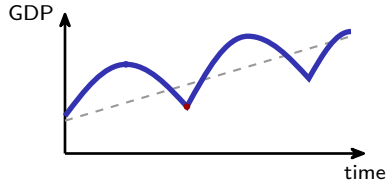


Economic Indicators & the Business Cycle

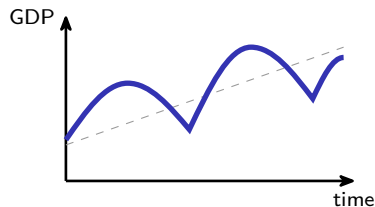
AP Macroeconomics ■ Unit 2

AP Macroeconomics



What we will cover

- 1 GDP and the circular flow
- 2 Limitations of GDP
- 3 Unemployment
- 4 Price indices and inflation
- 5 The costs of inflation
- 6 Real vs nominal GDP
- 7 The business cycle



1

GDP & circular flow

GDP: one number for total output

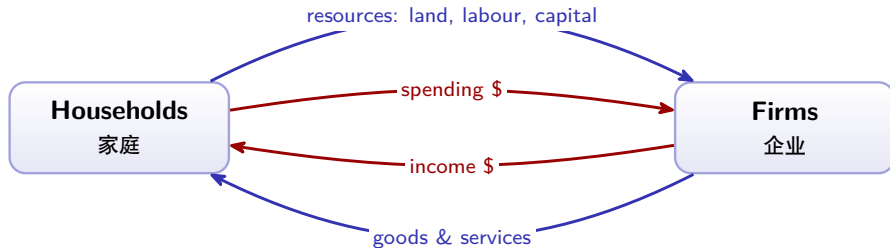
Gross domestic product 国内生产总值: market value of final output produced inside a country in one year.

One loaf, three producers: fictional dollars

Producer	Sale	Value added
Farmer: grain	2	2
Mill: flour	5	$5 - 2 = 3$
Bakery: bread	8	$8 - 5 = 3$
Total value added		$2 + 3 + 3 = 8$

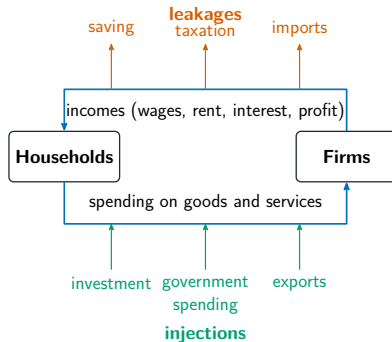
Final expenditure is \$8; value added and income generated also total \$8. Adding all sales gives \$15 and double counts.

The circular flow model



Spending on current production generates income, so **total spending = total income**.

The circular flow of income



The circular flow of income, with its leakages and injections

The circular flow, and the four spending categories

Circular-flow model

The **circular-flow model** 循环流量模型: households supply factors and buy goods; firms buy factors and sell goods. One side's spending is the other's income.

Consumption and investment

C is household spending; I is firms' spending on capital, plus new housing and inventory changes.

Government purchases

Government purchases 政府购买 G counts spending on goods and services – *not* transfer payments, which buy nothing new.

Net exports

$X - M$. Imports are subtracted because they were produced elsewhere, so $GDP = C + I + G + (X - M)$.

Gross domestic product (GDP) 国内生产总值 is the market value of all *final* goods and services produced within a country in a year.

Measuring GDP by spending

The expenditure approach

$$\text{GDP} = C + I + G + (X - M)$$

consumption, investment, government, net exports. Subtract imports M – made abroad.

Left out on purpose:

- **intermediate goods** 中间产品 – avoid double-counting
- **used goods** 二手商品 – counted when new
- **stocks & bonds** – nothing new made

Worked example (\$b)

$C = 700$, $I = 200$, $G = 300$,
 $X = 150$, $M = 100$.

$$\text{GDP} = 700 + 200 + 300 + (150 - 100)$$

$$\text{GDP} = \$1,250 \text{ billion}$$

Net exports $(X - M) = +50$: sold more abroad than bought.

2

Limitations of GDP

What GDP misses

Nonmarket 非市场: home cooking, volunteering – unpaid, so uncounted

Underground 地下经济: hidden work escapes the figures

Externalities 外部性: pollution lowers well-being, not GDP

GDP measures **output**, not well-being – it ignores leisure and the **distribution of income** 收入分配.

To compare living standards, use real **GDP per capita** 人均国内生产总值

$$= \frac{\text{real GDP}}{\text{population}}.$$

A huge total can still hide a low average.

What the measures leave out

Does recorded GDP capture the activity?

Parent provides unpaid childcare	Not included; no market transaction.
Parent pays a childcare provider	Market service included.
Unreported cash work	Can escape recorded output.
Factory output rises with pollution	GDP can rise while well-being falls.

GDP measures output. Distribution and environmental damage prevent a simple inference about welfare; there is no universal direction of welfare bias.

3

Unemployment

Measuring unemployment

Labor force 劳动力: employed plus unemployed (available and actively looking).

Fictional working-age population: 200 million

Employed 150; unemployed 10; outside the labor force 40.

$$LF = 150 + 10 = 160 \text{ million}$$

$$u = \frac{10}{160} \times 100 = 6.25\%, \quad LFPR = \frac{160}{200} \times 100 = 80\%$$

Part-time workers count as employed, even if they want full-time work. **Discouraged workers** 灰心工人 have stopped looking and are outside the labor force.

Three types of unemployment

Classify the cause, not the person

Graduate seeks a first job

Factory closes after automation; worker's skills do not match vacancies

Hotel cuts jobs as demand falls in a recession

Frictional 摩擦性失业: job search takes time.

Structural 结构性失业: skills mismatch.

Cyclical 周期性失业: weak aggregate demand.

Natural rate 自然失业率 = frictional + structural. At **full employment** 充分就业, cyclical unemployment is zero; actual unemployment need not be zero.

The natural rate, and the business cycle

AP 2024 Set 1, Q1(a)

Actual unemployment 8%; cyclical 3%; frictional 4%.

$$u_n = 8 - 3 = 5\%$$

Structural unemployment:

$$5 - 4 = 1\%$$

Why did the measured rate fall?

Start: 150 employed, 10 unemployed. Now 5 stop looking; no new jobs.

$$u = \frac{5}{155} \times 100 = 3.23\%$$

$$LFPR = \frac{155}{200} \times 100 = 77.5\%$$

The **natural rate of unemployment** 自然失业率 excludes cyclical unemployment. A lower measured rate alone does not prove job creation.

4

Inflation

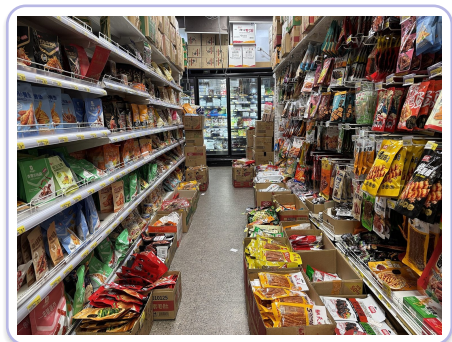
The price level and the CPI

Three words for how the **general price level** 一般价格水平 moves:

- **inflation** 通货膨胀 – prices **rising**
- **deflation** 通货紧缩 – prices **falling**
- **disinflation** 反通货膨胀 – still rising, but *slower*

The **consumer price index** (CPI) 消费者价格指数 prices a **fixed basket** of goods each period.

$$\text{index} = \frac{\text{basket cost now}}{\text{basket cost in base year}} \times 100$$



The CPI tracks a fixed consumer basket

Disinflation is not falling prices

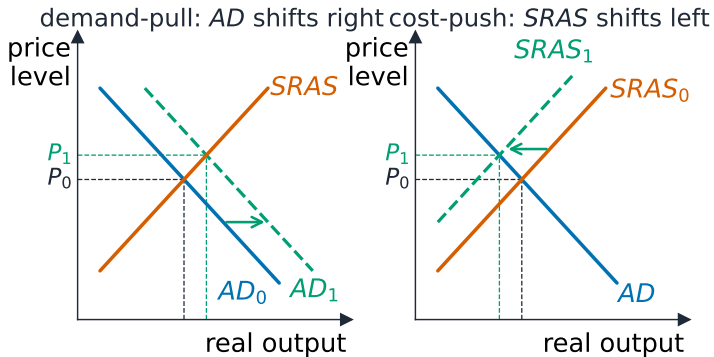
Fictional CPI series: use the previous year's index

Year	CPI	Annual inflation	Interpretation
1	100	—	Base year
2	110	10%	Inflation
3	115	4.55%	Disinflation: prices still rise
4	112	−2.61%	Deflation: prices fall

$$\pi_3 = \frac{CPI_3 - CPI_2}{CPI_2} \times 100 = \frac{115 - 110}{110} \times 100 \approx 4.55\%$$

Year 4 prices fall from year 3 but remain 12% above the base year. A lower inflation rate is different from a lower price level.

Price Indices and Inflation



Unit 3 preview: demand-pull and cost-push inflation. A supply shock can raise prices while output falls.

Reading the CPI – and its bias

Same basket, consecutive years

Year 1 (base): \$400. Year 2: \$440.

$$CPI_2 = \frac{440}{400} \times 100 = 110$$

$$\pi_2 = \frac{110 - 100}{100} \times 100 = 10\%$$

Substitution bias

Beef becomes dearer. Shoppers buy more chicken instead. The fixed basket still contains the original beef quantity. Its cost can rise faster than the cost of maintaining living standards.

An index of 110 means 10% above the base-year price level. It is a one-year inflation rate here only because year 1 immediately precedes year 2.

5

Costs of inflation

Who inflation hurts

A fixed nominal loan: fictional example

A lender expects \$1,050 repayment next year. Expected price index: 102; actual index: 110 (today = 100).

$$\text{Expected purchasing power} = \frac{1050}{102} \times 100 \approx \$1029$$

$$\text{Actual purchasing power} = \frac{1050}{110} \times 100 \approx \$955$$

The lender receives less purchasing power than expected; the borrower benefits from the lower real burden.

Surprise inflation reduces the real burden of fixed nominal repayments.

Which inflation costs remain?

Compare three contracts and decisions

Fixed nominal pension

Prices rise faster than payments: purchasing power falls.

Inflation-indexed pension

Payments adjust with the index; the same loss need not occur.

Shop updates its price lists

Menu costs remain even when inflation is expected.

Anticipated 预期到的 inflation can be built into contracts. Cash-management costs may remain; unexpected deflation benefits fixed-rate lenders at borrowers' expense.

6

Real vs nominal

Real vs nominal GDP

Fictional economy: billions of dollars

Year	Nominal GDP	GDP deflator	Real GDP
1 (base)	1,000	100	1,000
2	1,320	110	1,200

$$\text{Real GDP}_2 = \frac{1320}{110} \times 100 = 1200$$

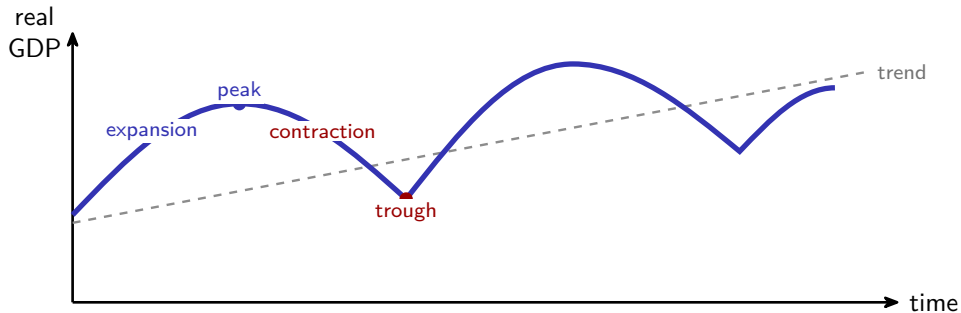
$$\text{Real growth} = \frac{1200 - 1000}{1000} \times 100 = 20\%$$

Nominal GDP 名义 GDP rose 32%; **Real GDP** 实际 GDP rose 20%. The 10% price rise compounds with output growth: $1.20 \times 1.10 = 1.32$.

7

Business cycle

The business cycle



Two phases and two turning points: **expansion** → **peak** → **contraction/recession** → **trough**. Expansion and contraction are phases; peak and trough mark reversals.

The four measures at a glance

AP 2024 Set 1, Q2: output and living standards

	Year 1 (base)	Year 2
Nominal GDP	800,000	1,035,000
GDP deflator	100	115
Population	1,000	1,200
Real GDP	800,000	$1,035,000 / 115 \times 100 = 900,000$
Real GDP per person	800	$900,000 / 1,200 = 750$

Total real GDP rises 12.5%, but real GDP per person falls 6.25%. Average output falls because population grows faster than real output.

Output gaps

Compare actual output to **potential output** 潜在产出 (real GDP at full employment):

$$\text{output gap} = \text{actual} - \text{potential}$$

- **recessionary gap** 衰退缺口: actual **below** potential – running cold
- **inflationary gap** 通货膨胀缺口: actual **above** potential – running hot

Worked example (\$b)

Potential = 1,200, actual = 1,140:

$$\text{gap} = 1,140 - 1,200 = -60$$

A recessionary gap – idle workers and factories, a case for **stabilization policy** 稳定政策.

Limitations of GDP

GDP per capita **shows**

- ✓ average output per person
- ✓ domestic production
- ✓ real change, if price-adjusted
- ✓ one living-standard indicator

but it **misses**

- ✗ how income is distributed
- ✗ unpaid household services
- ✗ pollution and resource use
- ✗ leisure, health, wellbeing

also check distribution, living conditions and measurement quality

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

Unemployment

frictional
short-term,
between
jobs

structural
skills no longer
match the jobs

cyclical
low demand in
a recession

Three types of unemployment: frictional, structural, and cyclical

Exam tips

- Compute GDP by the expenditure method $C + I + G + X_n$ and count only **final** goods (avoid double counting).
- Unemployment rate = unemployed $\div$ 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).

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Recap

Unit 2 – key takeaways

1

GDP

market value of final output;
spending = income = value
added

2

Unemployment

labour force = employed + looking;
natural rate at full employment

3

Inflation

CPI prices a fixed basket; real
GDP strips price changes out

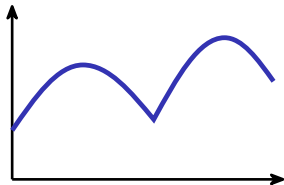
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Business cycle

expansion, peak, contraction,
trough; watch the output gap

Check yourself

- 1 In $C + I + G + (X - M)$, why subtract M ?
- 2 Which unemployment type rises in a recession?
- 3 Nominal GDP up on higher prices only – what is real GDP?
- 4 Actual GDP below potential – which gap?



Answers 1. imports are made abroad 2. cyclical 3. unchanged 4. recessionary gap