

Unit 5: Long-Run Consequences of Stabilization Policies

Unit 5 asks what happens after the dust settles. Units 3 and 4 showed how fiscal and monetary policy move aggregate demand in the short run. This unit follows those policies into the long run, covering the inflation-unemployment tradeoff and its limits, why sustained inflation is a monetary phenomenon, what deficits do to the national debt and to private investment, and what actually drives economic growth.

AP Macroeconomics

Long-Run Consequences of Stabilization Policies

About 13 minutes to read

How to use this guide

Read it in order the first time because the topics build on the AD-AS model from earlier units. The Phillips curve translates AD-AS into the language of inflation and unemployment, the quantity theory explains where long-run inflation comes from, deficits lead into crowding out, and growth closes the unit by asking what expands the economy's productive capacity.

After the first read, use the trap boxes and the tables to review the distinctions that exam questions test most often. Finish with the practice questions, then complete the recall check on the last page out loud and note any items you cannot explain yet.

What this unit is worth. Long-Run Consequences of Stabilization Policies is 20 to 30 percent of the AP Macroeconomics exam, the largest share of any unit. It also ties the whole course together. The Phillips curve, the quantity theory, crowding out, and growth each reuse the AD-AS framework from Units 3 and 4, which is one reason this unit carries the largest exam share.

5.1 The Phillips Curve

The Phillips curve restates the AD-AS model in the language of inflation and unemployment. The **short-run Phillips curve (SRPC)** slopes downward, with the inflation rate on the vertical axis and the unemployment rate on the horizontal axis. Lower unemployment comes with higher inflation, and higher unemployment comes with lower inflation, as long as expectations and supply conditions do not change.

That tradeoff is driven by aggregate demand. When AD rises, firms sell more output, bid up input prices, and hire more workers, so the price level rises while unemployment falls. On the graph, the economy moves up and to the left along a fixed SRPC. When AD falls, the economy moves down and to the right, with falling inflation and rising unemployment. **Demand-pull inflation** is this movement along the curve, and it always pairs higher inflation with lower unemployment.

Trap. A change in aggregate demand moves the economy along the SRPC. It does not shift the curve. Students sometimes draw a new Phillips curve after a fiscal or monetary policy change, but policy that works through AD only changes where the economy sits on the existing curve.

A supply shock moves the SRPC itself. When input prices jump, as in an oil price spike, short-run aggregate supply shifts left: the price level rises while output falls and unemployment rises. That combination of rising inflation and rising unemployment is **stagflation**. On the Phillips curve graph it appears as a shift of the whole SRPC up and to the right, so that every unemployment rate now pairs with higher inflation. A favorable supply shock, such as a productivity gain or a fall in input prices, shifts the SRPC down and to the left.

The **long-run Phillips curve (LRPC)** is vertical at the **natural rate of unemployment**. In the long run, wages and expectations fully adjust, so unemployment returns to its natural rate at any inflation rate, and there is no lasting tradeoff. Attempts to hold unemployment below the natural rate do not buy permanently lower unemployment. They buy accelerating inflation.

The SRPC crosses the LRPC at the **expected rate of inflation**. If people expect 2 percent inflation, the economy rests at the natural rate of unemployment with 2 percent inflation, and that point lies on both curves. When expected inflation rises to 4 percent, workers bargain for higher wages and firms set higher prices at every unemployment rate, so the SRPC shifts straight up by 2 points. Reducing expected inflation works in reverse: the economy must travel down along the higher SRPC, enduring temporarily higher unemployment, until expectations fall and the curve shifts back down. The lost output and higher unemployment endured while bringing inflation down is called the **sacrifice ratio**.

EVENT	EFFECT ON THE PHILLIPS CURVES
Increase in aggregate demand	Movement up and left along the SRPC. Inflation rises, unemployment falls.
Decrease in aggregate demand	Movement down and right along the SRPC. Inflation falls, unemployment rises.
Adverse supply shock, such as an oil price spike	SRPC shifts up and right. Stagflation: inflation and unemployment both rise.
Favorable supply shock, such as a productivity gain	SRPC shifts down and left. Inflation and unemployment both fall.
Rise in expected inflation	SRPC shifts up. Each unemployment rate pairs with higher inflation.
Fall in expected inflation	SRPC shifts down.
Change in the natural rate of unemployment	LRPC shifts. The natural rate moves only with labor market structure, never with aggregate demand.

Trap. The long-run Phillips curve is vertical, never downward sloping. Drawing the LRPC with a slope, or claiming a permanent tradeoff exists in the long run, misses the central claim of the curve. The LRPC moves only when the natural rate of unemployment itself changes, never in response to aggregate demand.

5.2 Money Growth and Inflation

The **quantity theory of money** starts from an identity: $M \text{ times } V \text{ equals } P \text{ times } Y$. M is the money supply, V is the **velocity of money** (the average number of times each dollar is spent in a year), P is the price level, and Y is real GDP. The left side is total spending in the economy, and the right side is the dollar value of everything produced. Rearranged, the price level equals MV divided by Y .

The theory becomes a prediction with two assumptions. First, velocity is stable over time, changing slowly if at all. Second, in the long run real GDP is set by real factors such as labor, capital, and technology, so it grows at its own pace regardless of the money supply. Then money growth that outpaces real output growth has nowhere to go except into the price level. The inflation rate is approximately the money supply growth rate minus the real GDP growth rate. A sustained rise in prices is, in the long run, a monetary phenomenon. Inflation persists only if the money supply keeps growing faster than output.

In the short run, faster money growth is not neutral. It raises aggregate demand, pushing output above potential and moving the economy up along the SRPC to lower unemployment and higher inflation. But once wages and expectations catch up, output settles back at potential and only the higher price level remains. Money affects real variables in the short run and only the price level in the long run.

TYPE	CAUSE	CURVE STORY	UNEMPLOYMENT
Demand-pull inflation	Increase in aggregate demand	Movement along the SRPC, up and left	Falls
Cost-push inflation	Decrease in short-run aggregate supply, a supply shock	SRPC shifts up and right	Rises

Trap. Match each inflation to its curve story. Demand-pull inflation comes from aggregate demand and moves the economy along the SRPC. Cost-push inflation comes from short-run aggregate supply and shifts the SRPC. Reversing the two is one of the most common errors on this topic.

5.3 Government Deficits and the National Debt

The **budget deficit** and the **national debt** measure different things. The deficit is a flow: the amount by which government spending exceeds tax revenue in a single year. A **budget surplus** is the opposite, revenue exceeding spending. The national debt is a stock: the accumulation of all past deficits minus all past surpluses. Running a deficit this year adds the amount of that deficit to the debt.

Deficits arise whenever spending outpaces revenue, and recessions widen them automatically: tax revenue falls as incomes fall while spending on programs such as unemployment benefits rises. To cover a deficit, the government sells bonds, which is borrowing from the public, and that borrowing is what increases the national debt.

The debt carries costs. Interest payments on the debt must come out of future budgets, leaving less room for everything else the government wants to do. Heavy borrowing also absorbs national saving and can push up interest rates, which reduces private investment. That last effect is crowding out, covered in topic 5.4. Economists usually scale the debt to the size of the economy: a rising **debt-to-GDP ratio** means the debt is outgrowing the economy's ability to carry it.

A government that borrows in its own currency cannot be forced into default the way a household can, but the debt is not free. Repaying it falls on future taxpayers, and the borrowing that builds it can squeeze the investment that future growth depends on. Debt held domestically is owed by residents to residents, while debt held abroad sends interest payments out of the country.

Trap. Deficit and debt are not synonyms. The deficit is this year's shortfall, measured in dollars per year. The debt is the running total of what is owed. A headline that says the debt grew by 2 trillion this year is describing this year's deficit, not the debt itself.

5.4 Crowding Out

The **loanable funds market** is where saving meets borrowing, and the **real interest rate** is the price that balances the two sides. The supply of loanable funds comes from **national saving**, which is private saving plus public saving (tax revenue minus government spending). The demand comes from private investment plus government borrowing.

When the government runs a deficit, public saving falls, so the total supply of loanable funds shrinks. The same story can be told from the demand side: government borrowing adds to the demand for loanable funds, shifting the demand curve to the right. Both descriptions end in the same place. The real interest rate rises, and private investment falls. That fall in private investment is **crowding out**: the government is competing with businesses for a limited pool of savings, and businesses lose.

Crowding out partly undoes expansionary fiscal policy. Government spending rises, but higher interest rates discourage business spending on factories, equipment, and research, so aggregate demand rises by less than the fiscal stimulus alone would imply. The policy still expands the economy, just by less than the simple multiplier suggests.

Economists disagree about the size of the effect. The classical view treats crowding out as complete: investment falls dollar for dollar with the deficit, aggregate demand does not move, and fiscal stimulus changes the composition of spending without changing its total. The Keynesian view holds that in a deep recession, with idle resources and already low interest rates, crowding out is small. The central bank can also offset it by expanding the money supply to hold interest rates down while the government borrows.

STEP	WHAT HAPPENS
1	The government runs a deficit. Public saving falls, so the supply of loanable funds shrinks (equivalently, government borrowing shifts the demand for loanable funds right).
2	The real interest rate rises to clear the market.
3	Borrowing is more expensive for firms, so private investment falls. This is crowding out.
4	Expansionary fiscal policy is partly offset: aggregate demand rises by less than the stimulus alone would imply.

Trap. Crowding out means private investment falls, not rises. The government does not create extra savings when it borrows. It takes a larger share of the existing pool, leaving less for private borrowers at a higher price.

5.5 Economic Growth

Economic growth is a sustained increase in real GDP over time, and it comes from the supply side of the economy. An economy grows when it has more or better inputs and better ways of combining them. The sources are growth in physical capital, growth in the labor force, improvements in **human capital** (the education, skills, and health of workers), technological progress, and the **institutions** that make productive activity worthwhile, such as secure property rights, the rule of law, stable money, and openness to trade.

On the graphs, growth is a rightward shift of long-run aggregate supply, or equivalently an outward shift of the production possibilities curve. This is different from a short-run recovery. A recovery closes a recessionary gap by moving the economy back toward its existing LRAS or PPC, using capacity that was sitting idle. Growth expands capacity itself.

The measure that tracks living standards is **real GDP per capita**, not total real GDP. If output and population grow at the same rate, the average person is no better off. Sustained growth in real GDP per capita is what raises incomes and consumption from one generation to the next.

The **rule of 70** gives the doubling time for anything growing at a steady rate. Divide 70 by the annual growth rate in percent. An economy growing at 2 percent per year doubles in about 35 years; at 3.5 percent, in about 20 years. Because growth compounds, small differences in the growth rate produce very large differences in living standards over a few decades.

Trap. A rightward shift of aggregate demand is not economic growth. AD shifts move the economy along a fixed LRAS, changing the price level and short-run output, but they leave productive capacity unchanged. Growth shifts LRAS itself, or pushes the PPC outward.

Confusions That Cost Points

PAIR	HOW TO KEEP THEM STRAIGHT
Movement along the SRPC vs a shift of the SRPC	Changes in aggregate demand move the economy along the curve. Supply shocks and changes in expected inflation shift the curve.
SRPC vs LRPC	The SRPC slopes down: a short-run tradeoff exists. The LRPC is vertical at the natural rate: no long-run tradeoff.
Expected inflation vs actual inflation	Expectations decide where the SRPC sits. A rise in expected inflation shifts the SRPC up even if current inflation has not changed.
Demand-pull vs cost-push inflation	Demand-pull comes from AD, moves along the SRPC, and lowers unemployment. Cost-push comes from SRAS, shifts the SRPC, and raises unemployment.
Deficit vs national debt	The deficit is one year's shortfall, a flow. The debt is the accumulated total, a stock.
Crowding out and investment	Deficit borrowing raises the real interest rate and reduces private investment. It never raises investment.
Short-run vs long-run effects of money growth	In the short run, money growth can move output along the SRPC. In the long run, only the price level rises.
Real GDP vs real GDP per capita	Total GDP can rise with population while the average person gains nothing. Per capita GDP tracks living standards.
Recovery vs growth	Recovery closes a gap back to the existing LRAS. Growth shifts LRAS rightward or the PPC outward.

Practice Questions

Original questions written for this guide in the style of the AP exam. Answers and explanations are on the next pages, so complete the questions before checking them.

1. In the short run, an increase in aggregate demand caused by expansionary fiscal policy moves the economy

1. along the short-run Phillips curve to lower inflation and higher unemployment
2. to a new short-run Phillips curve shifted to the right
3. along the short-run Phillips curve to higher inflation and lower unemployment
4. to a new long-run Phillips curve shifted to the left

2. A sharp rise in the price of imported oil shifts short-run aggregate supply to the left. On the Phillips curve graph, this supply shock

1. moves the economy up along the existing short-run Phillips curve
2. shifts the short-run Phillips curve up and to the right
3. shifts the long-run Phillips curve to the right
4. shifts the short-run Phillips curve down and to the left

3. If households and firms come to expect lower inflation in the future, the short-run Phillips curve will

1. shift up
2. become vertical
3. shift left along with the long-run Phillips curve
4. shift down

4. In a given year, the money supply grows by 7 percent while real GDP grows by 2 percent. According to the quantity theory of money, and assuming velocity is stable, the inflation rate is approximately

1. 5 percent
2. 9 percent
3. 2 percent
4. 7 percent

- 5.** A country runs a budget deficit of \$400 billion this year. Which of the following is true?
1. The national debt is now \$400 billion
 2. The national debt falls because the deficit was financed by borrowing
 3. The national debt increases by \$400 billion
 4. The deficit equals the total amount the government owes
- 6.** The government finances an increase in spending by borrowing. In the loanable funds market, this will most likely
1. increase the supply of loanable funds, lowering the real interest rate
 2. increase the demand for loanable funds, raising the real interest rate and reducing private investment
 3. raise private investment by increasing business confidence
 4. leave the real interest rate unchanged because government borrowing does not affect private saving
- 7.** An economy's real GDP per capita grows at an average annual rate of 2 percent. Using the rule of 70, real GDP per capita will double in approximately
1. 140 years
 2. 70 years
 3. 14 years
 4. 35 years
- 8.** Which of the following best represents long-run economic growth in the aggregate demand and aggregate supply model?
1. A rightward shift of long-run aggregate supply
 2. A rightward shift of aggregate demand
 3. A leftward shift of short-run aggregate supply
 4. A movement along the short-run Phillips curve to lower unemployment

Answer Key

An increase in aggregate demand moves the economy up and to the left along the fixed SRPC: firms raise prices and hire more workers, so inflation rises while unemployment falls. A describes a decrease in aggregate demand, the opposite policy. B is wrong because changes in AD move the economy along the SRPC rather than shifting it. D is wrong because the LRPC is fixed at the natural rate of unemployment and never responds to aggregate demand.

A leftward shift of SRAS is an adverse supply shock. It produces stagflation, which appears on the Phillips curve graph as an upward and rightward shift of the SRPC. A describes a demand-driven movement along the curve, but nothing about aggregate demand changed here. C is wrong because a temporary oil shock does not change the natural rate of unemployment, so the LRPC does not move. D describes a favorable supply shock, the opposite of what happened.

The SRPC crosses the LRPC at the expected inflation rate, so lower expected inflation shifts the SRPC straight down: each unemployment rate now pairs with lower inflation. A shifts the curve in the wrong direction; that is what higher expected inflation does. B confuses the SRPC with the LRPC, which is the vertical curve. C is wrong because expected inflation never moves the LRPC.

With stable velocity, the inflation rate is approximately the money supply growth rate minus the real GDP growth rate: 7 minus 2 is 5 percent. B adds the two rates instead of subtracting. C uses only the output growth rate and ignores the money supply. D uses only the money growth rate, forgetting that some of the new money is absorbed by a larger real economy.

Each year's deficit is added to the debt, so the national debt rises by the \$400 billion shortfall. A confuses the flow with the stock: \$400 billion is this year's addition to the debt, not the accumulated total. B gets the direction backwards; financing a deficit by borrowing increases the debt. D states the classic mix-up: the deficit is one year's shortfall, while the total amount the government owes is the debt.

Deficit borrowing raises the demand for loanable funds, which pushes the real interest rate up and makes borrowing more expensive for firms, so private investment falls. That is crowding out. A shifts the wrong curve in the wrong direction; deficits shrink public saving rather than expanding the supply of funds. C reverses the effect: investment falls, not rises. D ignores the loanable funds market entirely; government borrowing directly competes with private borrowers for the same pool of savings.

The rule of 70 divides 70 by the annual growth rate in percent: 70 divided by 2 is 35 years. A multiplies 70 by 2 instead of dividing. B forgets to divide by the growth rate at all. C divides 70 by 5, which would be the answer for a 5 percent growth rate, not 2 percent.

Long-run growth expands productive capacity, which is a rightward shift of LRAS. B describes a demand-driven expansion that moves the economy along a fixed LRAS and raises the price level without expanding capacity. C is a contractionary supply shock, the opposite of growth. D describes a short-run movement along the Phillips curve, which changes unemployment without expanding the economy's productive capacity.

When you check your answers, note which distinction each miss came from. Make a flashcard for that distinction and drill it spaced out over the next few days instead of rereading the whole section. If you missed one of these questions, the same distinction is worth practicing again in Rycal, where the Long-Run Consequences of Stabilization Policies deck has flashcards for it and more practice questions use the same kinds of traps.

One-Page Recall Check

Say each answer out loud before you look back, and mark the ones you cannot finish. Anything you cannot say out loud yet belongs in your flashcard deck. In Rycal, add those items to the Long-Run Consequences of Stabilization Policies deck and let spaced review bring them back over the next few days.

- Sketch the SRPC and LRPC, label the axes, and mark the natural rate of unemployment.
- Explain why the SRPC slopes downward, using aggregate demand.
- Distinguish a movement along the SRPC from a shift of the SRPC, with an example of each.
- Show how an oil price spike produces stagflation on both the AD-AS and Phillips curve graphs.
- Explain how a change in expected inflation shifts the SRPC, and why the LRPC does not move.
- Write the quantity theory equation, define each variable, and derive the approximate inflation formula.
- Explain why sustained inflation is a monetary phenomenon in the long run.
- Contrast demand-pull and cost-push inflation by cause, curve story, and effect on unemployment.
- Define the deficit and the debt, and explain how one changes the other.
- Trace a government deficit through the loanable funds market to the change in private investment.
- Compare the classical and Keynesian views of crowding out.
- List the sources of long-run economic growth and show growth on the LRAS and PPC graphs.
- Explain the difference between a short-run recovery and long-run growth.
- Use the rule of 70 to find a doubling time, and explain why real GDP per capita measures living standards.

Where to go next. Turn every missed item above into flashcards and drill them spaced out over several days rather than in one sitting. In Rycal, open the Long-Run Consequences of Stabilization Policies deck under AP Macroeconomics. The deck covers the terms in this guide, and its practice questions target the same traps named here. If you have a test date, add it in the Test Planner. You can also start your next review with a Brain Dump, then check what you missed against this guide.

Key terms for this unit

Short-run Phillips curve (SRPC), Long-run Phillips curve (LRPC), Natural rate of unemployment, Expected inflation, Stagflation, Sacrifice ratio, Quantity theory of money, Velocity of money, Neutrality of money, Demand-pull inflation, Cost-push inflation, Budget deficit, Budget surplus, National debt, Debt-to-GDP ratio, Loanable funds market, Real interest rate, National saving, Public saving, Crowding out, Economic growth, Real GDP per capita, Human capital, Institutions, Rule of 70.

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