 120, transport 110. The official basket gives food weight 0.60; household H gives food weight 0.80. Both baskets use base-year prices = 100. Compare their cost indices.

Whose price changes does the CPI represent?

Different households, same category price indices

Food index 120, transport 110. The official basket gives food weight 0.60; household H gives food weight 0.80. Both baskets use base-year prices = 100. Compare their cost indices.

$$P_H = w_f P_f + w_t P_t$$

$$P_H = (0.80 \times 120) + (0.20 \times 110) = 118$$

H's basket costs 18% more than in the base year, against 16% for the official basket: an average need not describe every household.

Limits: basket updates lag changed spending, and quality changes and new products are hard to price like for like.

Convert money pay into real purchasing power

Purchasing power 购买力 is what money can buy. Compare nominal pay with the price index, not with the price of just one item.

Weekly pay: £500 to £520; CPI: 100 to 104

Calculate final real weekly pay in base-year pounds. Does the pay rise buy more of this basket?

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$$\begin{aligned}\text{real pay} &= \frac{\text{nominal pay}}{\text{CPI}} \times 100 \\ \text{real pay}_1 &= \frac{\text{£520/week}}{104} \times 100 = \text{£500/week}\end{aligned}$$

Initial real pay was also £500/week. Basket purchasing power is unchanged. Living standards also depend on hours, other income, household needs and public services.

Use the exact real change when rates differ

Independent practice

Nominal weekly pay rises from £500 to £550. CPI rises from 100 to 105. Calculate the percentage change in real weekly pay. Is $10\% - 5\% = 5\%$ exact?

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Nominal weekly pay rises from £500 to £550. CPI rises from 100 to 105. Calculate the percentage change in real weekly pay. Is $10\% - 5\% = 5\%$ exact?

$$W_1^R = \frac{W_1^N}{\text{CPI}_1} \times 100$$

$$W_1^R = \frac{\text{£}550/\text{week}}{105} \times 100 \approx \text{£}523.81/\text{week}$$

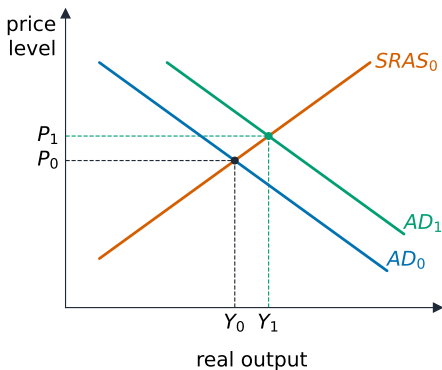
$$g_R = \frac{W_1^R - W_0^R}{W_0^R} \times 100\%$$

$$g_R = \frac{523.81 - 500}{500} \times 100\% \approx 4.76\%$$

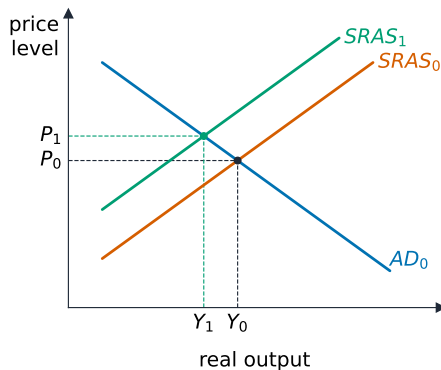
Subtracting percentage rates is an approximation, not the exact real increase.

Explain inflation through demand and costs

Demand increases



Production costs increase



Demand-pull inflation 需求拉动型通货膨胀: AD shifts right.

Cost-push inflation 成本推动型通货膨胀: higher costs shift SRAS left.

A one-off price rise is not continuing inflation

Explain the conditions behind the prediction

Fuel costs rise once, then stay unchanged. Separately, investment spending rises while factories have spare capacity. Must either case produce continuing inflation?

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Explain the conditions behind the prediction

Fuel costs rise once, then stay unchanged. Separately, investment spending rises while factories have spare capacity. Must either case produce continuing inflation?

The fuel shock can shift SRAS left and raise the price level. A one-off increase does not by itself establish repeated annual price rises; continuing inflation needs continuing pressure or further adjustments.

Extra investment raises AD, but spare capacity can allow output to rise with limited price pressure. Later it may also expand productive capacity. State the time period and AS conditions; do not infer inflation merely from higher spending.

Debt and savings: state the contract conditions

Fixed nominal debt; illustrative price index

Debt remains £1000 while the price index rises from 100 to 120. Find its real value in base-year pounds. Does this prove every borrower gains and every saver loses?

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$$D^R = \frac{D^N}{P} \times 100$$

$$D^R = \frac{£1000}{120} \times 100 \approx £833.33$$

The real value falls by about £167. Unexpected inflation favours a fixed-rate borrower over the lender, but indexed debt or higher interest can offset this. Savers lose only if their interest is below inflation.

Higher selling prices do not guarantee higher profit

Illustrative firm; no other costs

Initially price £10/unit, unit cost £8 and sales 100 units. Later price £12, unit cost £11 and sales 80 units. Compare profit. What else must an inflation argument consider?

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Illustrative firm; no other costs

Initially price £10/unit, unit cost £8 and sales 100 units. Later price £12, unit cost £11 and sales 80 units. Compare profit. What else must an inflation argument consider?

$$\text{profit} = (p - c)Q$$

$$\text{profit}_0 = (£10 - £8)/\text{unit} \times 100 \text{ units} = £200$$

$$\text{profit}_1 = (£12 - £11)/\text{unit} \times 80 \text{ units} = £80$$

Price rose, but the margin and sales fell. Demand-led inflation may support sales; cost-push inflation may squeeze margins. Export competitiveness also depends on foreign prices and exchange rates.

High inflation: compare consumers and firms

Build an assessment, not a list of effects

High, unpredictable inflation persists. A fixed-income household buys essentials; a firm uses imported inputs and cannot quickly change its selling prices. Explain each loss, then identify evidence needed to decide who is harmed more.

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Build an assessment, not a list of effects

High, unpredictable inflation persists. A fixed-income household buys essentials; a firm uses imported inputs and cannot quickly change its selling prices. Explain each loss, then identify evidence needed to decide who is harmed more.

The household loses real purchasing power if income fails to keep pace; its spending mix and savings matter. The firm's costs can outrun revenue, reducing margins and threatening jobs.

Frequent repricing costs time and money; uncertain costs and demand can discourage investment and make price signals harder to interpret. Compare income adjustment, debt terms, market power, input exposure and duration. Neither group is always harmed more; justify the conclusion using the case.

Deflation: identify why prices are falling

Two illustrative explanations

A: economy-wide spending collapses. B: productivity improves and production costs fall. Both lower the general price level. Must output and employment fall in both?

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In A, lower AD can reduce prices and output together. Expected further price falls may delay some purchases, especially durable goods, weakening demand further. Fixed nominal debts become more burdensome in real terms.

In B, increased supply can lower prices while raising output. Falling prices do not automatically prove a demand collapse. The cause, expectations and debt exposure determine the risks.

6

Recap

Unit 4 retrieval: diagnose the economy

Attempt before revealing the checks

An economy reports nominal GDP up 8%, its GDP price index up 10%, and a lower unemployment rate with employment unchanged. Explain why these headlines do not establish improving real output or more jobs.

Factories have spare capacity. Explain why higher investment need not cause a large immediate price rise. Name one leakage and explain how it differs from an injection.

Unit 4 retrieval: diagnose the economy

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Real-output factor = $1.08/1.10 \approx 0.982$: real GDP falls about 1.8%. The unemployment rate can fall as jobseekers leave the labour force.

Spare capacity lets output rise with little price pressure. Leakages (saving, tax, imports) leave the income flow; injections (investment, government spending, exports) enter it.

Check yourself

Attempt, calculate, then evaluate

CPI rises 125 to 130 while weekly pay rises £600 to £612. Calculate inflation and judge real pay. Automation displaces packers while technician vacancies remain: explain the unemployment type. State what would help compare this harm with a demand downturn.

Check yourself

Attempt, calculate, then evaluate

CPI rises 125 to 130 while weekly pay rises £600 to £612. Calculate inflation and judge real pay. Automation displaces packers while technician vacancies remain: explain the unemployment type. State what would help compare this harm with a demand downturn.

$$\pi = \frac{130 - 125}{125} \times 100\% = 4\%$$

$$g_R = \left(\frac{612/600}{130/125} - 1 \right) \times 100\% \approx -1.92\%$$

Money pay rises 2%, but real pay falls. Technological displacement overlaps with structural skill mismatch. Compare numbers, duration, lost income and access to