

Course Companion

AP Macroeconomics

Every topic handout in one volume

exercises.lol

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Basic Economic Concepts

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Scarcity

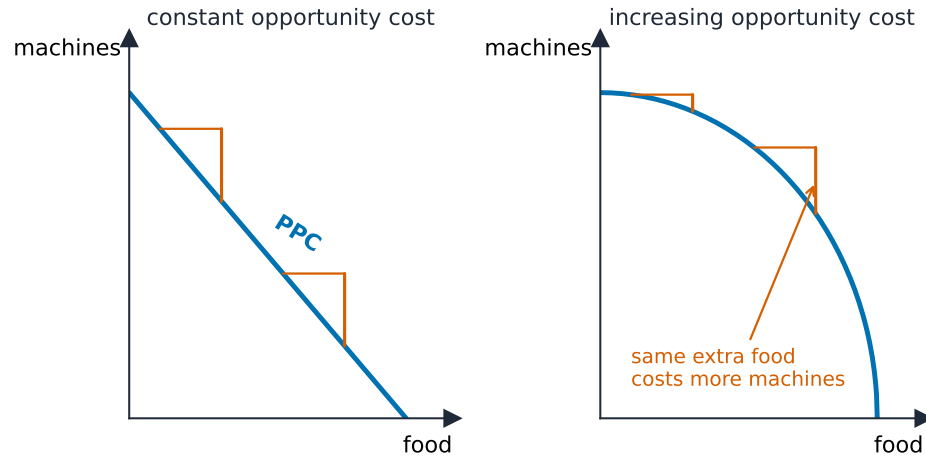


An open-pit mine: land and minerals are scarce resources with opportunity cost

Economics begins with **scarcity** : people's wants are unlimited, but the **resources** to satisfy them are limited. The resources – the **factors of production** – are **land, labor** , **capital** , and **entrepreneurship** . Scarcity forces every society to choose **what, how, and for whom** to produce, and it makes **trade-offs** unavoidable.

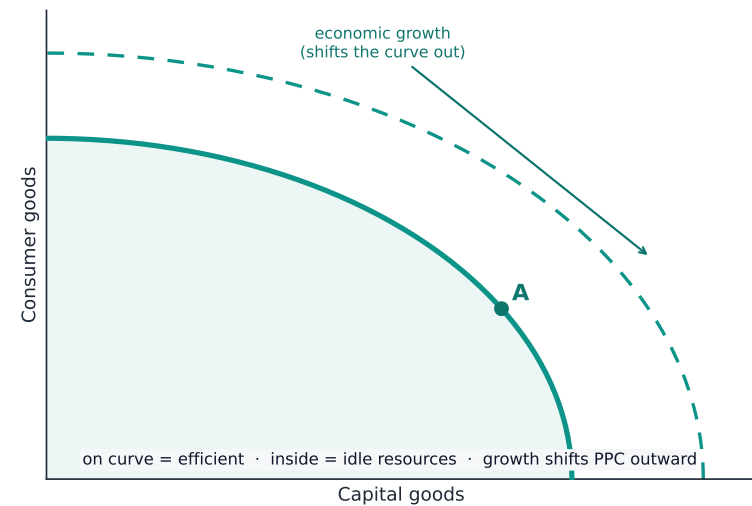
Opportunity Cost and the Production Possibilities Curve (PPC)

Every choice has an **opportunity cost** – the value of the next-best alternative given up. The **production possibilities curve (PPC)** shows the maximum combinations of two goods an economy can make when resources are fully and efficiently used.



A straight PPC means constant opportunity cost; a bowed one means increasing cost

- Points **on** the curve are efficient; **inside**, inefficient (unemployed resources); **outside**, unattainable.
- The downward slope shows opportunity cost; a **bowed-out** curve shows **increasing opportunity cost**.
- More resources or better technology cause **economic growth**, shifting the PPC **outward**.

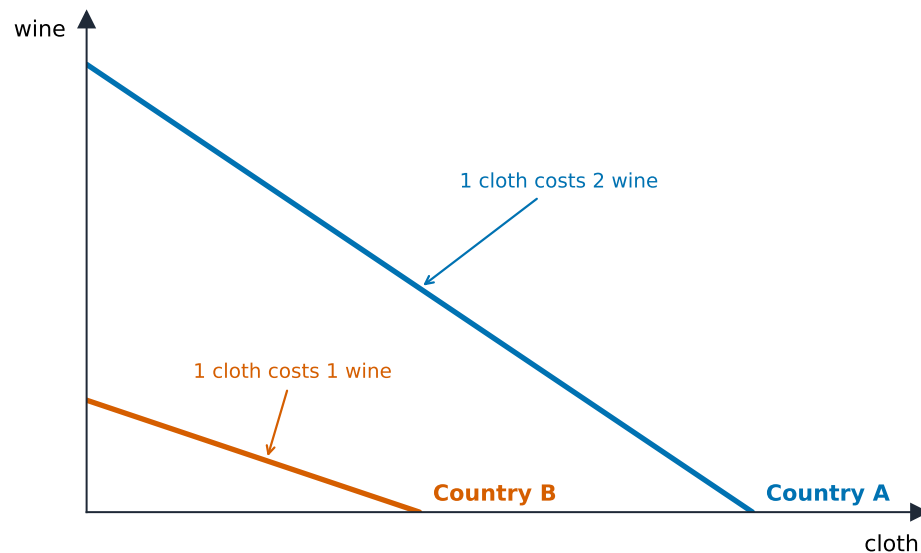


A production possibilities curve; investing in capital goods shifts it outward

Comparative Advantage and Gains from Trade

A producer has an **absolute advantage** in a good if it can make more of it. It has a **comparative advantage** if it has the **lower opportunity cost**. Nations should specialize in their comparative-advantage goods and trade – both gain if the **terms of trade** lie between the two opportunity costs. Trade lets a country consume beyond its own PPC.

Worked example. Country A can make 10 wheat **or** 5 cloth per day; Country B can make 8 wheat **or** 8 cloth. For A, one cloth costs $\frac{10}{5} = 2$ wheat; for B it costs $\frac{8}{8} = 1$ wheat. B's opportunity cost of cloth is lower, so **B specializes in cloth**. Checking wheat: A gives up 0.5 cloth per wheat and B gives up 1, so **A specializes in wheat**. Trading at any rate between the two costs, both consume beyond their own PPC.



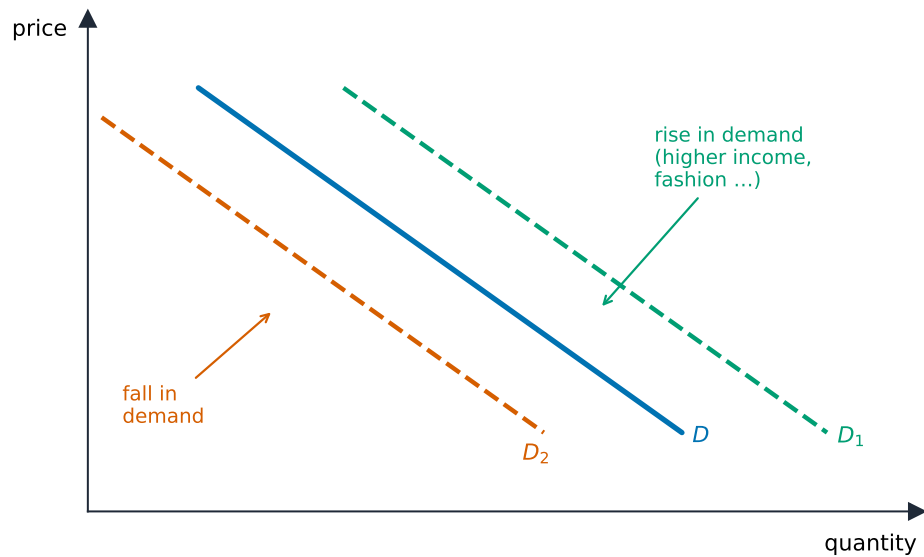
Comparative advantage comes from differently-sloped production possibilities curves



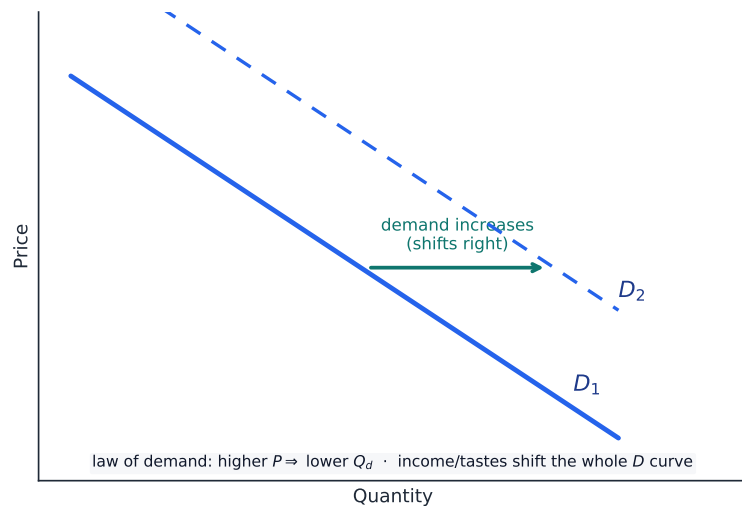
Container shipping: comparative advantage and trade let countries specialise and gain

Demand

Demand relates price to the quantity buyers will buy. The **law of demand** makes the curve slope **downward**. A change in the good's **own price** is a movement along the curve; the **determinants** (income, tastes, prices of **substitutes** and **complements**, number of buyers, expectations) **shift** the whole curve.



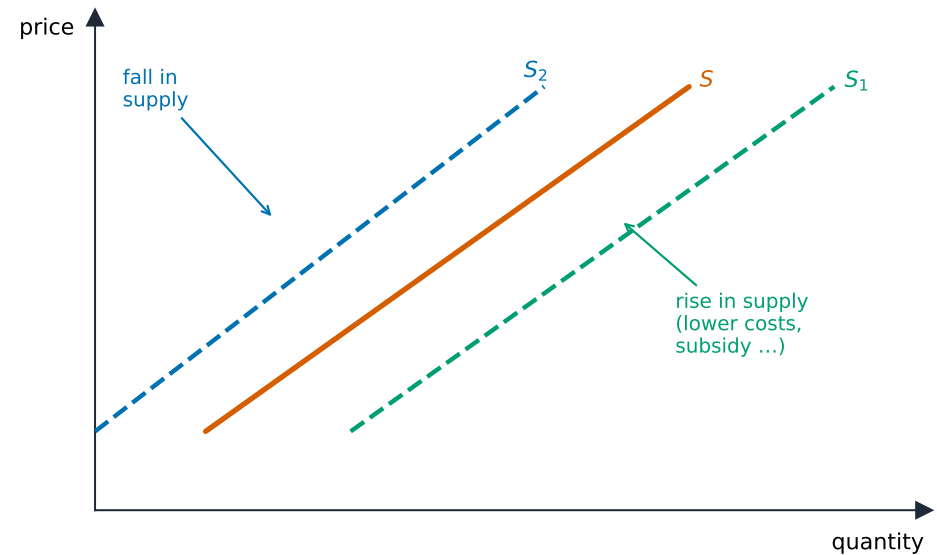
The demand curve slopes down; income, tastes, and related prices shift it



The law of demand slopes the curve downward; a determinant shifts the whole curve

Supply

Supply relates price to the quantity sellers will offer; the **law of supply** makes it slope **upward**. Its determinants – input prices, technology, taxes and **subsidies**, number of sellers, expectations – shift the curve, while the good's own price moves along it.



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

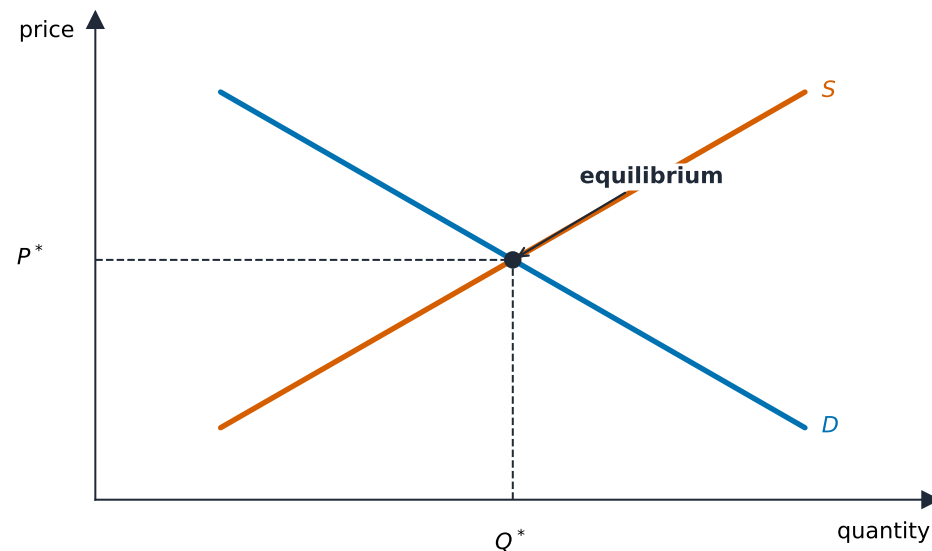
Market Equilibrium, Disequilibrium, and Changes in Equilibrium



A busy market: demand and supply meet where buyers and sellers agree a price

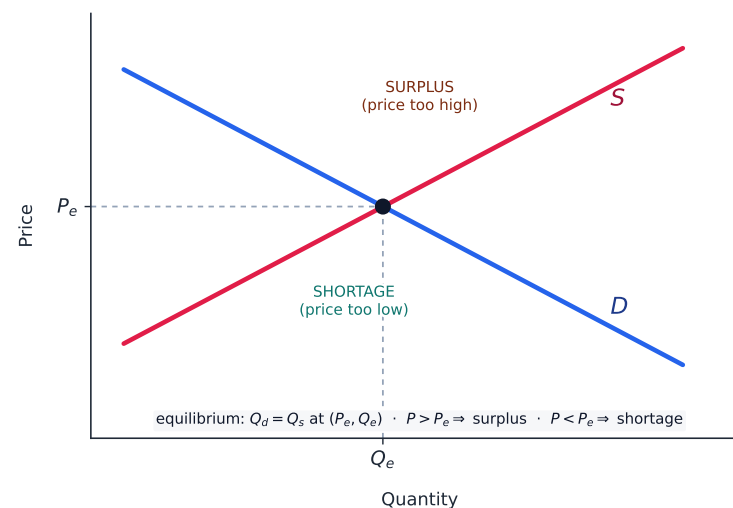
Equilibrium is where supply meets demand, clearing the market. Above the equilibrium price a **surplus** pushes price down; below it a **shortage** pushes price up. When a determinant shifts one curve, price and quantity move predictably; when both shift, one of them is **indeterminate**.

Worked example. A new technology lowers producers' costs, shifting **supply right**. Along the unchanged demand curve, the equilibrium **price falls** and the equilibrium **quantity rises**. If instead a rise in incomes shifts **demand right** at the same time, quantity clearly rises but the effect on price depends on which shift is larger – the “both shift” indeterminate case.



Equilibrium price and quantity where demand meets supply

Exam skill: macro builds on these micro tools – you must draw and shift supply-and-demand and PPC graphs correctly, because the same shift logic drives the aggregate (whole-economy) models later in the course.



Market equilibrium sits where supply meets demand; away from it lie surplus and shortage

Exam tips

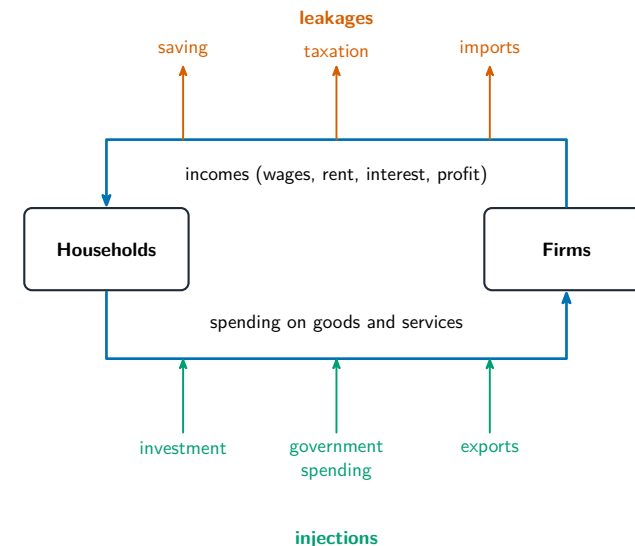
- Opportunity cost is what you **give up** — read it off a PPC as the slope; a bowed-out PPC shows increasing opportunity cost.
- **Comparative advantage** (lower opportunity cost), not absolute advantage, decides who should specialise and trade.
- Points inside the PPC are inefficient, outside unattainable; more resources/technology shift it out (growth).
- Distinguish a **movement along** a demand/supply curve (own price) from a **shift** (a determinant).
- These micro tools drive the aggregate models later — draw and shift the correct curve in the correct direction.

Economic Indicators and the Business Cycle

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The Circular Flow and GDP

The **circular-flow model** shows money moving between **households** and **firms**: households supply factors and earn income; firms sell goods and earn revenue. Every dollar of spending is someone's income, which is why output and income are two sides of the same total.



The circular flow of income, with its leakages and injections

Gross domestic product (GDP) is the market value of all **final** goods and services produced **within a country** in a year. Three ways to measure it give the same number:

- **Expenditure approach:** $GDP = C + I + G + X_n$ — **consumption** (household spending on final goods and services), **investment** (business spending on capital, plus new housing and inventory), **government purchases** (government spending on final goods and services), and **net exports** (exports minus imports).
- **Income approach:** add up all wages, rent, interest, and profit.

Exclude intermediate goods (avoid double counting), used goods, purely financial

transactions, and transfer payments.

Limitations of GDP

GDP measures market output, not well-being. It **omits** non-market production (unpaid housework, volunteering), the **underground economy**, leisure, and the **distribution** of income, and it ignores **environmental** damage and resource depletion. So a higher GDP does not automatically mean a better standard of living. **GDP per capita** ($\text{GDP} \div \text{population}$) is a better welfare proxy than total GDP.

GDP per capita shows	but it misses
✓ average income	✗ how income is distributed
✓ output of the economy	✗ unpaid and informal work
✓ growth over time	✗ pollution and resource use
✓ a rough living standard	✗ leisure, health, wellbeing

a higher GDP per capita usually means a better life - but not always

GDP per capita shows average output but misses distribution, unpaid work, and more

Unemployment



A long queue of people — unemployment is people willing and able to work who cannot find jobs

The **labor force** is the employed plus the **unemployed** (those without work who are actively looking). People not looking are **not** in the labor force.

frictional short-term, between jobs	structural skills no longer match the jobs	cyclical low demand in a recession
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Three types of unemployment: frictional, structural, and cyclical

$$\text{Unemployment rate} = \frac{\text{unemployed}}{\text{labor force}} \times 100\%, \quad \text{Labor-force participation} = \frac{\text{labor force}}{\text{working-age population}} \times 100\%.$$

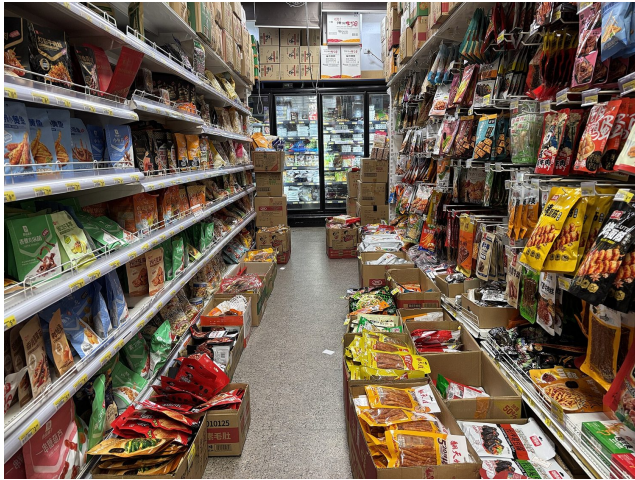
Worked example. A country has 150 million employed and 10 million unemployed (actively looking), with 40 million working-age adults not looking. The labor force is $150 + 10 = 160$ million, so the unemployment rate is $\frac{10}{160} = 6.25\%$ and the participation rate is $\frac{160}{200} = 80\%$.

Three types of unemployment:

- **Frictional** : between jobs or searching for a first job (normal, short).
- **Structural** : skills or location don't match available jobs (technology, trade).
- **Cyclical** : caused by a recession (a downturn in the business cycle).

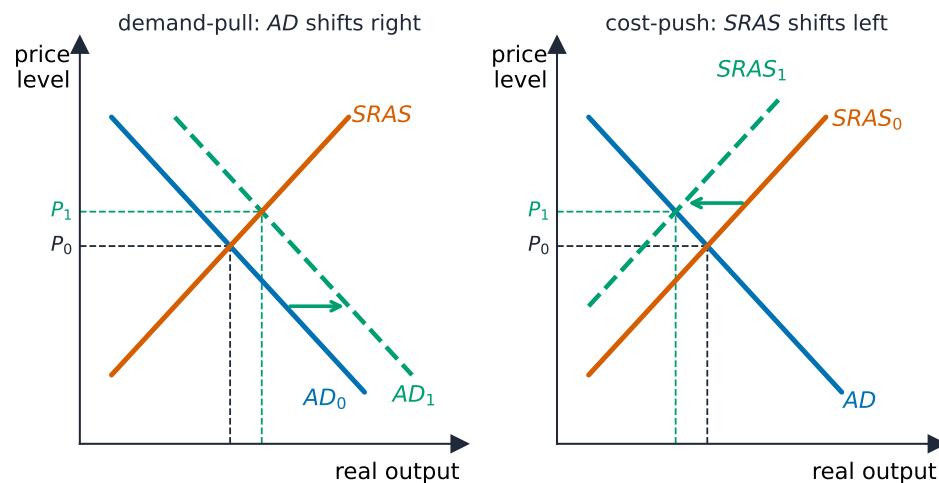
Frictional + structural make up the **natural rate of unemployment**. At the natural rate cyclical unemployment is zero and the economy is at **full employment**. The rate understates joblessness because it omits **discouraged workers** and the **underemployed**.

Price Indices and Inflation



A supermarket aisle: a fixed basket of goods measures inflation via a price index

Inflation is a sustained rise in the average price level. It is measured with a **price index**, most often the **consumer price index (CPI)**, built from a fixed **market basket** of goods a typical household buys:



Demand-pull and cost-push inflation on the AD-AS diagram

$$CPI = \frac{\text{cost of basket this year}}{\text{cost of basket in base year}} \times 100.$$

The **inflation rate** is the percent change in the index between two years. **Deflation** is a falling price level; **disinflation** is a slowing of inflation.

Worked example. If the CPI is 200 this year and was 190 last year, the inflation rate is $\frac{200 - 190}{190} \times 100\% = 5.3\%$. A basket that cost \$190 then costs \$200 – the same goods, more dollars.

Costs of Inflation

Inflation redistributes and distorts:

- It **hurts lenders and savers** and **helps borrowers** when it is unexpected, because loans are repaid in cheaper dollars. It erodes the value of money and fixed incomes.
- **Menu costs** and uncertainty discourage investment.
- **Anticipated** inflation is less harmful because contracts and interest rates adjust for it. This is why we separate **nominal** and **real** values.

Real v. Nominal GDP

- **Nominal GDP** GDP is valued at **current** prices, so it rises with both output and prices.
- **Real GDP** GDP is valued at **constant** (base-year) prices, stripping out inflation, so it reflects true output. Real GDP is the honest measure of growth.

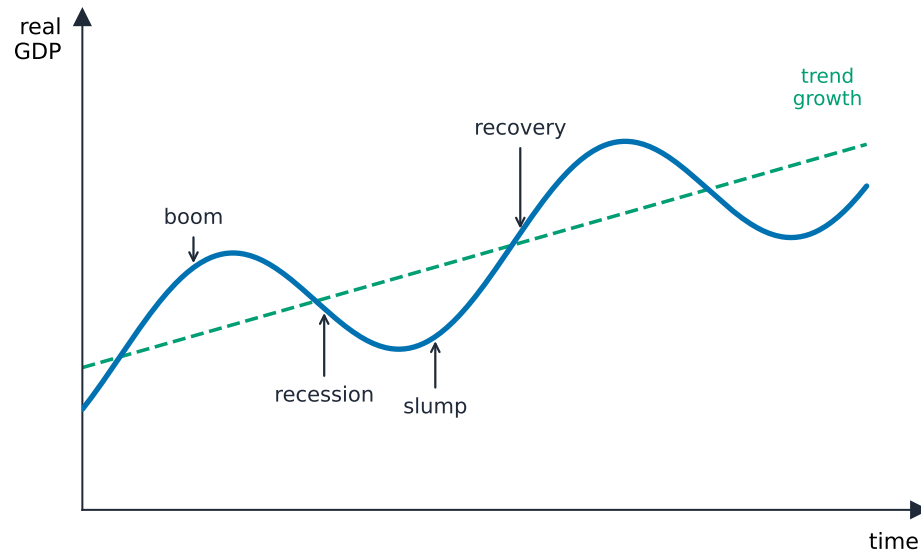
$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{price index}} \times 100, \quad \text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100.$$

Worked example. Nominal GDP is \$22 trillion and the GDP deflator is 110. Real GDP is $\frac{22}{110} \times 100 = \20 trillion. The extra \$2 trillion of nominal GDP is pure price rise, not real output – which is why growth is always measured with **real** GDP.

Exam skill: be fluent converting nominal to real using a price index, and computing an inflation rate or a growth rate as a percent change.

Business Cycles

The **business cycle** is the economy's short-run ups and downs in real GDP around its long-run growth trend: **expansion** (rising output, falling unemployment) up to a **peak**, then **contraction/recession** (falling output, rising cyclical unemployment) down to a **trough**, then **recovery**. A recession is commonly two consecutive quarters of falling real GDP. Unemployment and inflation move roughly opposite over the cycle – the tension the rest of the course tries to manage.



Real GDP swinging around its long-run trend

Exam tips

- Compute GDP by the expenditure method $C + I + G + X_n$ and count only **final** goods (avoid double counting).
- Unemployment rate = $\text{unemployed} \div \text{labor force}$; discouraged workers leave the labor force (so the rate can understate joblessness).
- Know the three unemployment types (frictional, structural, cyclical) and that the natural rate excludes cyclical.
- Inflation is the % change in the CPI; convert nominal to **real** with a price index and always use real GDP for growth.
- Place events on the business cycle (expansion $\rightarrow$ peak $\rightarrow$ contraction $\rightarrow$ trough).

National Income and Price Determination

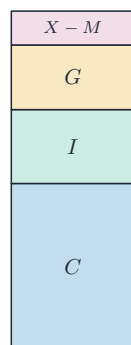
AP Macroeconomics

Aggregate Demand



A city skyline: national output and aggregate demand reflect economy-wide spending

Aggregate demand (AD) shows the total quantity of real output ($C + I + G + X_n$) buyers want at each **price level**. It slopes **downward** for three reasons special to the whole economy:



net exports: exports – imports

government spending

investment – spending by firms on capital

consumption – spending by households (the biggest part)

$AD = C + I + G + (X - M)$: total spending on a country's goods and services

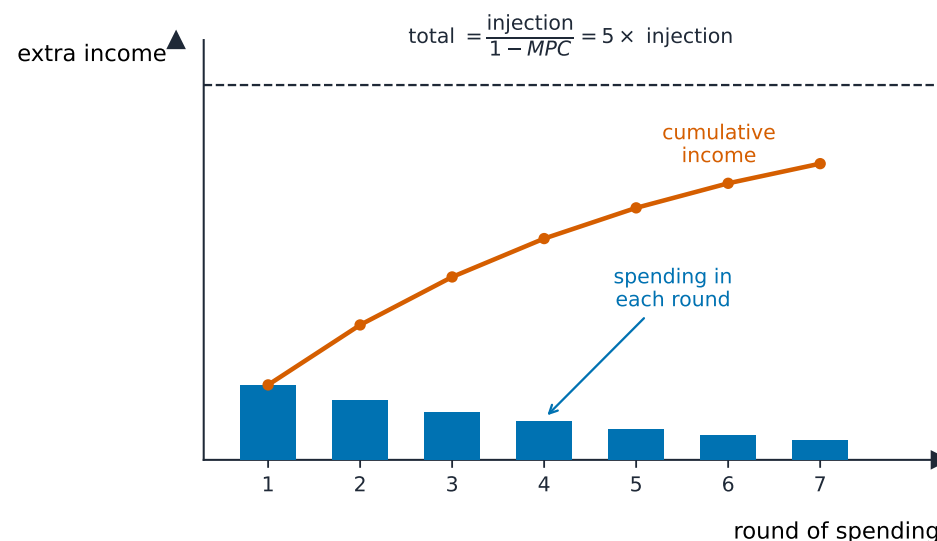
Aggregate demand is total spending: consumption, investment, government, and net exports

- the **wealth effect** (a higher price level shrinks the real value of money, so people buy less),
- the **interest-rate effect** (a higher price level raises money demand and interest rates, cutting investment),
- the **net-export effect** (a higher domestic price level makes exports dearer and imports cheaper).

A change in the price level is a **movement along** AD. AD **shifts** when any component of $C + I + G + X_n$ changes for another reason – consumer confidence, business expectations, government spending, taxes, or foreign incomes.

The Spending and Tax Multipliers

A change in spending sets off further rounds of spending, so the final change in GDP is **larger** than the initial change – the **multiplier effect**. It depends on the **marginal propensity to consume** (MPC), the fraction of extra income that is spent (the rest is the **marginal propensity to save** MPS, with $MPC + MPS = 1$):



One injection multiplies into a larger overall rise in income

$$\text{spending multiplier} = \frac{1}{1 - MPC} = \frac{1}{MPS}$$

A tax cut works through the multiplier too, but more weakly, because part of the tax cut is saved:

$$\text{tax multiplier} = -\frac{MPC}{1 - MPC} = -\frac{MPC}{MPS}$$

The tax multiplier is **smaller in size** and **negative** (a tax cut raises GDP; a tax rise lowers it). Total change in GDP = (multiplier) $\times$ (initial change).

Worked example. If $MPC = 0.8$, the spending multiplier is $\frac{1}{1 - 0.8} = 5$, so a \$10 billion rise in government spending lifts real GDP by $5 \times \$10 = \50 billion. The tax

multiplier is $-\frac{0.8}{0.2} = -4$, so a \$10 billion **tax cut** raises GDP by only \$40 billion – weaker, because part of the tax cut is saved.

Exam skill: compute both multipliers from the MPC and find the resulting change in real GDP – an almost-guaranteed calculation.

Short-Run Aggregate Supply



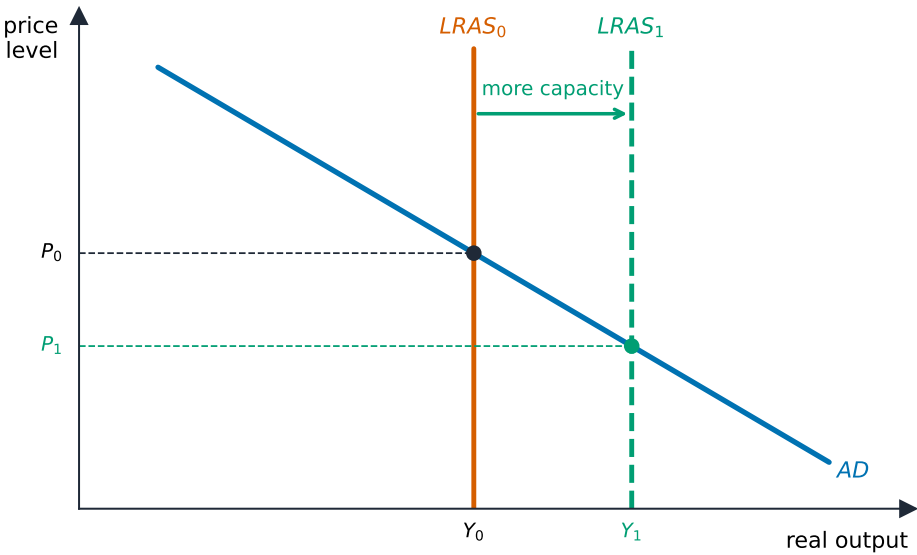
A power plant and industrial site: short-run aggregate supply depends on production costs

Short-run aggregate supply (SRAS) slopes **upward**: in the short run some input prices (especially **nominal wages**) are **sticky**, so a higher output price level widens profit margins and firms produce more. SRAS **shifts** with **input prices, productivity, taxes/subsidies on producers, and supply shocks** (e.g. an oil-price change). A rise in input costs shifts SRAS left.

Long-Run Aggregate Supply

Long-run aggregate supply (LRAS) is **vertical** at the economy's **full-employment (potential) output** Y_f . In the long run **all** prices and wages are fully **flexible** (only in the short run are some input prices fixed), so output depends only on real factors – resources, technology, institutions – not the price level. LRAS shifts only with **economic growth** (more or better resources). LRAS corresponds to the **production possibilities curve (PPC)**: both mark the economy's **maximum sustainable capacity**, so an outward LRAS shift

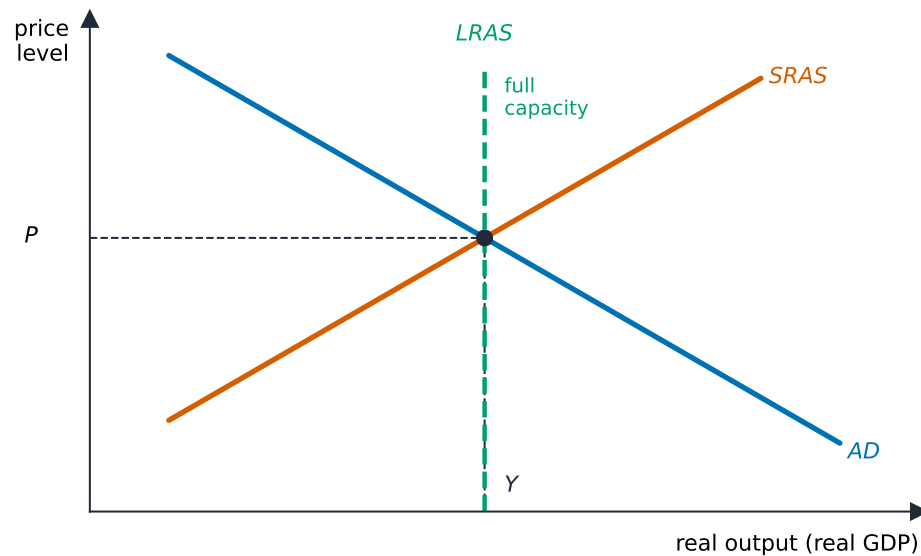
and an outward PPC shift are the same event drawn two ways. The vertical LRAS is why, in the long run, demand policy changes prices, not output.



Supply-side policy shifts long-run aggregate supply right: more output, lower prices

Equilibrium in the AD-AS Model

The economy settles where **AD meets SRAS**, fixing the equilibrium **price level** and **real GDP**. Comparing that output to Y_f (the LRAS line) gives the economy's state:



Macroeconomic equilibrium where aggregate demand meets aggregate supply

- output $< Y_f$: a **recessionary gap** (cyclical unemployment),
- output $> Y_f$: an **inflationary gap** (overheating),
- output $= Y_f$: long-run equilibrium.

Short-Run Changes: Demand and Supply Shocks

- A **demand shock** shifts AD: a positive one (more spending) raises both price level and output (and lowers unemployment); a negative one lowers both.
- A **supply shock** shifts SRAS: a negative one (higher input costs) raises the price level **and** lowers output at once – **stagflation** – the hardest case for policy-makers, because fixing one worsens the other.

Long-Run Self-Adjustment

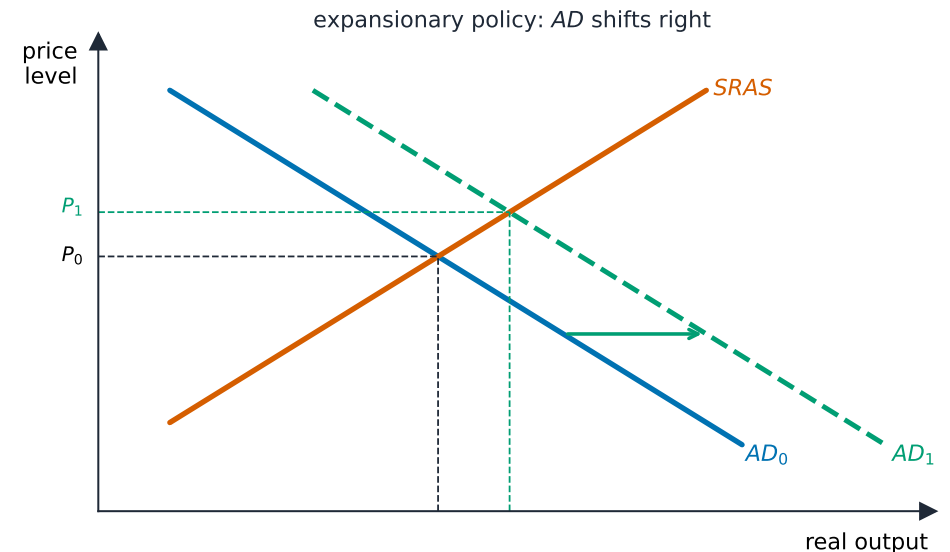
Left alone, the economy self-corrects through flexible wages:

- In a **recessionary gap**, high unemployment eventually pushes **nominal wages down**, shifting SRAS **right** until output returns to Y_f at a lower price level.
- In an **inflationary gap**, labor shortages push **wages up**, shifting SRAS **left** back to Y_f at a higher price level.

The debate over how **fast** this happens is the case for (or against) active policy: self-adjustment is slow and painful, which is the argument for intervening.

Fiscal Policy

Fiscal policy is the government's use of **spending** and **taxes** to shift AD:



Expansionary fiscal policy shifts AD right, raising output and prices

- **Expansionary** (more spending or lower taxes) shifts AD **right** to close a **recessionary gap**.
- **Contractionary** (less spending or higher taxes) shifts AD **left** to close an **inflationary gap**.

Size the policy with the multipliers: to close a gap of a given size, the required change in spending is $(\text{gap}) \div (\text{spending multiplier})$. Limits include **time lags**, **crowding**

out (below), and political difficulty.

Worked example. An economy has a \$100 billion recessionary gap and $MPC = 0.75$ (spending multiplier $= \frac{1}{0.25} = 4$). To close it, the government must raise spending by $\frac{\$100 \text{ billion}}{4} = \25 billion . Using a tax cut instead (tax multiplier -3) would require a larger $\frac{100}{3} \approx \$33 \text{ billion}$ cut.

Exam skill: you must draw the correctly labeled AD-AS graph, identify the gap, prescribe the right fiscal action and its direction, and often calculate the exact spending or tax change needed.

Automatic Stabilizers

Automatic stabilizers are features that dampen the cycle **without new legislation**. In a downturn, **progressive taxes** collect less and **transfer payments** (unemployment benefits, welfare) rise automatically – cushioning incomes and spending; in a boom they do the reverse. They soften the cycle and act instantly, avoiding the lags of **discretionary** policy.

Exam tips

- Aggregate demand slopes down for the wealth, interest-rate, and net-export effects; it **shifts** when C , I , G , or X_n changes.
- Compute the **spending multiplier** $\frac{1}{1-MPC}$ and the smaller, negative **tax multiplier** $-\frac{MPC}{1-MPC}$.
- Draw a correctly labeled AD-AS graph, identify a recessionary or inflationary gap, and prescribe the right fiscal action.
- Short-run AS slopes up (sticky wages); long-run AS is **vertical** at full-employment output.
- Size a policy with the multipliers: required spending = gap $\div$ spending multiplier.

Financial Sector

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Financial Assets

A **financial asset** is a claim that stores value: **money**, **stocks** (ownership shares), **bonds** (loans that pay interest), and bank deposits. Assets trade off **liquidity** (how easily converted to cash), **risk**, and **return**. A key inverse relationship: **bond prices and interest rates move in opposite directions** – when market interest rates rise, existing bonds paying the old, lower rate are worth less, so their price falls.



A stock exchange is where financial assets are bought and sold, setting prices from supply and demand

Nominal versus Real Interest Rates

- The **nominal interest rate** is the stated rate, not adjusted for inflation.
- The **real interest rate** is what you actually earn in purchasing power:

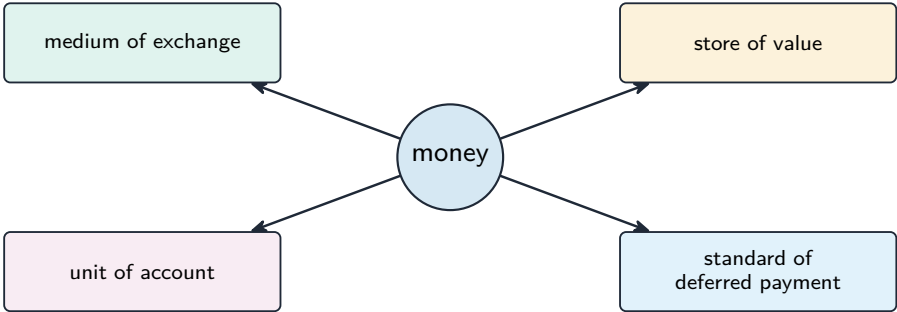
$$\text{real rate} \approx \text{nominal rate} - \text{inflation rate} \quad (\text{Fisher equation}).$$

Lenders and borrowers care about the **real** rate. If inflation turns out higher than expected, real rates fall – helping borrowers and hurting lenders.

Worked example. A loan carries a nominal rate of 6% while inflation runs at 2%. The real rate is $6\% - 2\% = 4\%$, so the lender's purchasing power grows by 4%. If inflation instead jumped to 7%, the real rate would be -1% – the lender would actually lose purchasing power.

The Definition, Measurement, and Functions of Money

Money is anything widely accepted in exchange. Its three **functions**: a **medium of exchange** (avoids barter), a **unit of account** (a common measure of value), and a **store of value** (holds value over time). Modern money is **fiat money** – valuable because the government declares it legal tender and people trust it, not because it is backed by gold.



The functions of money — the AP exam tests the first three (medium of exchange, unit of account, store of value); standard of deferred payment is beyond the CED

Money is measured in tiers by liquidity: **M1** (currency plus checkable deposits – the most liquid) and the broader **M2** (M1 plus savings deposits and other near-money). Below M1 is the **monetary base** (M0, or MB) – currency in circulation **plus** bank reserves. The **money multiplier** equals money supply ÷ monetary base, so a central-bank action that raises reserves expands the money supply by a larger amount through the multiplier.



Money works because everyone accepts it: a shared unit of account, medium of exchange, and store of value

Banking and the Expansion of the Money Supply

Banks operate on a **fractional reserve** system: they keep a fraction of deposits as **reserves** and lend the rest. The fraction they must keep is the **required reserve ratio** (rr). Lending creates new deposits, which are re-deposited and re-lent, expanding the money supply by the **money multiplier**:

$$\text{money multiplier} = \frac{1}{rr}.$$

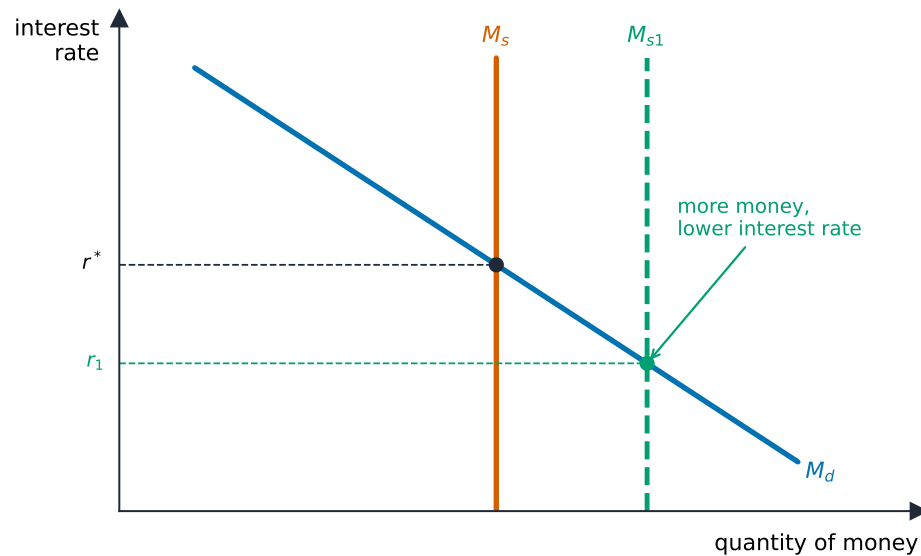
A new 1000depositwith $rr=0.1$ leaves\$900inexcessreserves,sothebankingsystemcanexpandth Use a bank's **T-account** (assets = reserves + loans; liabilities = deposits) to track required reserves and **excess reserves** (the amount available to lend).

Worked example. A bank receives a \$1000 deposit with $rr = 0.20$. It must hold $0.20 \times 1000 = \$200$ as required reserves, leaving \$800 of **excess reserves** to lend. With a money multiplier of $\frac{1}{0.20} = 5$, that \$800 of new lending can expand the money supply by up to $800 \times 5 = \$4000$ across the banking system.

Exam skill: given a required reserve ratio and a deposit, compute excess reserves, the money multiplier, and the maximum change in the money supply.

The Money Market

The **money market** determines the **nominal interest rate**:



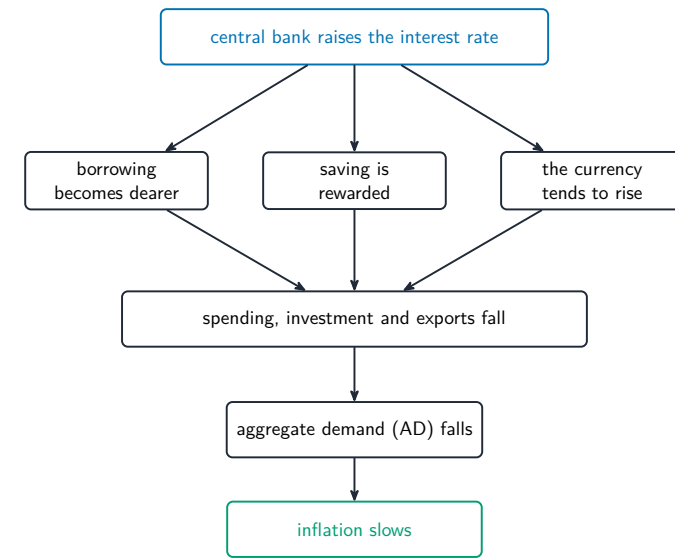
The interest rate is set by the demand for and supply of money

- **Money demand** slopes **downward** against the interest rate – the rate is the opportunity cost of holding money instead of interest-bearing assets. It shifts right with a higher price level or more real GDP.
- **Money supply** is **vertical** – set by the central bank, independent of the interest rate.

Their intersection sets the equilibrium interest rate. If the central bank increases the money supply, the supply line shifts right and the interest rate **falls**.

Monetary Policy

Monetary policy is the central bank's (the Federal Reserve's) use of the money supply to steer the economy, working **through the interest rate**:



How a higher interest rate works through the economy to slow inflation

- **Expansionary (easy)** : increase the money supply → interest rate falls → investment and consumption rise → AD shifts **right** (fights recession).
- **Contractionary (tight)** : decrease the money supply → interest rate rises → AD shifts **left** (fights inflation).

Tools: **open-market operations** (buying bonds injects money, selling bonds withdraws it – the main tool), changing the **reserve requirement**, and changing the **discount rate** (the rate banks pay to borrow from the central bank). Follow the full chain on the exam: money supply → interest rate → investment → AD → output, price level, unemployment.

Modern central banks run an **ample-reserves** system. Rather than nudging the money supply, the Fed sets **administered rates** – chiefly the **interest on reserves (IOR)** it pays banks – and this steers the **policy rate** (the federal funds rate, the overnight rate banks charge one another). In the **reserve market**, reserve demand slopes downward while the central bank supplies reserves at its chosen rate; raising IOR lifts the whole policy rate to fight inflation, lowering it eases to fight recession. (In the older **limited-reserves** system the Fed instead shifted

the reserve supply through open-market operations.)



A central bank building: monetary policy sets interest rates and the money supply

The Loanable Funds Market

The **loanable funds market** determines the **real interest rate** and connects saving to investment:

- **Supply of loanable funds** comes from **saving** and slopes upward.
- **Demand for loanable funds** comes from **borrowers** (firms investing, government borrowing) and slopes downward.

That saving is the economy's **national savings** = **private savings** (households and firms) + **public savings** (the government's budget balance – a surplus adds to saving, a deficit subtracts from it). For an open economy, investment = national savings + net capital inflow from abroad. So a bigger budget deficit is negative public saving that shrinks the supply of loanable funds and crowds out investment.

More saving shifts supply right and lowers the real rate; more government borrowing shifts demand right and **raises** the real rate – the mechanism behind **crowding out**. Distinguish the two graphs: the **money market** sets the **nominal** rate (vertical money supply), while **loanable funds** sets the **real** rate (upward-sloping saving supply).

Exam skill: know which graph to draw – money market for monetary policy, loanable funds for saving, deficits, and crowding out – and trace how a shift in one feeds into AD-AS.

Exam tips

- Know money's three functions and the M1/M2 measures.
- The **money market** sets the nominal interest rate (vertical money supply); more money supply lowers the rate.
- Compute the **money multiplier** $\frac{1}{rr}$ and the maximum change in the money supply from a new deposit.
- Trace monetary policy: money supply → interest rate → investment → AD → output.
- Distinguish the money market (nominal rate) from the loanable-funds market (real rate); use the real rate = nominal – inflation.

Long-Run Consequences of Stabilization Policies

AP Macroeconomics

Fiscal and Monetary Policy in the Short Run



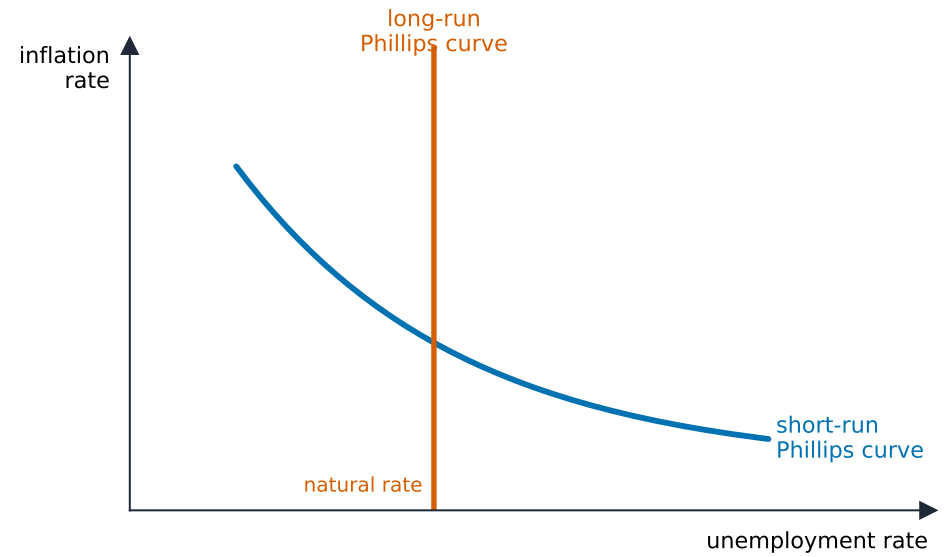
A parliament building: governments use spending and taxes as fiscal policy tools

Both policies work by shifting **AD** in the short run. **Fiscal policy** changes government spending or taxes; **monetary policy** changes the money supply and thus the interest rate. They can work **together** (both expansionary to fight a deep recession) or be **mixed** (e.g. loose fiscal + tight monetary). In the short run, expansionary policy raises output and the price level and lowers unemployment; contractionary policy does the reverse.

The Phillips Curve

The **Phillips curve** and **unemployment**:

shows the short-run trade-off between **inflation**



The short-run and long-run Phillips curves

- The **short-run Phillips curve (SRPC)** slopes **downward** – lower unemployment comes with higher inflation. It is the mirror image of AD-AS: a rightward AD shift moves the economy up-left along the SRPC (less unemployment, more inflation).
- The **long-run Phillips curve (LRPC)** is **vertical** at the **natural rate of unemployment** – the counterpart of vertical LRAS. In the long run there is **no** trade-off: policy changes inflation, not unemployment.
- A **supply shock** shifts the SRPC (a negative shock moves it right – worse inflation and unemployment, i.e. stagflation). A change in **expected inflation** also shifts the SRPC.

Exam skill: link the AD-AS and Phillips graphs – a recessionary gap in AD-AS corresponds to a point on the SRPC to the **right** of the natural rate; know what shifts SRPC versus moves along it.

Money Growth and Inflation

In the long run, **inflation is a monetary phenomenon**. The **quantity theory of money** states $M \times V = P \times Y$ (money supply $\times$ velocity = price level $\times$ real output). With velocity V and real output Y roughly stable in the long run, growth in the **money supply** translates almost one-for-one into **inflation**. Printing money faster than the economy grows raises the price level, not real output – the root of high inflation and, in the extreme, **hyperinflation**.

Worked example. Suppose the money supply grows 8% per year while real output Y grows 3% and velocity V is stable. Rearranging $M \times V = P \times Y$ into growth rates, inflation $\approx 8\% - 3\% = 5\%$. The 5% of money growth not matched by extra output simply becomes higher prices.



More money chasing goods: sustained money growth tends to raise the price level over time

Government Deficits and the National Debt

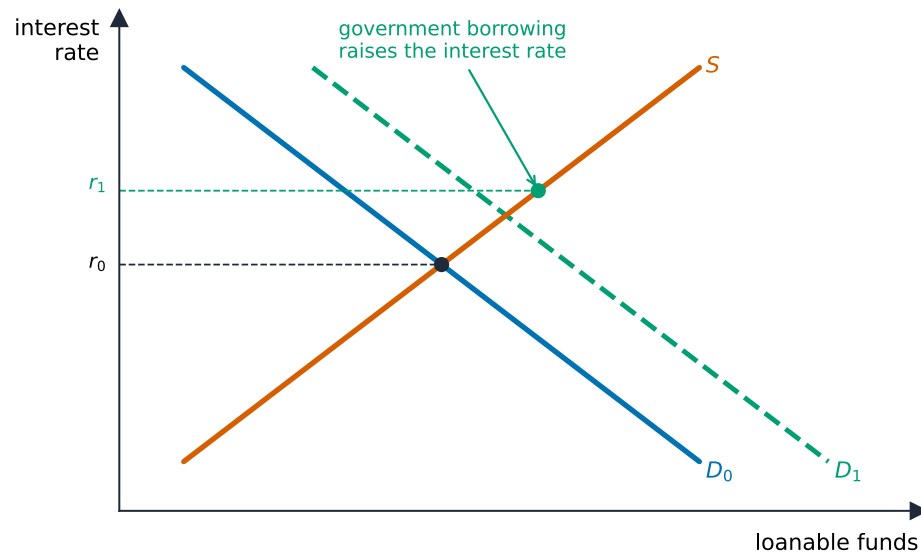
A **budget deficit** occurs when government spending exceeds tax revenue in a year (a **surplus** is the reverse). The accumulated total of past deficits is the **national debt**. Deficits are financed by **borrowing** – selling government bonds – which adds to the debt and to future interest payments. Persistent deficits raise concerns about crowding out and the burden of servicing the debt.



Bond and equity markets: government borrowing competes for loanable funds and can crowd out private investment

Crowding Out

Crowding out is the main long-run cost of deficit-financed fiscal policy. When the government borrows heavily, it increases the **demand for loanable funds**, raising the **real interest rate**. Higher rates **reduce private investment** (and interest-sensitive consumption). So expansionary fiscal policy partly cancels itself: the AD boost is offset by weaker investment. Worse, less investment today means a smaller capital stock and **slower long-run growth**.



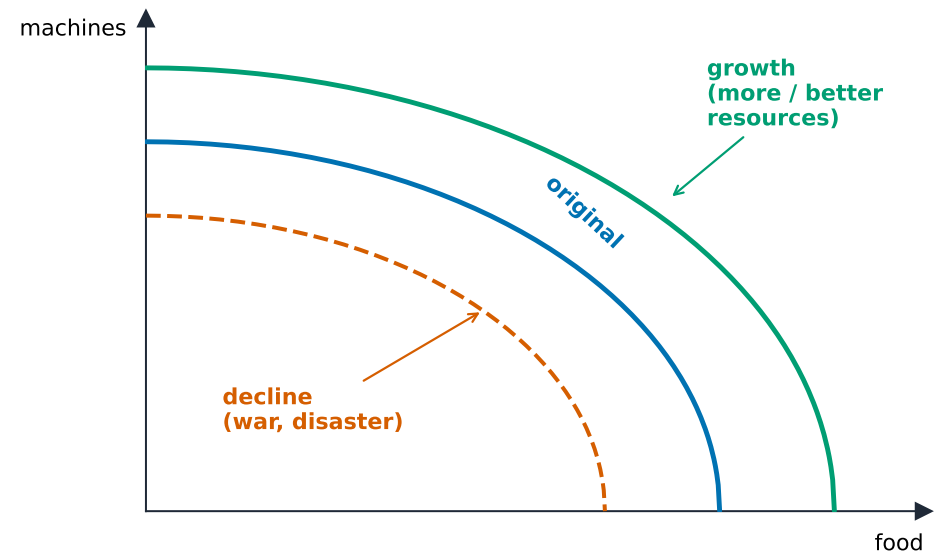
Government borrowing raises interest rates and crowds out private investment

Exam skill: show crowding out on the **loanable funds** graph – government borrowing shifts demand right, the real interest rate rises, and private investment falls.

Worked example. A government borrows \$500 billion to finance a deficit. On the loanable funds market this shifts the demand for funds right, pushing the real interest rate up (say from 3% to 4%). At the higher rate firms scale back investment – perhaps by \$150 billion – so the net boost to AD is smaller than the \$500 billion, and the lost investment slows long-run growth.

Economic Growth

Economic growth is a sustained rise in **real GDP per capita** – the true source of higher living standards. It comes from more or better resources and is shown as a **rightward shift of LRAS** (and an outward shift of the PPC). Its main drivers:



Economic growth shifts the production possibilities curve outward

- **physical capital** (more tools and machines per worker),
- **human capital** (education, skills, health),
- **technology** and innovation,
- **productivity** (output per worker) growth, the deepest driver.

Public Policy and Economic Growth



A wind farm: public investment in capital can raise long-run economic growth

Governments can raise long-run growth by policies that build capital and productivity: **investment in infrastructure and education, research and development** incentives, protecting **property rights** and the rule of law, encouraging **saving and investment** (which finances capital), and keeping inflation low and stable. The recurring long-run theme: policies that **crowd out** or discourage investment slow growth, while those that **encourage** capital formation speed it up.

Exam tips

- The short-run **Phillips curve** shows the inflation–unemployment trade-off; the long-run curve is **vertical** at the natural rate.
- In the long run inflation is a **monetary** phenomenon (money growth beyond output growth → inflation).
- Show **crowding out** on the loanable-funds graph: government borrowing raises the real rate and cuts private investment.
- Growth comes from more/better resources — physical capital, human capital, technology — shifting LRAS right.
- A supply shock moves inflation and unemployment the same way (stagflation), unlike a demand shock.

Open Economy—International Trade and Finance

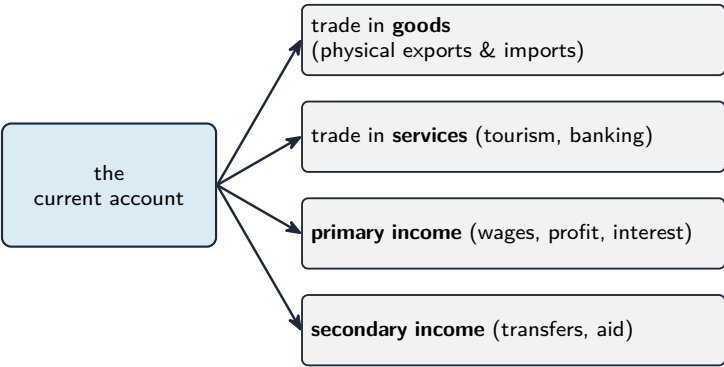
AP Macroeconomics

Balance of Payments Accounts



A container terminal: exports and imports appear in the balance of payments

The **balance of payments** records all transactions between a country and the rest of the world, in two main accounts:

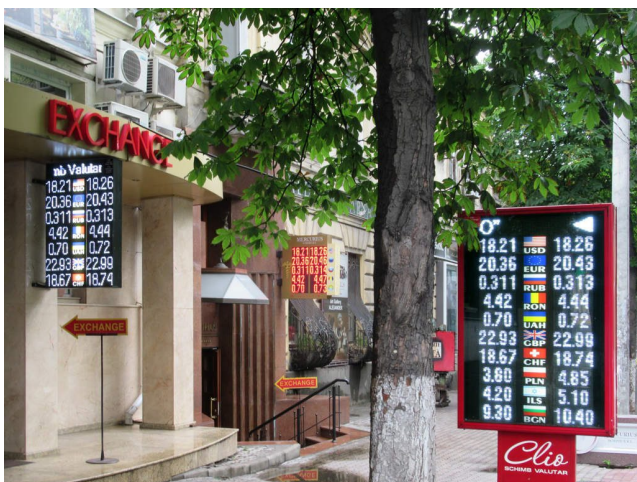


The four parts of the current account

- The **current account** tracks trade in **goods and services** (exports minus imports), plus income and transfers. A trade deficit makes it negative.
- The **capital (financial) account** tracks flows of **financial assets** – foreigners buying domestic assets, and residents buying foreign assets.

The two are **mirror images**: a current-account deficit is matched by a capital-account surplus (a country that imports more than it exports pays with assets, so foreign investment flows in). They sum to zero.

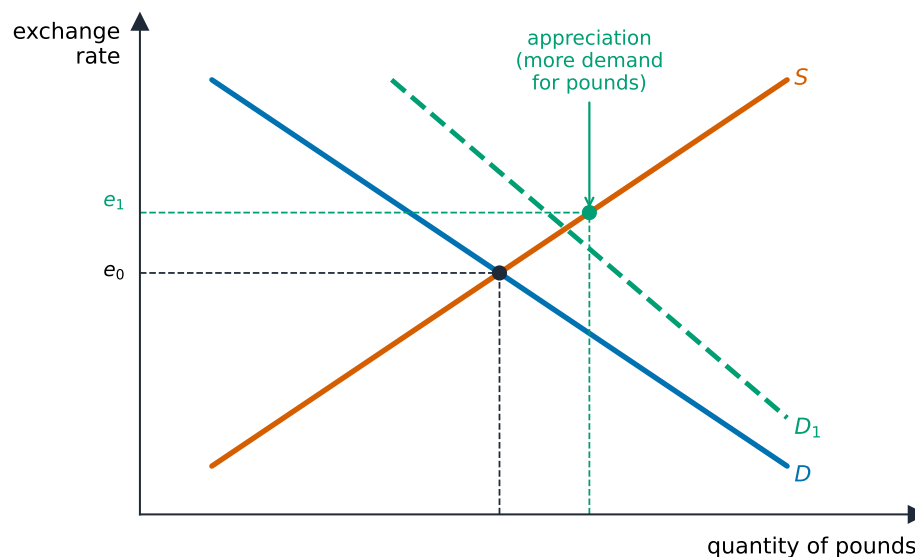
Exchange Rates



A currency exchange board: exchange rates are the price of one currency in terms of another

An **exchange rate** is the price of one currency in terms of another. A currency **appreciates** when it gains value (buys more foreign currency) and **depreciates** when it loses value. Always track *which* currency: if the US dollar appreciates against the euro, the euro depreciates against the dollar – the same event from two sides.

Worked example. Suppose $\$1 = \text{€}0.90$, so $\text{€}1 = \frac{1}{0.90} \approx \1.11 . If the dollar then appreciates to $\$1 = \text{€}1.00$, each dollar now buys more euros, while the euro has *depreciated* – it now buys only \$1.00 instead of \$1.11. The single event is an appreciation of the dollar **and** a depreciation of the euro.



A floating exchange rate set by the demand for and supply of a currency

Most currencies today are **floating**, set by supply and demand in the foreign-exchange market.

The Foreign Exchange Market

Each currency has its own supply-and-demand graph (price = the exchange rate, quantity = amount of that currency).

- **Demand** for a currency comes from foreigners wanting its goods, services, or assets.
- **Supply** of a currency comes from its own residents wanting foreign goods, services, or assets.

The equilibrium exchange rate is where they cross. A rightward shift in **demand** for a currency causes it to **appreciate**; a rightward shift in **supply** causes it to **depreciate**.

Exam skill: always draw the graph for the **currency named in the question**, label the axis with that currency's price, and shift the correct curve – mixing up the two currencies' graphs is the most common error.

Changes in Policies and Economic Conditions

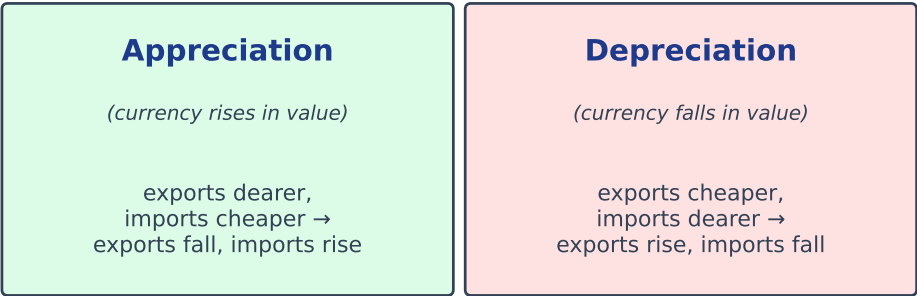
Exchange rates respond to:

- **Relative interest rates:** a higher domestic real interest rate attracts foreign financial investment, raising **demand** for the currency and causing **appreciation**.
- **Relative price levels/inflation:** higher domestic inflation makes goods less competitive, lowering demand for the currency (**depreciation**).
- **Relative incomes:** higher domestic income raises imports, increasing the **supply** of domestic currency (depreciation).
- **Tastes** and expectations about future value.

Monetary policy has a strong link: **expansionary** monetary policy lowers interest rates, reduces demand for the currency, and causes **depreciation** (which then boosts net exports).

Exchange Rates and Net Exports

Exchange rates feed back into AD through **net exports**:



Appreciation makes exports dearer and imports cheaper; depreciation does the reverse

- A **depreciation** makes exports cheaper for foreigners and imports dearer, so **net exports rise** and AD shifts right.
- An **appreciation** makes exports dearer and imports cheaper, so **net exports fall** and AD shifts left.

Worked example. A US car priced at \$30,000 costs a European buyer €27,000 when $\$1 = \text{€}0.90$. If the dollar **depreciates** to $\$1 = \text{€}0.80$, the same car now costs only €24,000 – cheaper for foreigners, so US exports rise while imports (now dearer in dollars) fall, lifting net exports and shifting AD right.

This is how the foreign-exchange market and the AD-AS model connect – a currency change is a channel through which policy reaches output.

Real Interest Rates and International Capital Flows

Money chases the highest **real** return, so **capital flows** respond to real interest rates:

- A **higher** domestic real interest rate attracts **inflows** of foreign financial capital – foreigners buy domestic bonds, raising currency demand and causing appreciation.
- A **lower** real rate causes **outflows** and depreciation.

This ties the whole course together: government borrowing raises the real interest rate (loanable funds), which attracts foreign capital, appreciates the currency, and reduces net exports – so a budget deficit can widen a trade deficit (the “twin deficits”). Tracing these linked effects across the loanable-funds, forex, and AD-AS graphs is the capstone skill of AP Macroeconomics.

Exam tips

- The current account and financial account are **mirror images** and sum to zero.
- Always draw the forex graph for the **currency named**, and label its price with that currency; one currency appreciating is the other depreciating.
- A **depreciation** raises net exports (exports cheaper); an appreciation lowers them.
- Higher domestic real interest rates attract capital inflows → currency appreciates → net exports fall.
- Link it all: a budget deficit raises the real rate, appreciates the currency, and can widen the trade deficit (twin deficits).