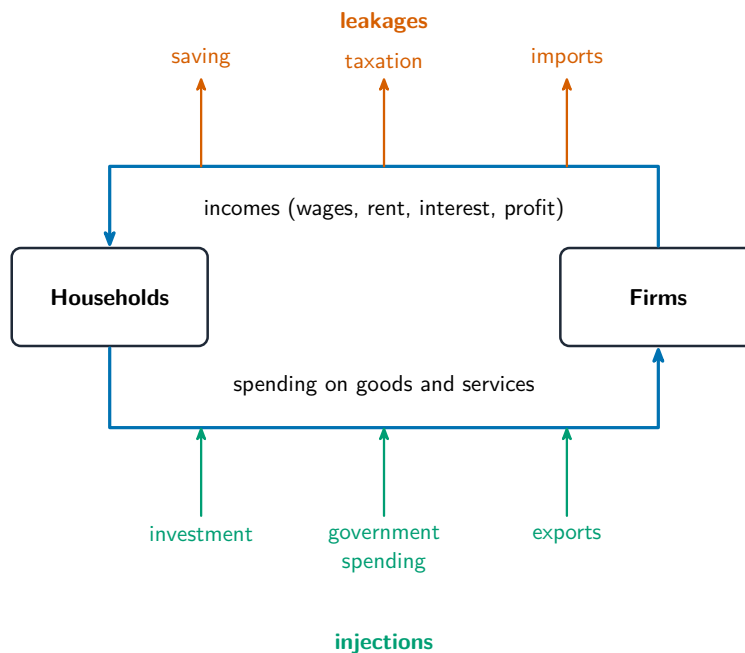


Economic Indicators and the Business Cycle

AP Macroeconomics

The Circular Flow and GDP

The **circular-flow model** links **households** supplying factors and earning income with **firms** producing goods and services. Spending on current domestic production generates income; transfers and existing financial assets do not themselves add to GDP.



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 the incomes earned in production: wages, rent, interest, and profit.

- **Value-added approach:** add each producer's sales minus its purchases of intermediate goods. For example, grain sells for \$2, flour for \$5, and bread for \$8. Total value added is $2 + (5 - 2) + (8 - 5) = 8$ dollars, equal to the final bread sale. Adding all three sales would double count.

Worked example (billions of dollars). If $C = 700$, $I = 200$, $G = 300$, exports are 150 and imports 100, GDP is $700 + 200 + 300 + (150 - 100) = 1250$. Buying shares is not investment in this GDP formula; a new factory machine is.

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), unreported production in 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. **Real GDP per capita** (real GDP $\div$ population) is a better welfare proxy than total GDP.

Real GDP per capita

Real output divided by population

Average output per person

Compare years at constant prices

Still does not tell us

How income is distributed

The value of unpaid housework

Pollution, leisure or health

Higher average output does not prove that every household is better off.

Real GDP per capita measures average output, not its distribution or all aspects of welfare



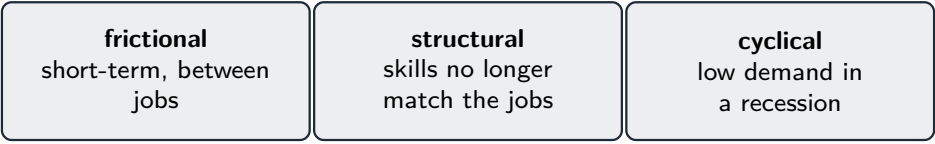
Museum visitors illustrate leisure and tourism, not unemployment. A queue alone cannot reveal employment status.

Comparison example (AP 2024 Set 1, Q2). Year 1: real GDP \$800,000, population 1,000, so output per person \$800. Year 2: nominal GDP \$1,035,000, deflator 115 (year 1 = 100), so real GDP \$900,000. Population 1,200 gives \$750 per person. Total

real output rose 12.5%; output per person fell 6.25%. Neither average proves every household's welfare.

Unemployment

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



Three types of unemployment: frictional, structural, and cyclical

Unemployment rate = $\frac{\text{unemployed}}{\text{labor force}} \times 100\%$, 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 $\frac{10}{160} \times 100\% = 6.25\%$ and the participation rate is $\frac{160}{200} \times 100\% = 80\%$.

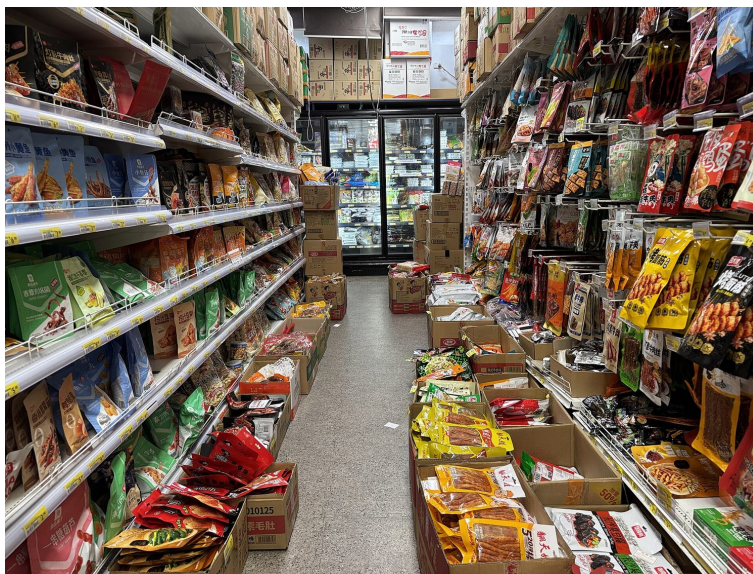
Three types of unemployment:

- **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 does not describe all unused labor. **Discouraged workers** have stopped looking, so are outside the labor force. **Underemployed** people working part time who want full-time work count as employed, not unemployed. If 5 million of the 10 million unemployed stop looking, with no new jobs, unemployment becomes $5/155 \times 100\% = 3.23\%$ and participation $155/200 \times 100\% = 77.5\%$. A falling unemployment rate need not mean more jobs.

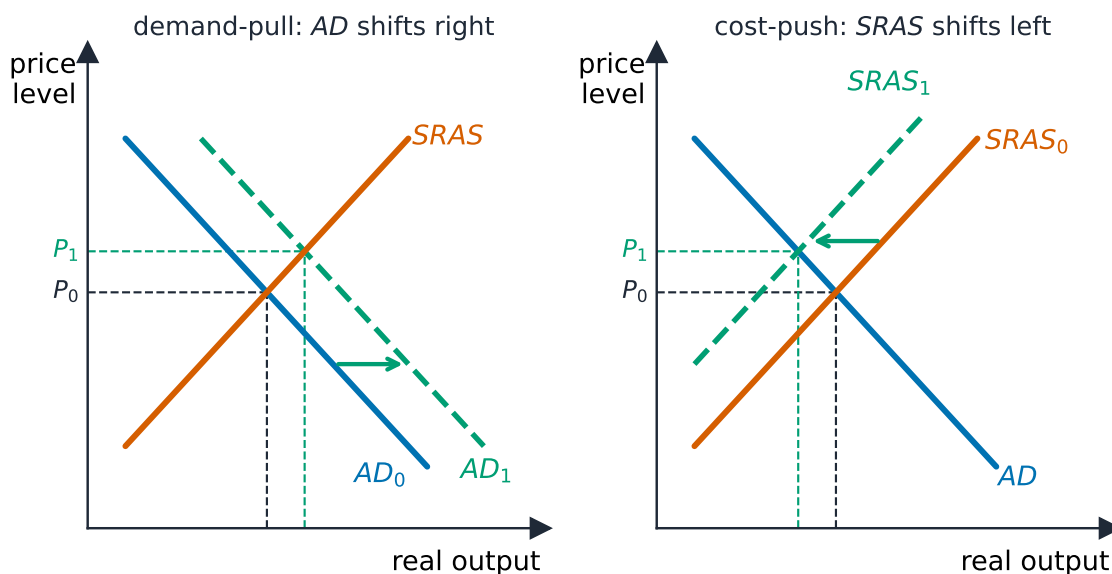
Classify the cause. First-job search is frictional; skills mismatch is structural; recession layoffs are cyclical. Actual unemployment 8% minus cyclical 3% gives natural 5%; subtract frictional 4% to find structural 1% (AP 2024 Set 1, Q1a). The natural rate can change.

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:



Unit 3 preview: demand-pull and cost-push inflation on the AD-AS diagram. Unit 2 calculations below use price indices.

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

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.

Read a series. In a fictional example, CPI values of 100, 110, 115 and 112 in four consecutive years imply inflation of 10%, 4.55% and -2.61%. Year 3 has disinflation: prices still rise, but more slowly. Year 4 has deflation: prices fall from year 3, yet remain 12% above the base year.

Substitution bias. If beef becomes dearer, households may buy more chicken. A fixed basket keeps the old quantities, so it can overstate the increase in the cost of maintaining living standards.

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:

- Unexpected inflation above the expected rate **hurts lenders** and **helps borrowers** on existing fixed nominal interest-rate loans: repayments buy less than expected. Unexpected deflation reverses this effect. Cash and incomes that do not adjust lose purchasing power when prices rise; indexed incomes may adjust.
- **Menu costs** and uncertainty discourage investment.
- **Anticipated** inflation can be allowed for in contracts and interest rates, reducing surprise redistribution; menu costs can still remain. 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. Compare real GDP across periods to measure output growth.

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

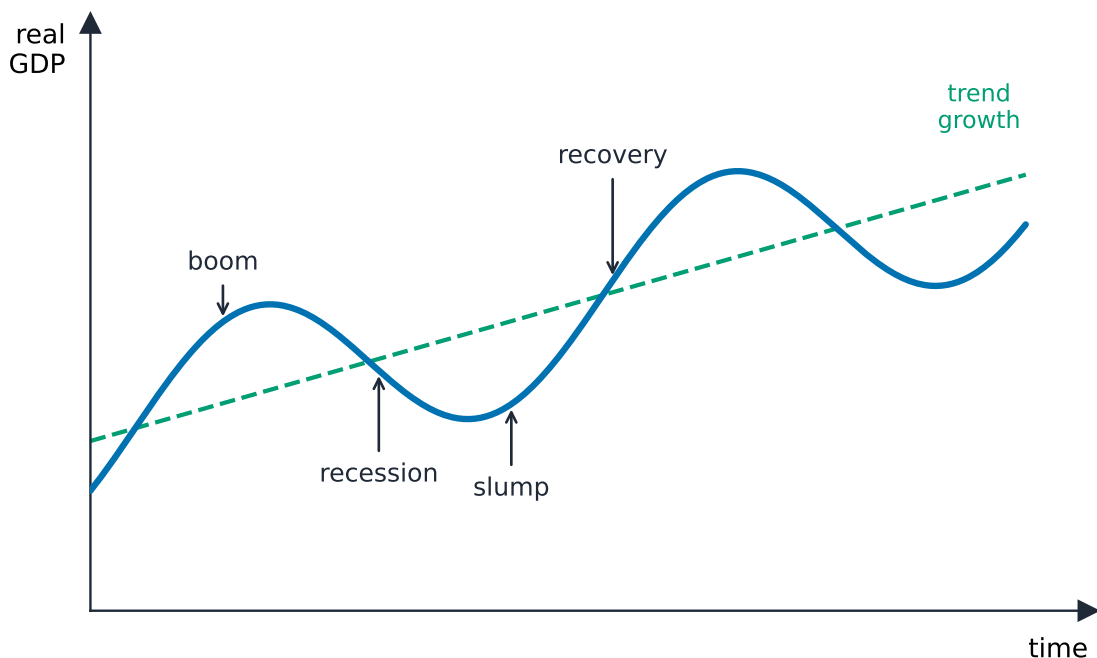
Worked example. Nominal GDP is \$22 trillion and the GDP deflator is 110. Real GDP is $\frac{22}{110} \times 100 = \$20$ trillion. The \$2 trillion difference reflects different price bases, not growth. If last year's real GDP was \$19 trillion, real growth is $(20 - 19)/19 \times 100\% = 5.26\%$. Growth needs an earlier value.

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** describes real GDP fluctuating around its long-run trend. **Expansion** (rising output) ends at a **peak**; **contraction/recession** (falling output) ends at a **trough**. These are two phases and two turning points. Recessions raise cyclical unemployment, but inflation need not fall: an adverse supply shock can reduce output while raising prices.

Output-gap example. Potential output is real GDP at full employment. If actual real GDP is \$1,140 billion and potential output \$1,200 billion, the gap is minus \$60 billion, or -5% of potential output: a recessionary gap. Positive gaps indicate actual output above potential, not automatically a higher long-run growth rate.



Real GDP swinging around its long-run trend

Exam tips

Show the formula and denominator before substituting. Distinguish final output from intermediate sales, unemployment from non-participation, and index levels from inflation rates. For growth, compare real values across years; for living standards, divide by population and state the limitations.