MACROECONOMICS Principles

Grades 9–12 · College | 8 pages

GDP · inflation and the CPI · unemployment · the business cycle and growth · aggregate demand and supply · money and banking · the Federal Reserve and monetary policy · fiscal policy and the multiplier · the Phillips curve · trade · exchange rates

1 GDP | 2 Inflation & CPI | 3 Unemployment | 4 Cycle & growth | 5 AD/AS | 6 Money timeline | 7 Money & banking | 8 Monetary policy | 9 Fiscal policy | 10 Phillips curve | 11 Trade | 12 Exchange rates | 13 Policy history | 14 Practice | 15 Key formulas | 16 Common errors | 17 Key terms

1 MEASURING OUTPUT: GDP

Expenditure approach: a made-up economy

Spending (billions)	$	Share
C Consumption (households)	14,000	66%
I Investment (machines, buildings, new homes, inventories)	3,500	16.5%
G Government purchases (not transfer payments)	4,200	19.8%
X Exports	2,300	
− **M** Imports	(2,800)	
NX Net exports = X − M	(500)	-2.4%
GDP = C + I + G + NX	**21,200**	100%

Nominal vs real

Two goods	2020	2025
Pizzas (qty × price)	100 × $10	120 × $12
Haircuts (qty × price)	50 × $20	60 × $22
Nominal GDP (that year's prices)	2,000	2,760
Real GDP (2020 prices)	2,000	2,400
GDP deflator = nominal ÷ real × 100	100	115

Nominal grew 38%, but real output grew only 20%; the rest was higher prices.

What counts

GDP market value of all **final** goods and services produced **within a country** in a year

Final good bought by the last user; counting parts too would count them twice

Not counted used goods, stocks and bonds, transfer payments (Social Security checks), unpaid home work, the underground economy

GNP output of a country's **people and firms**, wherever they are

The same economy, counted as income

Income approach (billions)	$
Compensation of employees	12,800
Rent	700
Interest	1,100
Proprietors' income	1,900
Corporate profits	2,600
Indirect business taxes	1,500
Depreciation	600
Total = GDP	**21,200**

Every dollar spent is a dollar earned, so both approaches give 21,200.

Value added: from wheat to bread

Stage	Sale price	Value added
Farmer: wheat	$0.40	$0.40
Miller: flour	$0.90	$0.50
Baker: bread	$2.50	$1.60
Total		**$2.50**

The sum of value added equals the price of the final loaf. Adding every sale (3.80) would count the wheat three times.

Using GDP

Real GDP per person real GDP ÷ population: the usual yardstick of living standards

Limits leaves out leisure, home production, the quality of goods and how output is shared

MEMORY TRICK **Once, final, here, now**
GDP counts each good **once**, only **final** goods, only what is made **here**, and only what is made **this year**. Simon Kuznets built the first U.S. national accounts in the 1930s.

2 INFLATION & THE CPI

A two-item basket (base year 2020)

Basket item	Qty	2020	2024	2025
Pizzas	10	$10	$11.50	$12
Haircuts	4	$20	$21.25	$22
Basket cost		180	200	208
CPI = cost ÷ base cost × 100		100	111.11	115.56

Inflation 2024 → 2025 = (115.56 − 111.11) ÷ 111.11 = **4%**.

Measuring prices

CPI BLS index of a fixed basket bought by city consumers; base 1982–84 = 100

CPI biases overstates the cost of living: substitution, new goods, better quality

Other indexes GDP deflator (all goods made here), PCE price index (the Fed's 2% goal)

Real wage and real interest WORKED

Wage rose $18.00 → $20.80 while the CPI went 100 → 115.56

Real 2025 wage in 2020 dollars: 20.80 ÷ 1.1556 = **$18**

no raise at all

Savings account pays 7%; inflation is 4%

Real interest rate ≈ 7% − 4% = **3%** *Fisher*

Quantity equation: M × V = P × Y

2,000 × 5 = P × 8,000 → **P = 1.25**; with V and Y steady, 10% more money → 10% higher prices

MV = PY

MEMORY TRICK
Real = nominal with prices peeled off
Divide by the price index (as a decimal) to turn any dollar figure into base-year dollars.

Terms

Inflation a rise in the **general** price level; **deflation** is a fall; **disinflation**, a slower rise

Demand-pull spending grows faster than output (too much money chasing too few goods)

Cost-push input costs jump (an oil shock) and push prices up

Who loses savers and lenders at fixed rates, people on fixed incomes; **who gains**: borrowers at fixed rates

Costs shoe-leather and menu costs, confusing price signals, taxes on inflated gains

"But thou shalt have a perfect and just weight, a perfect and just measure shalt thou have: that thy days may be lengthened in the land which the LORD thy God giveth thee." (Deuteronomy 25:15, KJV)

3 UNEMPLOYMENT

Counting the jobless

Made-up economy (millions)	Number
Adults 16+, civilian, not in institutions	250
Employed	156
Unemployed (no job, looked in the last 4 weeks)	9
Labor force = employed + unemployed	**165**
Not in the labor force	85
Unemployment rate = 9 ÷ 165	**5.45%**
Participation rate = 165 ÷ 250	**66%**

Four types

Type	Cause	Example
Frictional	between jobs, searching	a graduate interviewing
Structural	skills or place no longer match jobs	a typesetter after computers
Cyclical	a recession cuts spending	factory layoffs in a downturn
Seasonal	time of year	a lifeguard in winter

Terms

Natural rate — frictional + structural; the rate at full employment (roughly 4–5% in recent U.S. estimates)

Full employment — cyclical unemployment is zero, not unemployment

Discouraged workers — want work but stopped looking, so they are **not** counted; the rate can understate hardship

Underemployed — part-time but want full-time, or working below their skills

U-3 / U-6 — the official rate / a broad rate that adds discouraged and part-time-for-economic-reasons workers

MEMORY TRICK **Looking counts**
To be **unemployed** you must be **looking**. Stop looking and you leave the labor force; the rate can fall while no one finds a job.

Where the numbers come from

Report	Agency	How often
GDP	BEA	quarterly (first estimate about a month after the quarter)
Employment Situation (jobless rate, payrolls)	BLS	monthly, usually the first Friday
Consumer Price Index	BLS	monthly
PCE price index	BEA	monthly
Trade balance	Census and BEA	monthly
FOMC rate decision	Federal Reserve	8 scheduled meetings a year

Okun's rule of thumb WORKED

Each point of unemployment above the natural rate ≈ 2% of output lost

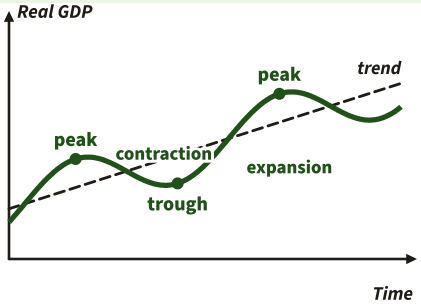
Unemployment 7%, natural rate 5%

Output gap ≈ −2 × (7 − 5) = **-4%** of potential

about

On $20 trillion potential: about **$0.8 trillion** not produced

4 THE BUSINESS CYCLE & GROWTH



Real GDP swings around its dashed long-run trend (potential output).

Rule of 70

Growth rate	Rule of 70	Exact doubling
1% a year	70 yrs	69.7 yrs
2% a year	35 yrs	35 yrs
3.5% a year	20 yrs	20.1 yrs
7% a year	10 yrs	10.2 yrs

Doubling time ≈ 70 ÷ growth rate. A country growing 3.5% doubles living standards in 20 years; at 1% it takes 70.

MEMORY TRICK **Seven fat years**
Joseph stored grain in the good years for the lean ones. Cycles come and go; growth is the trend underneath.

Phases and signals

Expansion — real GDP rising, unemployment falling

Peak — the top before a downturn

Contraction — real GDP falling; a **recession** is a significant, widespread decline lasting months (dated by the NBER)

Trough — the bottom

Depression — a severe, long contraction: 1929–33, real GDP fell about a quarter and unemployment reached about a quarter of workers

Indicators — **leading** (building permits, stock prices, new orders), **coincident** (payrolls, output), **lagging** (unemployment duration)

Downturns are shorter than booms

Recent U.S. recessions (NBER)	Months
July 1981 – November 1982	16
July 1990 – March 1991	8
March 2001 – November 2001	8
December 2007 – June 2009	18
February 2020 – April 2020	2

The four complete expansions since 1982 each lasted about 6 to 11 years.

Small rates, big gaps

$10,000 a person, 35 years	Ends at
1% a year	$14,166
2% a year	$19,999
3% a year	$28,139

Two points of growth a year is the difference between $14,166 and $28,139 a generation later.

Long-run growth

Sources of growth — more and better **physical capital**, **human capital** (skills, health), **technology**, natural resources

What lets them grow — secure **property rights**, the **rule of law**, stable money, open trade, saving and investment, freedom to start a business

Productivity — output per hour of work: the long-run source of higher real wages

Shown on graphs — the PPF and the LRAS shift **out**

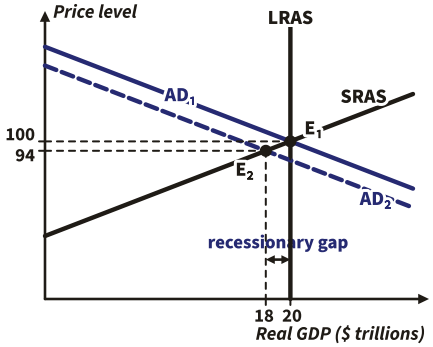
"And that food shall be for store to the land against the seven years of famine, which shall be in the land of Egypt; that the land perish not through the famine." (Genesis 41:36, KJV)

5 AGGREGATE DEMAND & AGGREGATE SUPPLY

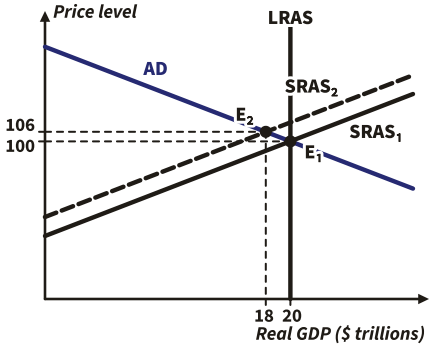
Schools of thought

	Classical and monetarist	Keynesian	Supply-side
Wages and prices	flexible; markets clear	sticky; slumps can last	respond to incentives
Recessions	correct themselves	may need a push	ease barriers to work and investment
Policy emphasis	steady money growth; rules	active spending and rate changes	lower tax rates on work, saving, investment
Names	Adam Smith, Milton Friedman	John Maynard Keynes	Robert Mundell, Arthur Laffer

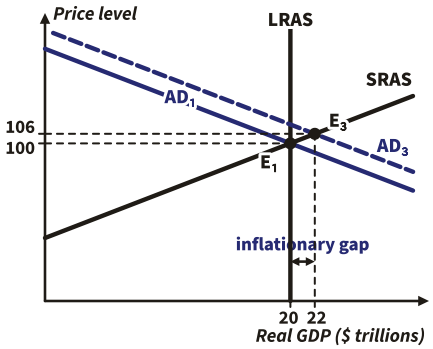
Each school stresses different parts of the same model; most economists borrow from more than one.



Spending falls ($AD_1 \rightarrow AD_2$): output drops below potential and a recessionary gap opens.



An oil shock ($SRAS_1 \rightarrow SRAS_2$): prices up and output down at once, stagflation.



Spending booms (AD_3): output passes potential and prices rise; an inflationary gap.

Terms

AD slopes down — the **wealth**, **interest-rate** and **exchange-rate** effects

SRAS slopes up — some input prices (wages) are sticky in the short run

LRAS is vertical — at **potential output**, set by resources and technology, not the price level

Inflationary gap — output **above** potential; wages and prices tend to rise

Self-correction — wages adjust and SRAS returns to potential; how fast is debated

MEMORY TRICK **W-I-X**
Three reasons AD slopes down: **W**ealth, **I**nterest rate, e**X**change rate.

Reading the graph WORKED

AD_1: P = 160 − 3Y; SRAS: P = 40 + 3Y
Start: Y = **20**, P = **100** = potential (LRAS) — E_1
AD_2: P = 148 − 3Y (households cut spending)
New: Y = **18**, P = **94** — E_2
Gap = 20 − 18 = **2 trillion** below potential
recessionary

What shifts the curves

AD shifts with	SRAS shifts with
consumer wealth and confidence	input prices (wages, oil)
business expectations and interest rates	productivity and technology
government spending and taxes	business taxes, subsidies, regulation
the money supply	supply shocks (drought, war)
foreign incomes and the exchange rate	expected inflation

Short-run effects

Shock	Price level	Real GDP	Unemployment
AD ↑	↑	↑	↓
AD ↓	↓	↓	↑
SRAS ↑	↓	↑	↓
SRAS ↓ (stagflation)	↑	↓	↑
LRAS ↑ (growth)	↓	↑	—

6 THE STORY OF MONEY: A TIMELINE

From coins to fiat money

When	What happened	Lesson
600s B.C.	Lydia (in today's Turkey) strikes the first coins; Croesus later issues gold and silver ones	stamped weight builds trust
200s A.D.	Rome cuts the silver in its coins again and again; prices soar	debasement is inflation
1252	Florence mints the gold florin, trusted across Europe	sound coin travels
1545 on	Silver from Potosí (Bolivia) floods Spain and Europe; prices rise for a century	more money, higher prices
1600s	London goldsmiths issue receipts and lend out stored gold	fractional reserves
1694	The Bank of England is founded; it later becomes lender of last resort	central banking
1791	Hamilton's First Bank of the United States	a national bank
1900–1913	Gold Standard Act (1900); Panic of 1907; Federal Reserve Act (1913)	gold and a central bank
1933–34	Americans must turn in gold coin; gold is repriced at $35 an ounce	government sets the gold price
1944	Bretton Woods: currencies pegged to the dollar, the dollar to gold at $35	fixed exchange rates
Aug 15, 1971	The U.S. stops exchanging dollars for gold with foreign governments	fiat money
1973 on	Major currencies float; central banks manage fiat money	floating rates

7 MONEY & BANKING

Three functions of money

Medium of exchange accepted in trade, ending barter's "double coincidence of wants"

Unit of account a common measure of value

Store of value holds buying power over time (if inflation is low)

Banking history in brief

Fractional reserve goldsmiths in London lent out gold left with them and found few depositors came at once

Bank run depositors rush to withdraw; the **FDIC** (1933) now insures $250,000 per depositor, per bank, per ownership category

Lender of last resort a central bank lends to sound banks in a panic (the Bank of England from the 1800s; the Fed since 1913)

Kinds of money

Kind	Meaning	Example
Commodity	valuable in itself	gold and silver coins (Lydia), salt
Representative	paper redeemable in a commodity	gold certificates
Fiat	money by government decree	U.S. dollar since 1971

Money creation from a $1,000 deposit

Round	Deposit	Reserve (10%)	Loan
1	1,000	100	900
2	900	90	810
3	810	81	729
4	729	72.9	656.1
Total	10,000	1,000	9,000

Money multiplier = 1 ÷ reserve ratio = 1 ÷ 0.10 = **10**. Maximum new deposits = 1,000 × 10 = 10,000. Cash held outside banks and extra reserves make the real multiplier smaller.

Measuring the money supply

M1 currency, checking deposits and other liquid deposits (including savings since 2020)

M2 M1 + small time deposits (CDs) + retail money market funds

Not money credit cards (a loan), stocks, bonds

A bank's balance sheet (T-account)

First Bank	Assets	Liabilities
Reserves (required 10%)	100	
Loans	900	
Checking deposits		1,000
Total	**1,000**	**1,000**

Assets = liabilities + owners' capital. Banks keep a **fraction** of deposits and lend the rest.

MEMORY TRICK **Swap, score, save**

Money lets you **swap** (medium of exchange), **score** prices (unit of account) and **save** (store of value).

"The rich ruleth over the poor, and the borrower is servant to the lender." (Proverbs 22:7, KJV)

8 THE FEDERAL RESERVE & MONETARY POLICY

The central bank

Created 1913 (the Federal Reserve Act, planned at Jekyll Island in 1910)

Structure a 7-member **Board of Governors** in Washington, **12 regional Federal Reserve Banks**, and the **FOMC** (the 7 governors + 5 bank presidents), which sets policy

Goals Congress's **dual mandate**: maximum employment and stable prices (a 2% inflation goal since 2012)

Independence governors serve 14-year terms, so policy is set apart from elections

Both balance sheets

$50 million purchase	Assets	Liabilities
Fed: government bonds	+50	
Fed: bank reserves (owed to banks)		+50
Banks: bonds	−50	
Banks: reserves at the Fed	+50	

The Fed pays by crediting reserves: new money in the banking system.

MEMORY TRICK

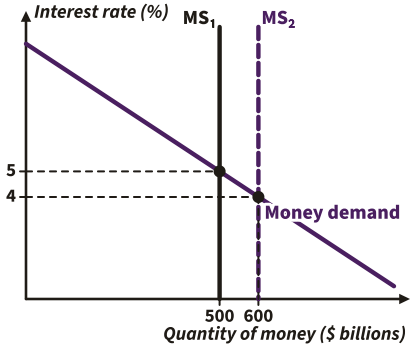
Buy builds, sell shrinks

When the Fed **buys** bonds, bank reserves **build** and money expands. When it **sells**, reserves **shrink**.

Tools

Tool	To expand	To contract
Interest on reserve balances (main tool today)	lower it	raise it
Open market operations: buying or selling government bonds	buy bonds	sell bonds
Discount rate on Fed loans to banks	lower it	raise it
Reserve requirement (set to 0% in March 2020)	lower it	raise it

The FOMC sets a target range for the **federal funds rate** (banks' overnight lending rate to each other) and uses the tools to keep it there.



More money (500 → 600) lowers the interest rate from 5% to 4%.

How policy travels

Step	Expansionary	Contractionary
Fed action	buys bonds; lowers rates	sells bonds; raises rates
Interest rates	↓	↑
Borrowing, investment, home buying	↑	↓
Aggregate demand	↑ (shifts right)	↓ (shifts left)
Output and jobs	↑	↓
Price level	↑	↓
Dollar	tends to weaken	tends to strengthen

Open market purchase WORKED

The Fed buys $50 million of bonds from banks

Bank reserves rise $50 million

At a 10% reserve ratio, deposits can grow up to 50 × 10 = **$500 million**

maximum

In practice

Lags policy takes months to a couple of years to reach prices and jobs

Limits near a zero interest rate the usual tool runs out; the Fed has then bought long-term bonds (**quantitative easing**)

Debate economists differ on rules versus discretion and on how big and fast effects are

9 FISCAL POLICY & THE MULTIPLIER

Multipliers (MPC = marginal propensity to consume)

MPC 0.8: spending multiplier **5**, tax multiplier **-4**. Raising spending and taxes by the same amount: multiplier **1**.

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

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

Terms

Fiscal policy — Congress and the President changing **government spending** and **taxes**

Automatic stabilizers — income taxes and unemployment benefits that rise and fall with the economy, no new law needed

Deficit / surplus — one year's spending minus revenue; the **national debt** is the running total of past deficits

Lags — recognizing, passing and spending take time; help can arrive after the recession ends

Views differ — some economists stress multipliers, others crowding out, incentives and debt costs

Why $100 of new spending becomes $500

Round	New spending	Saved (20%)
1	100	20
2	80	16
3	64	12.80
4	51.20	10.24
All rounds	500	100

Each round, people spend 80% of new income and save 20%: $100 \times (1 + 0.8 + 0.8^2 + \ldots) = 100 \div 0.2$.

Closing a $1 trillion gap (simple model) — WORKED

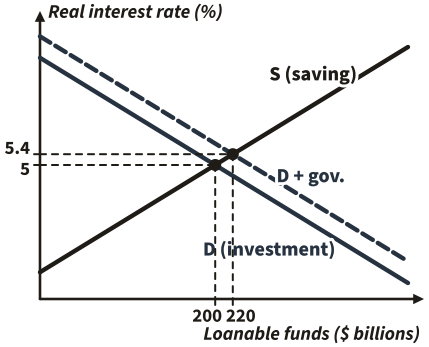
Output is $1 trillion below potential; MPC = 0.8

Raise spending by $1 \div 5$ = **$0.2 trillion** *or*

Cut taxes by $1 \div 4$ = **$0.25 trillion**

Price changes and crowding out make the real effect smaller

caution



More government borrowing (D → D + gov.) raises the real rate from 5% to 5.4%; private investment falls from 200 to 180: crowding out.

Marginal vs average tax rate

Made-up brackets	Rate	Tax on $60,000
First $10,000	10%	1,000
$10,001–$40,000	20%	6,000
Above $40,000	30%	6,000
Total tax		**13,000**

Marginal rate (on the next dollar) **30%**; average rate 13,000 ÷ 60,000 = **21.67%**. Moving into a higher bracket taxes only the dollars above the line.

Tax structures

Proportional (flat) — same average rate at every income

Graduated — the average rate rises with income (the U.S. income tax)

Regressive — the average rate falls as income rises (a sales tax as a share of income)

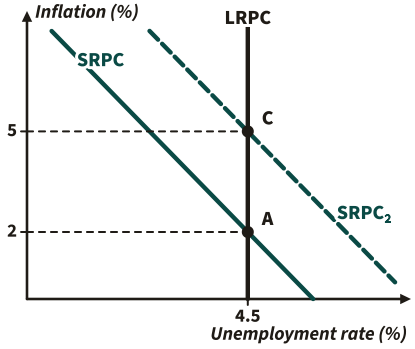
Taxes as principle

Tax principle (Adam Smith, 1776)	Meaning
Ability to pay	in proportion to means
Certainty	clear amount and date
Convenience	collected when easy to pay
Economy	cheap to collect

MEMORY TRICK **A dollar that echoes**

New spending is someone's income, and part of it is spent again. The smaller the share saved (MPS), the louder the echo: multiplier = 1 ÷ MPS.

10 THE PHILLIPS CURVE & THE POLICY MIX



Short run: lower unemployment comes with higher inflation. Long run: unemployment returns to the natural rate; higher expected inflation shifts SRPC up.

MEMORY TRICK **Short trade, long wall**

In the **short** run there is a **trade**-off. In the **long** run the Phillips curve is a **wall** at the natural rate.

One path

Point	Unemployment	Inflation
A (start, natural rate)	4.5%	2%
B (demand push, short run)	3.5%	3.5%
C (long run, expectations up)	4.5%	5%

SRPC: inflation = 8.75 − 1.5 × unemployment. Pushing unemployment below the natural rate bought only a temporary gain.

Two kinds of policy

Goal	Fiscal tool	Monetary tool
Fight a recession	spend more or tax less	lower rates, buy bonds
Fight inflation	spend less or tax more	raise rates, sell bonds
Who decides	Congress and the President	the Fed (FOMC)
Speed to act	slow to pass	fast to decide, slow to work

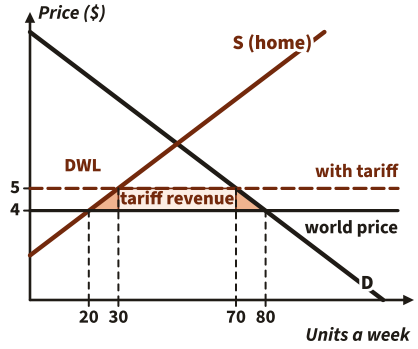
Terms

Phillips curve — A. W. Phillips (1958) found low unemployment years had faster wage growth

Long run — vertical at the natural rate: no lasting trade-off (Friedman and Phelps)

1970s — high inflation **and** high unemployment broke the simple trade-off

11 INTERNATIONAL TRADE



A $1 tariff on a $4 world price

Who gains, who pays

$1 tariff (Qd = 120 − 10P, Qs = 10P − 20)	Before ($4)	After ($5)
Quantity demanded	80	70
Home production	20	30
Imports	60	40
Tariff revenue 1 × 40		40
Deadweight loss ½ × 1 × 10 + ½ × 1 × 10		10

Home producers and the treasury gain; buyers pay more. The two triangles are lost to everyone.

Trade terms

Comparative advantage — nations gain by making what they give up least to make (Ricardo); see the micro sheet

Tariff — a tax on imports

Quota — a limit on import quantity; the price rises but no tariff revenue is collected

Embargo — a ban on trade with a country

WTO — the World Trade Organization (1995) sets trade rules among its members

Arguments made for limits — national security, infant industries, answering unfair practices, protecting particular jobs

Arguments made against — higher prices, retaliation, protected firms grow less efficient

The two big accounts

Balance of payments (billions)	$
Goods exports − imports: 120 − 150	(30)
Services, net	12
Income from abroad, net	5
Transfers, net	(7)
Current account	**(20)**
Financial account: net foreigners' purchases of home assets	**20**
Sum (ignoring errors)	0

A current-account deficit is matched by a financial-account surplus: dollars spent abroad come back to buy home assets.

MEMORY TRICK

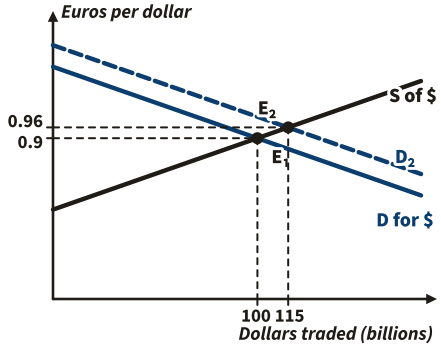
Every dollar comes home

Dollars paid for imports end up buying U.S. goods, services or assets. The accounts always balance.

History

The Corn Laws taxed imported grain in Britain until 1846; the container ship (1956) cut shipping costs and helped world trade grow.

12 EXCHANGE RATES



Europeans want more U.S. goods: demand for dollars rises and the dollar **appreciates** from €0.9 to €0.96.

Two systems

	Floating	Fixed (pegged)
Rate set by	supply and demand	the government or central bank
Shocks absorbed by	the exchange rate	reserves, interest rates, prices
Gives up	certainty for traders	independent monetary policy
Examples	dollar, euro, yen	gold standard; Hong Kong dollar to U.S. dollar

Converting and comparing WORKED

The rate goes from ¥150 to ¥160 per dollar

The dollar **appreciated** 6.67%; the yen depreciated

A ¥3,000 meal costs an American $20 → **$18.75**
cheaper trips

A $30 U.S. book costs a Japanese buyer ¥4,500 → **¥4,800**
harder to export

PPP: a $6 sandwich costs ¥900 → PPP rate **¥150** per $
purchasing power parity

At ¥160, the yen is **undervalued** by PPP

What moves the rate

Change	Effect on the dollar
Foreigners buy more U.S. goods or assets	demand ↑ → appreciates
U.S. interest rates rise relative to others	demand ↑ → appreciates
Americans buy more imports	supply of $ ↑ → depreciates
U.S. inflation is higher than abroad	depreciates
Speculators expect a rise	appreciates now
Incomes abroad rise	demand ↑ → appreciates

Terms

Exchange rate — the price of one currency in another

Appreciate — buys more foreign currency: imports cheaper, exports harder

Depreciate — buys less: exports easier, imports dearer

Floating — set by the market (major currencies since 1973)

Devaluation — a government lowering a fixed rate on purpose

Fixed / pegged — a government holds the rate; the gold standard and **Bretton Woods** (1944–71) were fixed systems

PPP — in the long run a basket should cost the same everywhere once converted

MEMORY TRICK

Strong dollar, cheap trips

A **strong** (appreciated) dollar makes trips and imports **cheap** and makes U.S. exports **hard** to sell.

13 POLICY IN HISTORY

Five episodes

Episode	What happened (approximate figures)	Policy response	What economists took from it
German hyperinflation, 1923	the government printed marks to pay its bills; by November a dollar cost over 4 trillion marks	a new currency (the Rentenmark) with strict limits on its supply	money printed to cover spending can destroy a currency
Great Depression, 1929–33	real GDP fell about a quarter; unemployment near 25% by 1933; the money supply fell about a third; thousands of banks failed	little at first; then deposit insurance (FDIC, 1933), leaving gold coin, New Deal spending	Keynes stressed collapsing spending; Friedman and Schwartz stressed the shrinking money supply
Stagflation, 1970s	oil shocks in 1973 and 1979; inflation near 13.5% in 1980 alongside high unemployment	wage and price controls (1971), then tighter money	supply shocks and expectations matter; the simple Phillips trade-off failed
Disinflation, 1979–82	Fed chair Paul Volcker let the federal funds rate climb near 20%; unemployment reached about 10.8% in 1982	tight money held until inflation fell to about 3% by 1983	credible central banks can end inflation, at a cost in jobs
Great Recession, 2007–09	housing prices and mortgage lending collapsed; unemployment peaked at 10% in 2009	rates cut to near zero; Fed bond buying (quantitative easing); bank rescues and stimulus spending	financial crises deepen recessions; debate over rescues and debt continues

Economists still weigh these causes differently; the sheet reports the main views without choosing among them.

14 PRACTICE WITH ANSWERS

Seventeen problems across the sheet

#	Problem	Answer (every number recomputed by the build)
1	C = 900, I = 300, G = 250, X = 120, M = 170. GDP?	900 + 300 + 250 + (120 − 170) = **1,400**
2	The CPI rose from 240 to 252. Inflation?	(252 − 240) ÷ 240 = **5%**
3	190 million employed, 10 million unemployed. Unemployment rate?	10 ÷ 200 = **5%**
4	MPC = 0.75. Spending and tax multipliers?	1 ÷ 0.25 = **4**; −0.75 ÷ 0.25 = **-3**
5	Reserve ratio 20%; a $500 deposit. Maximum new loans in the whole system?	500 × 5 = 2,500 deposits; new loans **$2,000**
6	Real GDP per person grows 2.5% a year. Years to double (rule of 70)?	70 ÷ 2.5 = **28 years**
7	Nominal rate 6%, expected inflation 2.5%. Real rate?	6 − 2.5 = **3.5%**
8	Nominal GDP 1,200 and the deflator is 120. Real GDP?	1,200 ÷ 1.20 = **1,000**
9	A recession: which way should AD shift, and name one fiscal and one monetary tool.	Right: more spending or lower taxes; buy bonds or lower rates
10	€0.90 per dollar. What does a €45 jacket cost in dollars?	45 ÷ 0.90 = **$50**
11	Income $25,000 with the sheet's made-up brackets. Tax and average rate?	1,000 + 15,000 × 0.20 = **$4,000**; **16%**
12	Real GDP grows from $20.0 to $20.6 trillion. Growth rate?	0.6 ÷ 20 = **3%**
13	M = 3,000, V = 4, real output Y = 10,000. Price level?	3,000 × 4 ÷ 10,000 = **1.2**
14	The Fed sells $20 million of bonds; reserve ratio 10%. Largest change in deposits?	−20 × 10 = **−$200 million**
15	¥160 per dollar. What does a $40 U.S. shirt cost in yen?	40 × 160 = **¥6,400**
16	A $50,000 loan: rate goes from 6% to 9%. Extra interest a year?	50,000 × 0.03 = **$1,500**
17	Unemployment 8%, natural rate 5%. Output gap by Okun's rule?	−2 × (8 − 5) = **-6%** of potential

Macro on Main Street (see the Seven Small Businesses course)

The economy changes	What a small bakery feels	A sensible response
Interest rates rise from 6% to 9%	a $50,000 oven loan costs **$1,500** more interest a year	borrow less, lock in a fixed rate, pay down debt
Inflation runs 4%	flour, butter and wages cost more each year	review prices; track profit in real terms
A recession arrives	fewer customers, and they shop on price	trim waste; keep a cash reserve for lean months
The dollar strengthens	imported vanilla gets cheaper; fewer foreign tourists	buy imported supplies ahead
A tariff on imported mixers	new equipment costs more	compare home suppliers or repair the old one
Unemployment is low	hiring is hard and wages rise	train and keep good workers
The local economy booms	more orders than one oven can bake	expand with care; plan for the next downturn

MEMORY TRICK **Name the rule first**
GDP: C + I + G + NX. Rates: part ÷ whole. Change: (new − old) ÷ old.
Multipliers: 1 ÷ MPS and 1 ÷ reserve ratio.

"Wealth gotten by vanity shall be diminished: but he that gathereth by labour shall increase." (Proverbs 13:11, KJV)

15 KEY FORMULAS

All in one place

Quantity	Formula	Example on this sheet
GDP (expenditure)	C + I + G + (X − M)	14,000 + 3,500 + 4,200 − 500 = 21,200
Real GDP	nominal ÷ (deflator ÷ 100)	2,760 ÷ 1.15 = 2,400
CPI	basket cost ÷ base-year cost × 100	208 ÷ 180 × 100 = 115.56
Inflation rate	(new index − old) ÷ old × 100	4%
Real value	nominal ÷ (price index ÷ 100)	$20.80 ÷ 1.1556 = $18.00
Real interest rate	nominal − expected inflation	7% − 4% = 3%
Quantity equation	M × V = P × Y	2,000 × 5 = 1.25 × 8,000
Unemployment rate	unemployed ÷ labor force × 100	9 ÷ 165 = 5.45%
Participation rate	labor force ÷ adult population × 100	165 ÷ 250 = 66%
Growth rate	$(Y_{new} - Y_{old}) \div Y_{old} \times 100$	real GDP +20%
Rule of 70	doubling years ≈ 70 ÷ growth %	70 ÷ 3.5 = 20 years
Spending multiplier	1 ÷ (1 − MPC) = 1 ÷ MPS	1 ÷ 0.2 = 5
Tax multiplier	−MPC ÷ (1 − MPC)	−0.8 ÷ 0.2 = −4
Money multiplier	1 ÷ reserve ratio	1 ÷ 0.10 = 10
Appreciation %	(new rate − old) ÷ old × 100	¥150 → ¥160 = 6.67%
PPP rate	price abroad ÷ price at home	900 ÷ 6 = ¥150 per $

16 COMMON ERRORS

Ten common slips

Slip	Right way
Counting intermediate goods or used goods in GDP	final, new goods only
Counting Social Security checks in G	transfers are not purchases
Calling stock purchases “investment” in GDP	I means new capital goods, new homes and inventories
Using nominal GDP to compare years	use real GDP
Counting discouraged workers as unemployed	they are out of the labor force
Thinking full employment means 0% unemployment	it means no cyclical unemployment
Saying the Fed sets the prime rate or taxes	the Fed targets the federal funds rate; Congress taxes and spends
Mixing up fiscal and monetary policy	fiscal = spending and taxes; monetary = money and interest rates
Treating the deficit and the debt as the same	deficit = one year; debt = the running total
A weaker dollar hurts exporters	it **helps** exporters and hurts importers

Graph checklist

- AD/AS: label P and real GDP; draw LRAS at potential.
- Money market: money supply is vertical; demand slopes down.
- Phillips: inflation on the vertical axis; LRPC at the natural rate.
- Exchange rate: label the axis “foreign currency per dollar” and say which currency appreciated.

MEMORY TRICK **Two teams, two toolkits**

Fiscal = Congress and the President: spending and taxes. **Monetary** = the Fed: money and interest rates.

17 KEY TERMS

A–C

Aggregate demand — total spending on final goods at each price level

Aggregate supply — total output firms offer at each price level

Appreciation — a currency buying more foreign currency

Balance of payments — record of a nation’s transactions with the world

Commodity money — money with value of its own (gold, silver)

D–N

Deflation — a falling price level

Disinflation — inflation slowing but still positive

Fiat money — money by government decree, not backed by a commodity

Hyperinflation — extremely fast inflation (often above 50% a month)

Liquidity — how easily an asset becomes spendable money

National debt — the total the federal government owes

O–V

Output gap — actual minus potential real GDP

Potential GDP — output at the natural rate of unemployment

Recession — a broad fall in activity lasting months

Stagflation — inflation and stagnant output at once

Velocity — how many times a dollar is spent in a year