UNIT 3

National Income and Price Determination

The aggregate demand–aggregate supply model, multipliers, output gaps, and fiscal policy

17–27%	10–12	9
EXAM WEIGHTING	CLASS PERIODS	TOPICS IN UNIT

Teacher presentation · Aligned to the College Board Course and Exam Description

What This Unit Covers

TOPICS IN THIS UNIT

- 3.1 Aggregate Demand (AD)
- 3.2 Multipliers
- 3.3 Short-Run Aggregate Supply (SRAS)
- 3.4 Long-Run Aggregate Supply (LRAS)
- 3.5 Equilibrium in the AD–AS Model
- 3.6 Changes in the AD–AS Model (Short Run)
- 3.7 Long-Run Self-Adjustment
- 3.8 Fiscal Policy
- 3.9 Automatic Stabilizers

BIG IDEAS

- MOD — Macroeconomic Models: How do spending and production decisions affect an economy?
- POL — Macroeconomic Policies: How do taxation and government spending affect an economy?

WHY IT MATTERS

The AD–AS model represents the relationship between the price level and aggregate output, and shows how output, employment, and the price level respond to spending decisions, shocks, and policy. It is the single most-tested model on the AP Exam.

17–27% of the AP Exam multiple-choice and free-response score

TOPIC 3.1

Aggregate Demand

Enduring Understanding MOD-2 — Economists use the AD–AS model to represent the relationship between the price level and aggregate output.

LEARNING OBJECTIVES: MOD-2.A — Define the AD curve; explain its slope and its determinants.

The Aggregate Demand Curve

Aggregate demand shows the relationship between the price level and the total quantity of real output demanded in an economy.

- AD = C + I + G + Xn — consumption, investment, government spending, and net exports.
- The axes are PRICE LEVEL (vertical) and REAL GDP (horizontal) — not price and quantity.
- AD slopes downward: a lower price level is associated with a greater quantity of real output demanded.
- A change NOT caused by the price level shifts the whole AD curve.

KEY TAKEAWAY

AD is total spending in the economy. Always label the axes 'Price Level' and 'Real GDP' — mislabeling them is the most common AD-AS error.

Why Aggregate Demand Slopes Downward

The AD curve's negative slope is explained by three distinct effects — NOT by the substitution and income effects behind the micro demand curve.

1 Real Wealth Effect

A higher price level reduces the real purchasing power of money and fixed-value assets. Households feel poorer, so they consume less — quantity of real output demanded falls.

2 Interest Rate Effect

A higher price level increases the demand for money, which raises interest rates. Higher rates discourage investment and interest-sensitive consumption.

3 Exchange Rate Effect

Higher domestic prices (and higher interest rates) affect the currency and make domestic goods relatively expensive — exports fall and imports rise, so net exports decline.

Shifts of Aggregate Demand

Any change in C, I, G, or Xn that is NOT caused by the price level shifts the entire AD curve.

- CONSUMPTION shifters: consumer confidence, household wealth, expectations, taxes on households.
- INVESTMENT shifters: business confidence, interest rates, expected returns, business taxes.
- GOVERNMENT spending: a direct policy lever — more G shifts AD right.
- NET EXPORTS shifters: foreign income, exchange rates, relative price levels and trade policy.
- Rightward shift = increase in AD; leftward shift = decrease in AD.

KEY TAKEAWAY

A change in the price level moves you ALONG AD. A change in any component for any other reason SHIFTS AD.

TOPIC 3.2

Multipliers

Why an initial change in spending produces a larger total change in real GDP.

LEARNING OBJECTIVES: MOD-2.B — Define, explain, and calculate the expenditure and tax multipliers and the MPC/MPS.

The Multiplier Effect and Marginal Propensities

A $1 change in autonomous spending sets off a chain of further spending and income — the total change in real GDP is larger than the initial $1.

The Multiplier Effect

When spending rises, it becomes someone's income. That person spends part of it, becoming another's income, and so on. The total change in AD is a multiple of the initial change.

Marginal Propensity to Consume (MPC)

The fraction of additional disposable income that households spend: MPC = ΔConsumption ÷ ΔDisposable income.

Marginal Propensity to Save (MPS)

The fraction of additional disposable income that households save: MPS = ΔSaving ÷ ΔDisposable income. Crucially, MPC + MPS = 1.

Multiplier Formulas

Two multipliers — the spending multiplier and the tax multiplier — both depend on the MPC.

SPENDING (EXPENDITURE) MULTIPLIER

$$1 / (1 - MPC) = 1 / MPS$$

Applies to changes in C, I, G, or exports. With MPC = 0.8, the multiplier = 1/0.2 = 5.

TAX MULTIPLIER

$$- MPC / (1 - MPC) = - MPC / MPS$$

Applies to changes in taxes/transfers. It is NEGATIVE and smaller in size than the spending multiplier — a tax cut is partly saved, not all spent.

CHANGE IN REAL GDP

$$\Delta \text{Real GDP} = \text{multiplier} \times \Delta \text{spending}$$

Multiply the relevant multiplier by the initial change to find the total shift in AD and real GDP.

MPC + MPS IDENTITY

$$MPC + MPS = 1$$

All additional disposable income is either spent or saved. Use this to find one from the other.

Multipliers in Action

Given: MPC = 0.75. The economy needs the AD curve to shift right by $400 billion to reach full employment.

- **Spending multiplier = 1 / (1 − 0.75) = 1 / 0.25 = 4.**
- **Tax multiplier = −0.75 / 0.25 = −3.**
- Option A — increase government spending: $400B ÷ 4 = $100 billion increase in G closes the gap.
- Option B — cut taxes: $400B ÷ 3 = a $133.3 billion tax cut is needed for the same effect.
- **Why the difference? A tax cut's first round is partly saved (MPS = 0.25), so it takes a larger tax cut to move AD by the same amount.**
- This is why the government spending multiplier is always stronger than the tax multiplier — a key result for Topic 3.8.

TOPIC 3.3

Short-Run Aggregate Supply

The production side of the economy when some input prices are still fixed.

LEARNING OBJECTIVES: MOD-2.C — Define SRAS and its determinants. MOD-2.D — The short-run inflation–unemployment trade-off.

The Short-Run Aggregate Supply Curve

SRAS shows the relationship between the price level and the quantity of real output firms supply when some input prices are fixed.

- SRAS slopes UPWARD: a higher price level is associated with greater real output in the short run.
- The reason is STICKY WAGES AND PRICES — some input costs (especially nominal wages) are fixed by contracts in the short run.
- When output prices rise but input costs lag, production becomes more profitable, so firms supply more.
- Any factor that changes production costs shifts SRAS.

KEY TAKEAWAY

SRAS is upward-sloping ONLY because some input prices are sticky in the short run. That single assumption defines 'the short run.'

Determinants of Short-Run Aggregate Supply

Any factor that changes firms' per-unit production costs shifts the SRAS curve.

Input / Resource Prices

Cheaper inputs (wages, raw materials, energy) lower production costs → SRAS shifts right. Costlier inputs shift it left.

Productivity

Gains in productivity (output per worker) reduce per-unit cost → SRAS shifts right.

Inflationary Expectations

If workers and firms expect higher inflation, they negotiate higher nominal wages and prices, raising costs → SRAS shifts left.

Supply Shocks

Sudden cost events — an oil price spike, a natural disaster, a new business tax or subsidy — shift SRAS. Negative shocks shift it left; positive shocks shift it right.

The Short-Run Trade-off: Inflation vs. Unemployment

Movement along the SRAS curve reveals a built-in short-run relationship between the price level and unemployment.

- Moving UP the SRAS curve, a higher price level is associated with greater real output.
- Greater output requires more workers, so employment rises.
- With the labor force roughly constant, more employment means unemployment falls.
- Therefore there is a SHORT-RUN trade-off: higher inflation tends to come with lower unemployment, and vice versa.

KEY TAKEAWAY

Along SRAS, output up → employment up → unemployment down. This short-run inflation–unemployment trade-off becomes the Phillips curve in Unit 5.

TOPIC 3.4

Long-Run Aggregate Supply

The economy's productive capacity when all wages and prices are fully flexible.

LEARNING OBJECTIVES: MOD-2.E — Define the short run and the long run. MOD-2.F — Define the LRAS curve.

Long-Run Aggregate Supply

In the long run, all wages and prices are fully flexible — so output depends only on the economy's real productive capacity.

- SHORT RUN: some input prices are fixed → SRAS slopes up. LONG RUN: all prices and wages adjust → no slope.
- The LRAS curve is VERTICAL at the full-employment level of output (Yf).
- Because LRAS is vertical, there is NO long-run trade-off between inflation and unemployment.
- LRAS corresponds to the production possibilities curve — both represent maximum sustainable capacity.

KEY TAKEAWAY

LRAS is vertical at full-employment output. In the long run the price level can change, but real output cannot be pushed beyond Yf.

TOPIC 3.5

Equilibrium in the AD–AS Model

Putting AD, SRAS, and LRAS together to locate the economy.

LEARNING OBJECTIVES: MOD-2.G — Explain short-run and long-run equilibrium and the resulting output gaps.

Short-Run Equilibrium and Output Gaps

Short-run equilibrium is where AD meets SRAS. Comparing it to LRAS reveals the output gap.

- SHORT-RUN equilibrium: where AD and SRAS intersect — sets the current price level and real GDP.
- LONG-RUN equilibrium: where AD and SRAS intersect ON the LRAS — output equals full employment (Y = Yf).
- RECESSIONARY (negative) gap: short-run output is BELOW Yf — high cyclical unemployment.
- INFLATIONARY (positive) gap: short-run output is ABOVE Yf — the economy is overheating.

KEY TAKEAWAY

Compare short-run equilibrium output (Y) to full-employment output (Yf). Y < Yf = recessionary gap; Y = Yf = long-run equilibrium; Y > Yf = inflationary gap.

Reading the Three Equilibrium Situations

< Recessionary Gap (Y < Yf)

Short-run equilibrium is to the LEFT of LRAS. Cyclical unemployment is positive; the actual unemployment rate exceeds the natural rate. Calls for expansionary policy.

= Long-Run Equilibrium (Y = Yf)

AD and SRAS intersect exactly on LRAS. Unemployment equals the natural rate; there is no output gap. The economy is at full employment.

> Inflationary Gap (Y > Yf)

Short-run equilibrium is to the RIGHT of LRAS. The economy is producing beyond its sustainable level; upward pressure on the price level. Calls for contractionary policy.

TOPIC 3.6

Changes in the AD–AS Model in the Short Run

How the economy responds to demand and supply shocks before any long-run adjustment.

LEARNING OBJECTIVES: MOD-2.H — Explain the short-run response of output, employment, and the price level to AD or SRAS shocks.

Aggregate Demand Shocks

A shift in AD moves output, employment, and the price level in the SAME direction.

- POSITIVE AD shock (AD shifts right): real output rises, employment rises, the price level rises.
- NEGATIVE AD shock (AD shifts left): real output falls, employment falls, the price level falls.
- A negative AD shock creates a recessionary gap; a positive shock creates an inflationary gap.
- When AD increases and pulls the price level up, the result is DEMAND-PULL inflation.

KEY TAKEAWAY

An AD shock pushes output, employment, and the price level all the same way. A rightward AD shift causes demand-pull inflation.

Supply Shocks and Stagflation

An SRAS shift moves output and the price level in OPPOSITE directions — the awkward case.

- NEGATIVE SRAS shock (SRAS shifts left): real output falls AND the price level rises.
- Falling output with rising prices is STAGFLATION — a stagnant economy with inflation at the same time.
- When higher production costs push the price level up, the result is COST-PUSH inflation.
- POSITIVE SRAS shock (SRAS shifts right): output rises and the price level falls — the best of both.

KEY TAKEAWAY

A negative SRAS shock causes stagflation: output falls while prices rise. This cost-push inflation is the hard case for policymakers.

Demand-Pull vs. Cost-Push Inflation

The CED requires students to identify the SOURCE of inflation — demand-pull and cost-push inflation arise from opposite sides of the economy.

DEMAND-PULL INFLATION

- **Cause: an increase in aggregate demand (AD shifts right).**
- Often described as 'too much spending chasing too few goods.'
- Price level rises AND real output rises.
- Triggers: surging consumer or business confidence, expansionary policy, an export boom.
- Comes with an inflationary gap and falling unemployment.

COST-PUSH INFLATION

- **Cause: a decrease in short-run aggregate supply (SRAS shifts left).**
- Driven by rising per-unit production costs.
- Price level rises BUT real output falls — stagflation.
- Triggers: an oil shock, a sharp rise in wages or input prices, a natural disaster.
- Comes with rising unemployment — the difficult policy case.

TOPIC 3.7

Long-Run Self-Adjustment

How the economy returns to full employment on its own — without policy action.

LEARNING OBJECTIVES: MOD-2.I — Explain the long-run response of output, employment, and the price level to shocks.

The Economy Heals Itself — Eventually

In the long run, with no policy action, flexible wages and prices restore full-employment output.

- RECESSIONARY gap: high unemployment puts downward pressure on nominal wages → costs fall → SRAS shifts RIGHT → output returns to Yf.
- INFLATIONARY gap: tight labor markets push nominal wages up → costs rise → SRAS shifts LEFT → output returns to Yf.
- Either way, unemployment reverts to its natural rate once adjustment is complete.
- Shifts of the LRAS curve itself represent changes in full-employment output — that is economic growth.

KEY TAKEAWAY

Left alone, the economy self-corrects through flexible wages: SRAS shifts to push output back to Yf. The debate is over how SLOW that process is.

TOPIC 3.8

Fiscal Policy

Using government spending and taxes to influence aggregate demand.

LEARNING OBJECTIVES: POL-1.A — Define fiscal policy; explain & calculate its short-run effects. POL-1.B — Lags to discretionary fiscal policy.

Fiscal Policy: Tools and Direction

Governments implement fiscal policy to achieve macroeconomic goals such as full employment.

The Two Tools

GOVERNMENT SPENDING and TAXES/TRANSFERS. Government spending affects AD directly; taxes and transfers affect AD indirectly, by changing households' disposable income and then their consumption.

Expansionary Fiscal Policy

Increase government spending and/or cut taxes. Used to fight a RECESSIONARY gap — it shifts AD right to restore full employment.

Contractionary Fiscal Policy

Decrease government spending and/or raise taxes. Used to fight an INFLATIONARY gap — it shifts AD left to cool the economy.

Expansionary Fiscal Policy in the AD–AS Model

Expansionary fiscal policy shifts AD rightward to close a recessionary gap.

- The economy starts in a recessionary gap (Y below Yf) with cyclical unemployment.
- An increase in G or a cut in T raises aggregate demand — AD shifts right.
- The multiplier magnifies the initial change, so AD shifts by more than the initial dollar amount.
- Result: real output rises to Yf, unemployment falls to the natural rate, and the price level rises.

KEY TAKEAWAY

Expansionary fiscal policy shifts AD right by (multiplier × initial change), closing the recessionary gap — but it does raise the price level.

Multiplier Sizing and the Lags of Fiscal Policy

Spending Multiplier > Tax Multiplier

A dollar of government spending enters AD fully. A dollar of tax cut is partly saved, so it raises AD by less. Equal-sized spending and tax changes do NOT have equal effects.

Sizing the Policy

To close a gap, work backward: required AD shift ÷ multiplier = the needed change in spending or taxes. Choose the multiplier that matches the tool.

Lags Make It Imperfect

Discretionary fiscal policy faces lags — the time to RECOGNIZE the problem, the time to DECIDE on and legislate a response, and the time for the policy to take EFFECT. Policy can arrive late.

TOPIC 3.9

Automatic Stabilizers

Built-in features of the budget that dampen the business cycle with no new legislation.

LEARNING OBJECTIVES: POL-1.C — Define automatic stabilizers and explain how they moderate business cycles.

How Automatic Stabilizers Work

Automatic stabilizers support the economy in recessions and restrain it in booms — automatically, with no policy decision required.

In a Recession

As GDP falls, tax revenues fall automatically (incomes drop) and transfer payments rise (more unemployment benefits). This cushions disposable income and props up consumption — preventing a deeper downturn.

In an Expansion

As GDP rises, tax revenues rise automatically and transfer payments fall. This restrains spending and helps prevent the economy from overheating.

Why They Matter

Because they require no new legislation, automatic stabilizers have NO decision lag. They moderate the business cycle's swings instantly — a built-in shock absorber for the economy.

Common Pitfalls & Exam Tips

Label AD-AS axes correctly

The axes are 'Price Level' and 'Real GDP' — NOT 'Price' and 'Quantity.' This is the #1 AD-AS error the College Board flags.

Use the right slope explanation

AD slopes down because of the wealth, interest-rate, and exchange-rate effects — not the micro substitution/income effects.

Spending vs. tax multiplier

The spending multiplier (1/MPS) is larger than the tax multiplier. The tax multiplier is negative — a tax hike lowers AD.

Demand-pull vs. cost-push

Demand-pull = AD right (price and output move together). Cost-push = SRAS left (price up, output down = stagflation).

Short run vs. long run

SRAS slopes up because of sticky prices; LRAS is vertical at Yf. Be explicit about which run a question asks about.

Show every step

On free-response, draw shifts with arrows, label the new equilibrium, and explain the full cause-and-effect chain — no skipped steps.

Unit 3 — Key Takeaways

1. AD = C + I + G + Xn; it slopes down due to the wealth, interest-rate, and exchange-rate effects.
2. The multiplier magnifies spending changes; the spending multiplier (1/MPS) exceeds the tax multiplier.
3. SRAS slopes up because of sticky wages/prices; LRAS is vertical at full-employment output (Yf).
4. Short-run equilibrium relative to LRAS reveals a recessionary gap, long-run equilibrium, or an inflationary gap.
5. AD shocks move output and prices together; negative SRAS shocks cause stagflation (cost-push inflation).
6. Fiscal policy (spending and taxes) shifts AD to close gaps; automatic stabilizers moderate the cycle without lags.