

Macroeconomics

IB SL Study Guide

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Measuring Economic Activity

Macroeconomics studies the economy as a whole rather than individual markets. National income accounting provides the tools to measure economic performance and compare it across time and countries.

Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is the total market value of all final goods and services produced within a country's borders in a given time period (usually one year).

Three equivalent approaches to measuring GDP:

Approach	What it measures
Expenditure	$GDP = C + I + G + (X - M)$ — sum of all final spending on domestic output
Output (value-added)	Sum of value added at each stage of production across all industries
Income	Sum of all factor incomes (wages, profits, rents, interest) earned in domestic production

All three approaches yield the same GDP figure in theory.

Components of the expenditure approach:

- C — household consumption expenditure (largest component in most economies)
- I — gross investment (business capital expenditure + residential construction + changes in inventories)
- G — government expenditure on goods and services (excludes transfer payments)
- $X - M$ — net exports (exports minus imports)

Nominal vs Real GDP

Nominal GDP is measured at current prices — it includes the effect of both changes in output and changes in the price level.

Real GDP adjusts nominal GDP for inflation using a base-year price index. It measures changes in actual physical output.

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price index}} \times 100$$

EXAM ALERT

A common exam error: using nominal GDP to compare living standards over time. Nominal GDP rises with both output growth and inflation. Always use **real GDP** for output comparisons across time periods, and **real GDP per capita** for cross-country living standard comparisons.

GNI (Gross National Income)

Gross National Income (GNI) measures the total income earned by a country's residents, regardless of where that income is generated.

$$GNI = GDP + \text{Net factor income from abroad}$$

Net factor income from abroad = income earned by domestic residents abroad minus income earned by foreign residents domestically.

GNI is more relevant than GDP for measuring national income in economies with significant flows of capital income abroad (e.g., remittance-heavy developing countries) or foreign profit repatriation.

Green GDP

Green GDP (or adjusted net savings / genuine progress indicator) attempts to account for environmental degradation and resource depletion by subtracting these costs from conventional GDP.

$$\text{Green GDP} = GDP - \text{Cost of environmental degradation} - \text{Depletion of natural resources}$$

Why it matters: Conventional GDP can rise even as natural capital is destroyed (e.g., clear-cutting forests, exhausting fish stocks). Green GDP provides a more sustainable welfare measure.

Limitations:

- Difficult to assign monetary values to ecosystem services and biodiversity loss.
- No universally agreed methodology — limits international comparability.
- Not yet in mainstream national accounting, though the UN System of Environmental-Economic Accounting (SEEA) is a step toward it.

IB TIP

IB evaluations of GDP as a welfare measure should acknowledge: GDP ignores income distribution (the Gini coefficient is better for that), ignores non-market activity (domestic labour, volunteer work), ignores leisure, and ignores environmental sustainability. Better composite measures include the Human Development Index (HDI) and Genuine Progress Indicator (GPI).

The AD/AS Model

The **Aggregate Demand/Aggregate Supply (AD/AS)** model is the central framework for macroeconomic analysis in IB Economics. It explains the determination of the overall price level and real output in an economy.

Aggregate Demand (AD)

Aggregate demand is the total spending on an economy's output at different price levels, expressed as:

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

The AD curve slopes downward — as the price level falls, real output demanded rises. Three reasons:

1. **Wealth effect:** Lower prices increase real wealth (fixed nominal assets are worth more in real terms), stimulating consumption.
2. **Interest rate effect:** Lower prices reduce the demand for money, pushing interest rates down, increasing investment and consumption.
3. **International trade effect:** Lower domestic prices make exports cheaper and imports more expensive, increasing net exports.

Determinants of AD (Non-Price Factors that Shift AD)

Consumption (C) shifts:

- Consumer confidence / expectations about future income
- Changes in household wealth (e.g., rising house prices)
- Interest rates (lower rates increase borrowing for consumption)
- Income taxes (higher taxes reduce disposable income)

Investment (I) shifts:

- Business confidence / expected profitability
- Interest rates (lower rates reduce the cost of borrowing)
- Business taxes
- Technological change

Government spending (G) shifts:

- Fiscal policy decisions (expansionary or contractionary)

Net exports ($X - M$) shifts:

- Exchange rate changes (depreciation increases competitiveness, raising X and reducing M)
- Foreign income levels (higher foreign GDP increases demand for domestic exports)

- Relative inflation rates

MEMORISE THIS

The components of AD are **CIGX**: Consumption, Investment, Government spending, net eXports. A shift in any of these shifts the entire AD curve — never say “price level changes shift AD.” A change in the price level causes a movement along AD.

Aggregate Supply (AS) — Short Run (SRAS)

The **short-run aggregate supply (SRAS)** curve shows the total output that all firms in the economy are willing and able to produce at each price level, holding factor prices (especially wages) constant.

Shape: The SRAS curve slopes upward. At higher price levels, firms’ revenues rise while costs (sticky wages) remain temporarily fixed, making production more profitable — firms expand output.

Determinants of SRAS (shifts):

Cause	Direction of shift
Rise in wages / input costs	Left (decreases SRAS)
Fall in oil prices	Right (increases SRAS)
Supply shocks (drought, war)	Left
Productivity improvements (short run)	Right
Indirect taxes increase	Left
Subsidies to firms increase	Right

Aggregate Supply (AS) — Long Run (LRAS)

The **long-run aggregate supply (LRAS)** curve represents the economy’s maximum productive capacity when all resources are fully employed and all prices (including wages) have fully adjusted.

Shape: Vertical at the **potential output** (Y_p) level — in the long run, changes in the price level do not affect real output.

Shifts in LRAS reflect changes in an economy’s productive capacity (economic growth):

- Improvements in technology
- Growth in the labour force (population growth, net immigration)
- Investment in physical and human capital
- Discovery of new resources
- Institutional improvements (rule of law, property rights, reduced corruption)

Macroeconomic Equilibrium

Short-run equilibrium: Where AD intersects SRAS, determining the price level and real GDP.

Long-run equilibrium (full employment): Where $AD = SRAS = LRAS$ — the economy is at potential output with stable inflation.

Inflationary gap: AD is above potential output ($Y > Y_p$). Unemployment is below its natural rate. Upward pressure on wages and prices.

Deflationary (recessionary) gap: AD is below potential output ($Y < Y_p$). Unemployment is above its natural rate. Downward pressure on prices.

WORKED EXAMPLE

Worked Example — AD/AS Shift Analysis

Scenario: A central bank raises interest rates significantly.

1. Higher interest rates increase the cost of borrowing — consumers borrow less for cars, houses; firms reduce capital investment.
2. AD decreases (shifts left).
3. In the short run (SRAS fixed), the new AD intersects SRAS at a lower real GDP and a lower price level.
4. The economy moves below potential output — a recessionary gap opens.
5. Unemployment rises above the natural rate.
6. In the long run (if no policy response), lower demand for labour puts downward pressure on wages, shifting SRAS right until the economy returns to Y_p at a lower price level.

Diagram: Show AD1 shifting left to AD2; original equilibrium E1 at Y_p moving to E2 at $Y < Y_p$ and $P_2 < P_1$; label the recessionary gap between Y and Y_p .

Macroeconomic Objectives

Governments generally pursue four main macroeconomic objectives simultaneously. These objectives sometimes conflict.

Objective	Indicator	Target range (typical)
Economic growth	Real GDP growth rate	2–4% per year in developed economies
Low unemployment	Unemployment rate	Close to the natural rate of unemployment
Low inflation	CPI inflation rate	~2% (common central bank target)
Equity	Gini coefficient, income shares	Reduction in extreme inequality

Policy conflicts (trade-offs):

- Policies to reduce unemployment (expand AD) tend to increase inflation.
- Policies to reduce inflation (contract AD) tend to increase unemployment.
- Rapid growth may worsen environmental sustainability (Green GDP falls while conventional GDP rises).

Unemployment

Unemployment occurs when people who are willing and able to work cannot find jobs. The IB syllabus distinguishes several types with different root causes and appropriate policy responses.

Definition and Measurement

A person is **unemployed** if they are: (a) without a job, (b) available for work, and (c) actively seeking work.

$$\text{Unemployment rate} = \frac{\text{Number unemployed}}{\text{Labour force}} \times 100$$

The **labour force** = employed + unemployed. It excludes those not seeking work (students, retired, stay-at-home carers — the economically inactive).

Limitations of the unemployment rate:

- Excludes **underemployment** (workers in part-time jobs who want full-time work).
- Excludes **discouraged workers** — people who have given up searching.
- Claimant count vs. survey methods may give different figures.
- Does not capture informal employment (prevalent in developing economies).

Types of Unemployment

Cyclical (demand-deficient) unemployment: Caused by insufficient aggregate demand during a recession. Output falls below potential, and firms reduce their workforces. Remedy: expansionary fiscal or monetary policy.

Structural unemployment: Caused by a mismatch between the skills workers have and the skills demanded by employers, or by technological change that makes certain jobs obsolete. Remedy: retraining, education investment, regional policy.

Frictional unemployment: Workers between jobs — temporarily unemployed while searching for a new position. It is a normal part of a dynamic labour market. A small amount is considered healthy. Remedy: better job-matching information.

Seasonal unemployment: Industries with seasonal demand (agriculture, tourism) create unemployment during off-seasons. Remedy: diversification of the local economy.

Natural Rate of Unemployment (NRU)

The **natural rate of unemployment** (also called the non-accelerating inflation rate of unemployment, NAIRU) is the unemployment rate that exists when the economy is at its potential output. It consists of frictional + structural unemployment. It is not zero — some unemployment is always present in a dynamic economy.

⚠ EXAM ALERT

Do not confuse the natural rate of unemployment with “acceptable” unemployment. The NRU varies by country (typically 4–6% in developed economies) and can change over time as structural factors change. Unemployment above the NRU is cyclical — it is the target of demand-management policies.

Consequences of Unemployment

For individuals: Loss of income, skill deterioration (hysteresis), psychological harm, social exclusion.

For the economy: Lost output (actual GDP below potential), lower tax revenues, higher government welfare spending, fiscal pressure.

Hysteresis: Prolonged unemployment can permanently increase the natural rate — unemployed workers lose skills and become less employable, shifting the LRAS left.

Inflation

Inflation is a sustained rise in the general price level that erodes purchasing power. Its causes, distributional effects, and the monetary and fiscal policies used to control it are central IB topics.

Definition and Measurement

Inflation is a sustained rise in the general price level over time. **Deflation** is a sustained fall.

Consumer Price Index (CPI): The most common measure. A basket of goods and services representing typical household purchases is priced each month. The CPI measures how the cost of that basket changes.

$$\text{Inflation rate} = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100$$

Limitations of CPI:

- The basket is based on average spending — does not reflect the experience of every household.
- Substitution bias: consumers switch to cheaper substitutes when prices rise, but the fixed basket does not account for this.

- Does not capture quality improvements (a new laptop at the same price is “more” for your money).
- Housing costs are treated differently across countries.

Demand-Pull Inflation

Demand-pull inflation occurs when aggregate demand grows faster than aggregate supply, pulling the price level upward.

Causes: Rapid economic growth, large fiscal stimulus, credit booms, falling interest rates.

AD/AS diagram: AD shifts right; the economy moves along an upward-sloping SRAS curve to a higher price level. If the economy is at or near Y_p , the AD shift produces mainly a price rise with little output gain.

Cost-Push Inflation

Cost-push inflation (also called supply-side inflation) occurs when input costs rise, shifting SRAS left and pushing up prices even as output falls.

Causes: Oil price shocks, wage increases above productivity growth, supply chain disruptions, rising raw material costs.

AD/AS diagram: SRAS shifts left; the economy reaches a new equilibrium at a lower real GDP and a higher price level — **stagflation** (simultaneous inflation and recession).

MEMORISE THIS

Demand-pull: AD shifts right → higher P, higher Q. **Cost-push:** SRAS shifts left → higher P, lower Q (stagflation).

The policy dilemma with stagflation: contractionary policy to fight inflation worsens unemployment; expansionary policy to reduce unemployment worsens inflation.

Consequences of Inflation

For households:

- Erodes purchasing power of nominal incomes (real income falls if wages do not keep up).
- Redistributes income from creditors to debtors (debt repayments are worth less in real terms).
- Menu costs and shoe-leather costs (time and resources spent adjusting prices and managing cash).

For firms:

- Uncertainty discourages long-term investment.

- Export competitiveness falls if domestic inflation exceeds foreign inflation.

Hyperinflation (inflation exceeding several hundred or thousand percent per year): destroys the money's function as a store of value and medium of exchange; devastates savings; causes economic collapse (Zimbabwe 2007–09, Germany 1923).

Deflation

Deflation is a sustained fall in the price level. While seemingly positive, deflation is dangerous because:

- Consumers delay purchases expecting further price falls — depressing demand further.
- Real debt burden rises — debtors must repay loans with money that is worth more than when they borrowed (debt deflation).
- Firms' revenues fall while nominal costs (wages, debt) remain fixed — profit squeeze leads to layoffs.
- Monetary policy becomes ineffective when nominal interest rates approach zero (the **zero lower bound**).

Fiscal Policy

Fiscal policy involves the use of government spending and taxation to influence aggregate demand and macroeconomic objectives.

Expansionary Fiscal Policy

Used to close a recessionary gap (when $Y < Y_p$):

- Increase government spending (shifts AD right).
- Reduce taxes (increases household disposable income and business investment — shifts AD right).

Contractionary Fiscal Policy

Used to close an inflationary gap (when $Y > Y_p$):

- Reduce government spending.
- Increase taxes.

Budget Balance

Budget balance = Government revenue — Government spending

- **Budget surplus:** Revenue > spending — government is saving.
- **Budget deficit:** Spending > revenue — government is borrowing.

- **Structural deficit:** The deficit that would exist even at full employment (a policy choice, not a cyclical outcome).
- **Cyclical deficit:** The component of the deficit due to below-potential output (automatically increases in recessions).

National debt: The accumulated stock of government borrowing — the sum of all past budget deficits minus any surpluses.

Automatic Stabilisers

Automatic stabilisers are fiscal mechanisms that reduce the severity of economic fluctuations without requiring active policy decisions:

- In a recession: tax revenues fall automatically (less income, less spending — lower income and VAT receipts); welfare spending rises (more unemployment benefits). This cushions the fall in AD.
- In a boom: tax revenues rise; welfare spending falls. This restrains AD.

Examples: Progressive income tax systems, unemployment insurance, means-tested benefits.

Limitations of Fiscal Policy

- **Time lags:** Recognition lag (detecting the problem), decision lag (passing legislation), implementation lag (spending taking effect) — by the time policy acts, the cycle may have turned.
- **Crowding out:** Government borrowing increases demand for loanable funds, pushing up interest rates and reducing private investment — partially offsetting the fiscal stimulus.
- **High existing debt:** Countries with high debt-to-GDP ratios face market pressure (rising borrowing costs) that limits their ability to run large deficits.
- **Political constraints:** Fiscal consolidation is unpopular; politicians may maintain deficits even during booms.

Monetary Policy

Monetary policy involves central bank actions to influence the money supply, interest rates, and credit conditions to achieve macroeconomic objectives.

Interest Rate Policy

The main instrument is the **policy interest rate** (e.g., the Federal Funds Rate in the US, the Bank Rate in the UK). By setting the rate at which it lends to commercial banks, the central bank influences borrowing costs throughout the economy.

Expansionary monetary policy (loose/easy):

- Cut interest rates.
- Lower borrowing costs → increased investment (I) and consumption (C).
- AD shifts right.

Contractionary monetary policy (tight):

- Raise interest rates.
- Higher borrowing costs → reduced investment and consumption.
- AD shifts left, reducing inflationary pressure.

Quantitative Easing (QE)

Quantitative easing is an unconventional monetary policy tool used when policy interest rates are already near zero (the zero lower bound). The central bank creates new money and uses it to purchase financial assets (government bonds, mortgage-backed securities) from commercial banks.

Transmission mechanism:

1. Asset purchases inject money into the banking system.
2. Banks have more reserves — encouraged to lend more.
3. Lower long-term interest rates on bonds stimulate investment.
4. Rising asset prices increase household wealth — boosting consumption.
5. Currency depreciation (more money supply) improves export competitiveness.

QE in practice: Used extensively by the US Federal Reserve, European Central Bank, and Bank of England after the 2008 financial crisis and during COVID-19.

Limitations of QE:

- If banks simply hold excess reserves (liquidity trap), the money does not reach the real economy.
- May inflate asset prices (stocks, property), increasing wealth inequality.
- Risk of inflation if used excessively.

Limitations of Monetary Policy

- **Zero lower bound:** When rates are already at or near zero, there is no room for conventional rate cuts.
- **Liquidity trap:** When confidence is very low, low interest rates may not stimulate borrowing (firms will not invest if they see no profitable opportunities).
- **Credit availability:** Even if rates are low, banks may be reluctant to lend to risky borrowers.
- **Time lags:** Interest rate changes take 12–18 months to have their full effect on output.

Supply-Side Policies

Supply-side policies aim to increase the economy's productive potential — shifting LRAS to the right — rather than managing demand. They address structural factors that limit long-run growth.

Market-Based Supply-Side Policies

These policies reduce government intervention and rely on market incentives:

- **Labour market deregulation:** Reducing minimum wages, weakening trade unions, relaxing employment protection legislation — increase labour market flexibility.
- **Tax reductions:** Cutting income and corporate taxes to increase the incentives to work, save, and invest.
- **Privatisation:** Transferring state-owned enterprises to private ownership to improve efficiency.
- **Deregulation:** Reducing regulations on businesses to lower compliance costs and encourage entry.
- **Free trade:** Reducing import barriers to expose domestic firms to international competition and allow consumers access to cheaper goods.

Interventionist Supply-Side Policies

These involve government investment to build productive capacity:

- **Education and training:** Investment in human capital — improving the quality and skills of the labour force.
- **Infrastructure:** Roads, railways, broadband, ports — reduce transport and transaction costs.
- **Research and development (R&D):** Government funding for basic research generates positive externalities (knowledge spillovers) and supports technological progress.
- **Industrial policy:** Targeted support for strategic industries (e.g., green energy, semiconductors).

Evaluation of Supply-Side Policies

Advantages:

- Address the root causes of low growth (skills shortages, poor infrastructure, low productivity).
- Non-inflationary — by expanding LRAS as well as AD, they allow growth without price pressure.
- Improve long-run competitiveness.

Limitations:

- Long time lags — education takes years to improve productivity; infrastructure projects take decades.
- High upfront cost (interventionist policies).
- Market-based policies may increase inequality (e.g., cutting benefits, weakening unions).
- Deregulation may increase market failures (e.g., financial sector deregulation contributed to the 2008 crisis).

HL The Multiplier Effect

HL extends fiscal policy analysis by showing how an initial injection of spending generates a larger final change in national income — the multiplier process. The size of the multiplier depends on the marginal propensity to consume.

The Keynesian Multiplier

The **multiplier** describes how an initial injection of spending into the economy generates a larger final increase in national income. When the government increases spending by 1 dollar, the total increase in GDP exceeds 1 dollar because the initial recipients spend a fraction of their income, creating further rounds of income and spending.

Marginal Propensity to Consume (MPC): The fraction of each additional unit of income that households spend on domestic consumption.

Marginal Propensity to Save (MPS): $MPS = 1 - MPC$ (in a closed economy with no government).

In an open economy with taxation and imports:

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

where:

- MPS = marginal propensity to save
- MPT = marginal propensity to tax (fraction of extra income paid in taxes)
- MPM = marginal propensity to import

In the simplified two-sector model:

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

Formula for the change in income:

$$\Delta Y = k \times \Delta \text{Injection}$$

WORKED EXAMPLE

Worked Example — Multiplier Calculation

In an open economy: $MPC = 0.75$, $MPT = 0.15$, $MPM = 0.10$.

Step 1 — Calculate the multiplier: $k = \frac{1}{MPS+MPT+MPM}$

$$MPS = 1 - MPC = 1 - 0.75 = 0.25$$

$$k = \frac{1}{0.25+0.15+0.10} = \frac{1}{0.50} = 2$$

Step 2 — Calculate the change in income: Government increases spending by 500 million dollars.

$$\Delta Y = 2 \times 500 = 1,000 \text{ million dollars}$$

The initial spending of 500 million dollars generates a total increase in national income of 1,000 million dollars.

Step 3 — Interpret: The multiplier is 2 because for every unit of spending injected, 50 cents are withdrawn from the circular flow (saved, taxed, or spent on imports) at each round. If the economy were already at full employment (Y_p), the extra demand would cause inflation rather than real output growth — the multiplier's impact on real output falls as the economy approaches capacity.

EXAM ALERT

The multiplier effect works in both directions. A decrease in government spending or a fall in exports triggers a negative multiplier — the initial withdrawal is amplified, causing a larger fall in GDP. This is why fiscal austerity during a recession can deepen the slump.

The Phillips Curve

HL examines the short-run trade-off between inflation and unemployment, as well as why this relationship breaks down in the long run and what it implies for economic policy.

Short-Run Phillips Curve (SRPC)

The **Phillips curve** shows an empirical inverse relationship between the unemployment rate and the inflation rate in the short run.

Inflation ↓ when Unemployment ↑ (and vice versa)

Economic intuition: When unemployment is low, workers have bargaining power — wages rise faster, increasing costs (pushing SRAS left) and consumer spending

(pushing AD right). Both forces increase inflation. Conversely, when unemployment is high, wage growth is subdued.

The SRPC appears to offer policymakers a **trade-off**: they can choose a point on the curve — tolerating higher inflation to achieve lower unemployment, or accepting higher unemployment to achieve lower inflation.

SRPC shifts:

- An **increase in inflation expectations** shifts the SRPC upward — workers anticipate higher prices and demand higher wages, causing both higher inflation and the same unemployment rate. This relationship is central to the adaptive expectations hypothesis.
- **Supply shocks** (oil price rise) shift the SRPC upward and right — stagflation (higher inflation and higher unemployment simultaneously).

Long-Run Phillips Curve (LRPC)

The **long-run Phillips curve (LRPC)** is **vertical** at the natural rate of unemployment (NRU). In the long run, there is no trade-off between inflation and unemployment.

Friedman-Phelps accelerationist hypothesis:

1. Suppose the economy is at the NRU with stable inflation (point A on the SRPC).
2. The government expands demand to reduce unemployment below the NRU (moves to point B — higher inflation, lower unemployment).
3. Workers and firms revise their inflation expectations upward.
4. Workers demand higher nominal wages to restore real wages. SRAS shifts left.
5. The economy returns to the NRU but with higher inflation (point C — now on a higher SRPC).
6. To keep unemployment below the NRU, the government must continuously accelerate inflation — hence the term “accelerationist.”
7. In the long run, output and unemployment return to their natural levels regardless of the inflation rate.

Policy implication: Attempts to keep unemployment permanently below the NRU through demand expansion will only generate ever-accelerating inflation, not permanently lower unemployment. Sustainable reductions in unemployment require supply-side policies that lower the NRU itself.

IB TIP

For HL essays on the Phillips curve, a strong answer distinguishes clearly between the short-run trade-off (SRPC, movement along the curve) and the long-run result (LRPC is vertical). Include the mechanism of expectations adjustment. Stagflation in the 1970s provided empirical evidence against the stable SRPC — it was a key challenge to Keynesian demand management and led to the monetarist/supply-side revolution in policy.

Practice Questions

Short-answer (Paper 2 style):

1. Explain the difference between nominal GDP and real GDP, and state which is more useful for comparing economic growth over time. (4 marks)
2. Using an AD/AS diagram, explain how a rise in household confidence can lead to demand-pull inflation. (4 marks)
3. Distinguish between structural and cyclical unemployment and explain one appropriate government policy for each. (4 marks)
4. Explain, using a diagram, how cost-push inflation differs from demand-pull inflation in its effects on the price level and real output. (4 marks)
5. **HL** In an economy: $MPC = 0.80$, $MPT = 0.10$, $MPM = 0.05$. Calculate the multiplier and the total change in national income if investment increases by 400 million dollars. (4 marks)

Essay questions (Paper 1 style):

6. (a) Explain the causes and consequences of demand-pull inflation using the AD/AS model. (10 marks) (b) Evaluate the use of monetary policy as a tool for reducing inflation. (15 marks)
7. (a) Explain the types of unemployment and their causes. (10 marks) (b) Evaluate the effectiveness of supply-side policies in reducing unemployment in the long run. (15 marks)

► Answer guidance — Question 5 (HL)

► Answer guidance — Question 6(b) evaluation points