

Principles of Economics, 10e

Chapter 34: Aggregate Demand and Aggregate Supply

Chapter Objectives (1 of 2)

By the end of this chapter, you should be able to:

- Explain why the aggregate-demand curve is downward sloping.
- Identify factors that cause the aggregate-demand curve to shift.
- Derive the short-run and long-run effects on output and prices according to the *AD-AS* model, given a scenario about an economic shock.
- Determine the effect of an economic event on the position of the long-run aggregate supply curve.
- Contrast the slope of the long-run aggregate supply curve and the short-run aggregate supply curve.

Chapter Objectives (2 of 2)

- Determine the effect of a change in one of the determinants of aggregate supply, given a graph of the short-run aggregate-supply curve.
- Explain how the sticky-wage theory affects equilibrium.
- Explain how the sticky-price theory affects equilibrium.
- Identify the long-run equilibrium in the *AD-AS* model.

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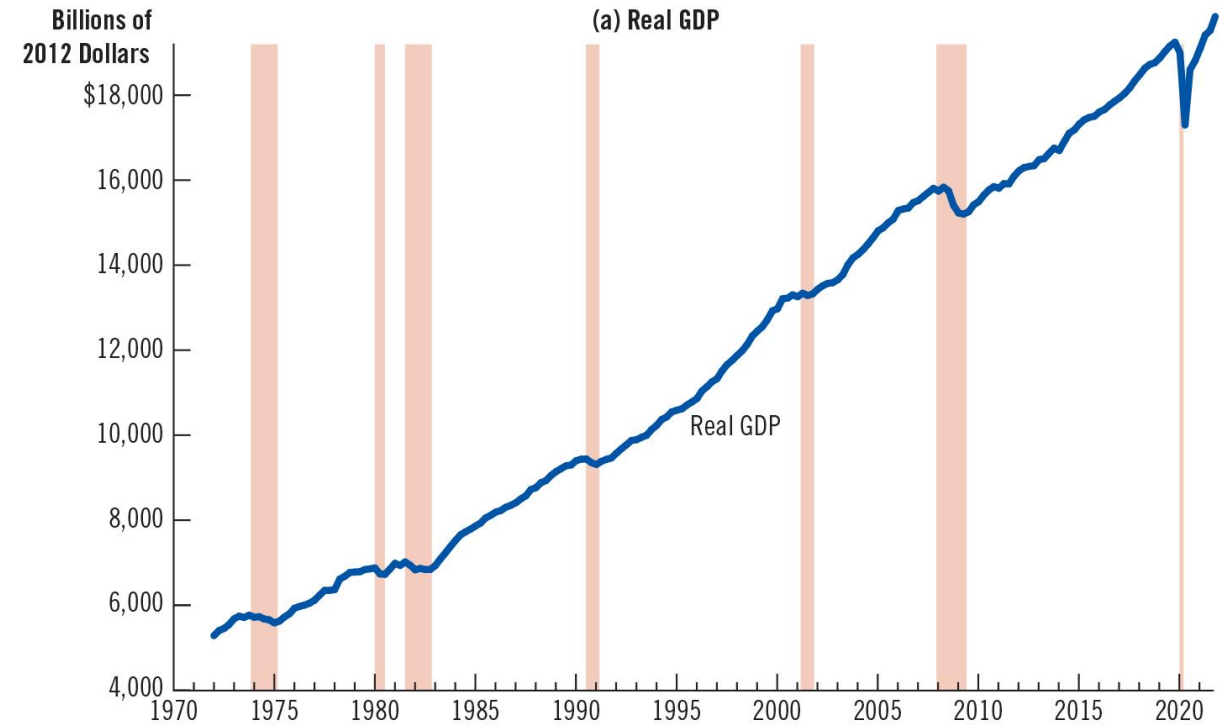
Three Key Facts about Economic Fluctuations

Introduction

- Economic activity
 - Fluctuates from year to year
- **Recession***
 - Period of declining real incomes and rising unemployment
- **Depression***
 - Severe recession

Figure 1 A Look at Short-Run Economic Fluctuations Panel (a)

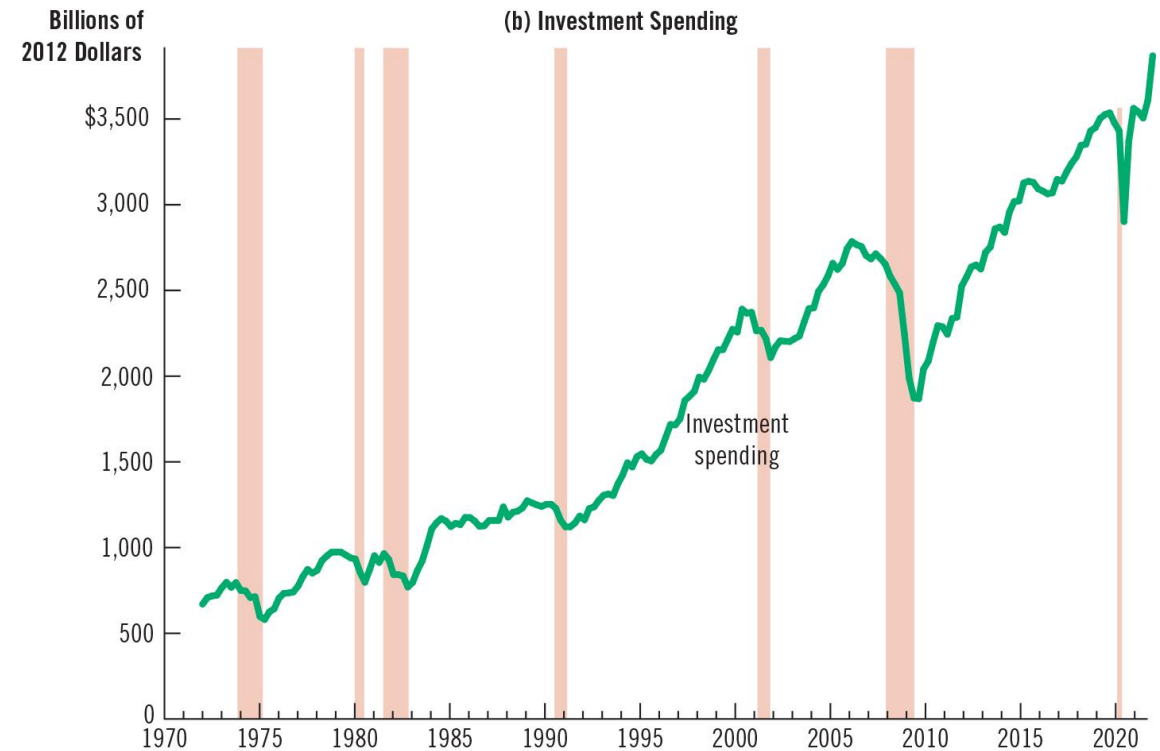
- This figure shows real GDP in panel (a), investment spending in panel (b), and unemployment in panel (c) for the U.S. economy.
- Recessions are shown as the shaded areas.
- Notice that real GDP and investment spending decline during recessions, while unemployment rises.



Source: U.S. Department of Commerce; U.S. Department of Labor.

Figure 1 A Look at Short-Run Economic Fluctuations Panel (b)

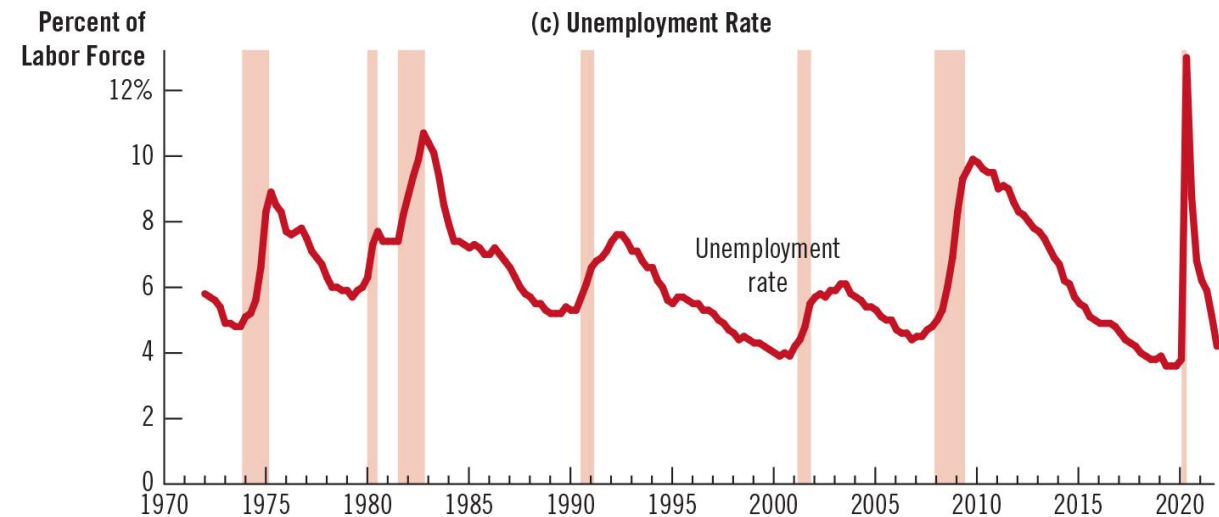
- This figure shows real GDP in panel (a), investment spending in panel (b), and unemployment in panel (c) for the U.S. economy.
- Recessions are shown as the shaded areas.
- Notice that real GDP and investment spending decline during recessions, while unemployment rises.



Source: U.S. Department of Commerce; U.S. Department of Labor.

Figure 1 A Look at Short-Run Economic Fluctuations Panel (c)

- This figure shows real GDP in panel (a), investment spending in panel (b), and unemployment in panel (c) for the U.S. economy.
- Recessions are shown as the shaded areas.
- Notice that real GDP and investment spending decline during recessions, while unemployment rises.



Source: U.S. Department of Commerce; U.S. Department of Labor.

Three Key Facts about Economic Fluctuations

- Fact 1: Economic Fluctuations Are Irregular and Unpredictable
 - Fluctuations in the economy are often called the **business cycle**
- Fact 2: Most Macroeconomic Quantities Fluctuate Together
 - Most macroeconomic variables that measure some type of income, spending, or production fluctuate closely together
 - When real GDP falls in a recession, so do personal income, corporate profits, consumer spending, investment spending, industrial production, retail sales, home sales, auto sales, etc.
- Fact 3: As Output Falls, Unemployment Rises

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Explaining Short-Run Economic Fluctuations

The Model of Aggregate Demand and Aggregate Supply (1 of 2)

- Most economists believe that classical theory describes the world in the long run but *not in the short run*
- Model of short-run economic fluctuations focuses on behavior of:
 1. Real variable: Output of goods and services (real GDP)
 2. Nominal variable: Average level of prices (CPI or GDP deflator)
- **Model of aggregate demand (AD) and aggregate supply (AS)***
 - Model that most economists use to explain short-run fluctuations in economic activity around its long-run trend

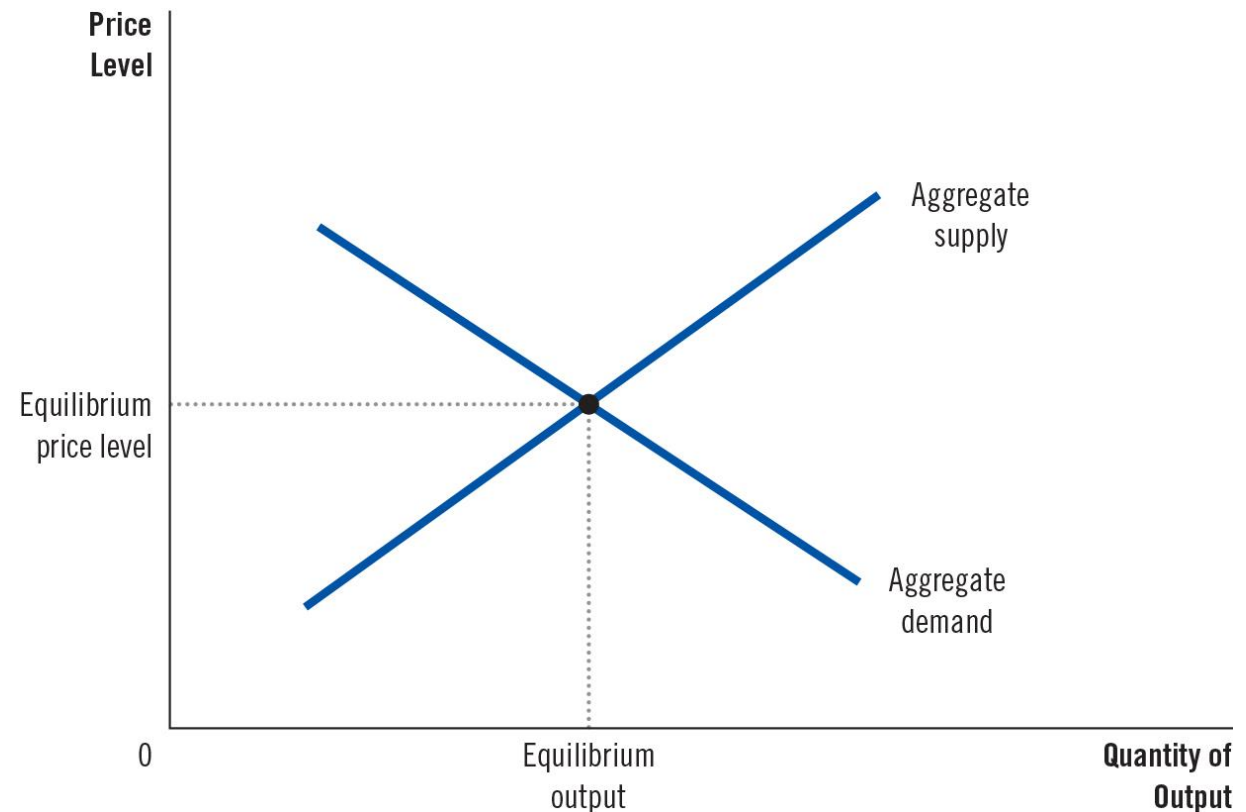
The Model of Aggregate Demand and Aggregate Supply (2 of 2)

- **Aggregate-demand curve***
 - Curve that shows the quantity of goods and services that households, firms, the government, and customers abroad want to buy at each price level
- **Aggregate-supply curve***
 - Curve that shows the quantity of goods and services that firms choose to produce and sell at each price level

*Words accompanied by an asterisk are key terms from the chapter.

Figure 2 Aggregate Demand and Aggregate Supply

- Economists use the model of aggregate demand and aggregate supply to analyze economic fluctuations.
- On the vertical axis is the overall level of prices.
- On the horizontal axis is the economy's total output of goods and services.
- Output and the price level adjust to the point at which the aggregate-supply and aggregate-demand curves intersect.



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The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Slopes Downward

- $Y = C + I + G + NX$
- Three effects explain why AD curve slopes downward:
 - Wealth effect (C)
 - Interest-rate effect (I)
 - Exchange-rate effect (NX)
- Assumption: Government spending (G) fixed by policy

The Price Level and Consumption: The Wealth Effect

- A lower price level
 - Raises the real value of money and makes consumers wealthier, encouraging them to spend more
 - Increases the quantity of goods and services demanded
- A higher price level
 - Reduces the real value of money and makes consumers poorer reducing consumer spending
 - Decreases the quantity of goods and services demanded

The Price Level and Investment: The Interest-Rate Effect

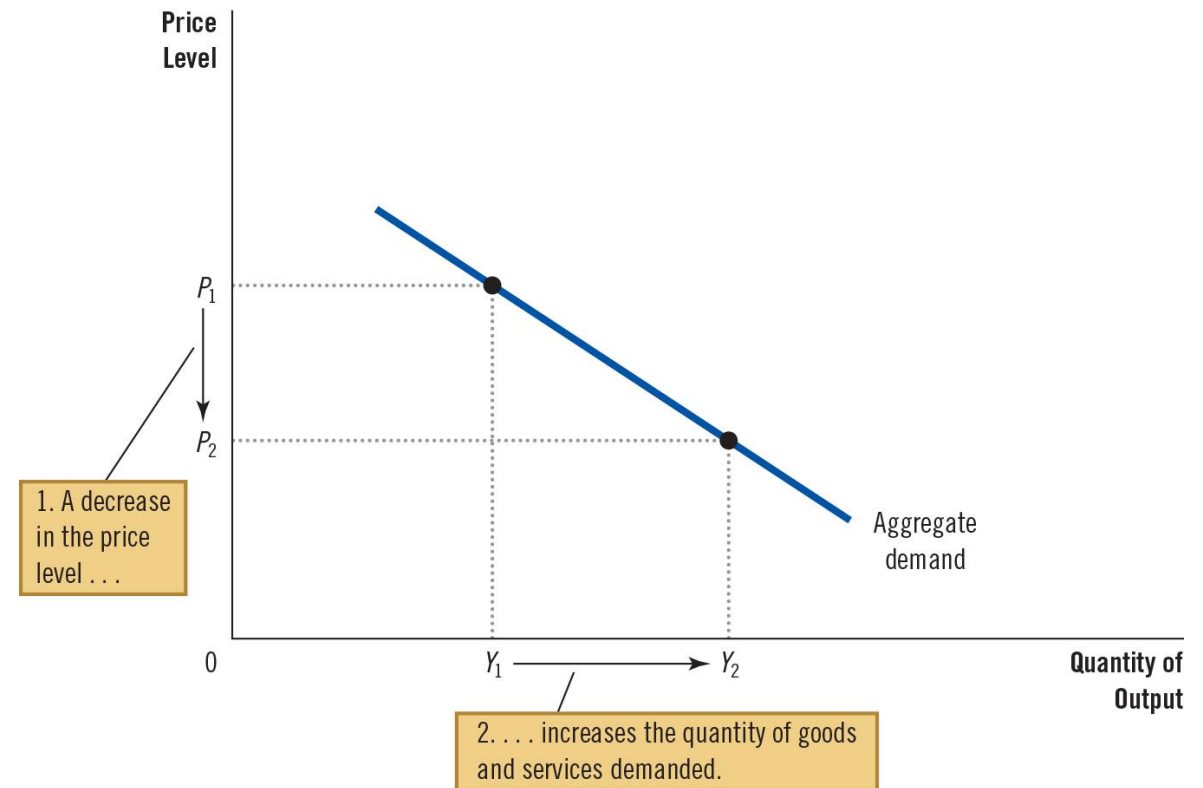
- A lower price level
 - Reduces the interest rate
 - Encourages spending on investment goods
 - Increases the quantity of goods and services demanded
- A higher price level
 - Raises the interest rate
 - Discourages investment spending
 - Decreases the quantity of goods and services demanded

The Price Level and Net Exports: The Exchange-Rate Effect

- A lower U.S. price level causes U.S. interest rates to fall
 - Real value of the dollar declines in foreign exchange markets
 - Depreciation stimulates U.S. net exports
 - Increases the quantity of goods and services demanded
- A higher U.S. price level causes U.S. interest rates to rise
 - Real value of the dollar increases
 - Appreciation reduces U.S. net exports
 - Decreases the quantity of goods and services demanded

Figure 3 The Aggregate-Demand Curve

- A fall in the price level from P_1 to P_2 increases the quantity of goods and services demanded from Y_1 to Y_2 .
- There are three reasons for this negative relationship.
- **As the price level falls, real wealth rises, interest rates fall, and the exchange rate depreciates.**
- These effects stimulate spending on consumption, investment, and net exports.
- Increased spending on any or all of these components of output means a larger quantity of goods and services demanded.



Why the Aggregate-Demand Curve Might Shift

- The *AD* curve might shift:
 - Changes in consumption, *C*
 - E.g., raise/cut taxes
 - Changes in investment, *I*
 - E.g., investment tax credit, money supply
 - Changes in government purchases, *G*
 - The most direct way that policymakers shift the aggregate-demand curve
- Changes in net exports, *NX*

Active Learning 1: The Aggregate-Demand Curve

- What happens to the AD curve (of the U.S.) in each of the following scenarios?
 - A. A ten-year-old investment tax credit expires.
 - B. The U.S. exchange rate falls.
 - C. A fall in prices increases the real value of consumers' wealth.
 - D. State governments replace their sales taxes with new taxes on interest, dividends, and capital gains.

Active Learning 1: Answers

- A. A ten-year-old investment tax credit expires
 - I falls, AD curve shifts left
- B. The U.S. exchange rate falls
 - NX rises, AD curve shifts right
- C. A fall in prices increases the real value of consumers' wealth
 - Move down along AD curve (wealth-effect)
- D. State governments replace their sales taxes with new taxes on interest, dividends, and capital gains.
 - C rises, AD shifts right

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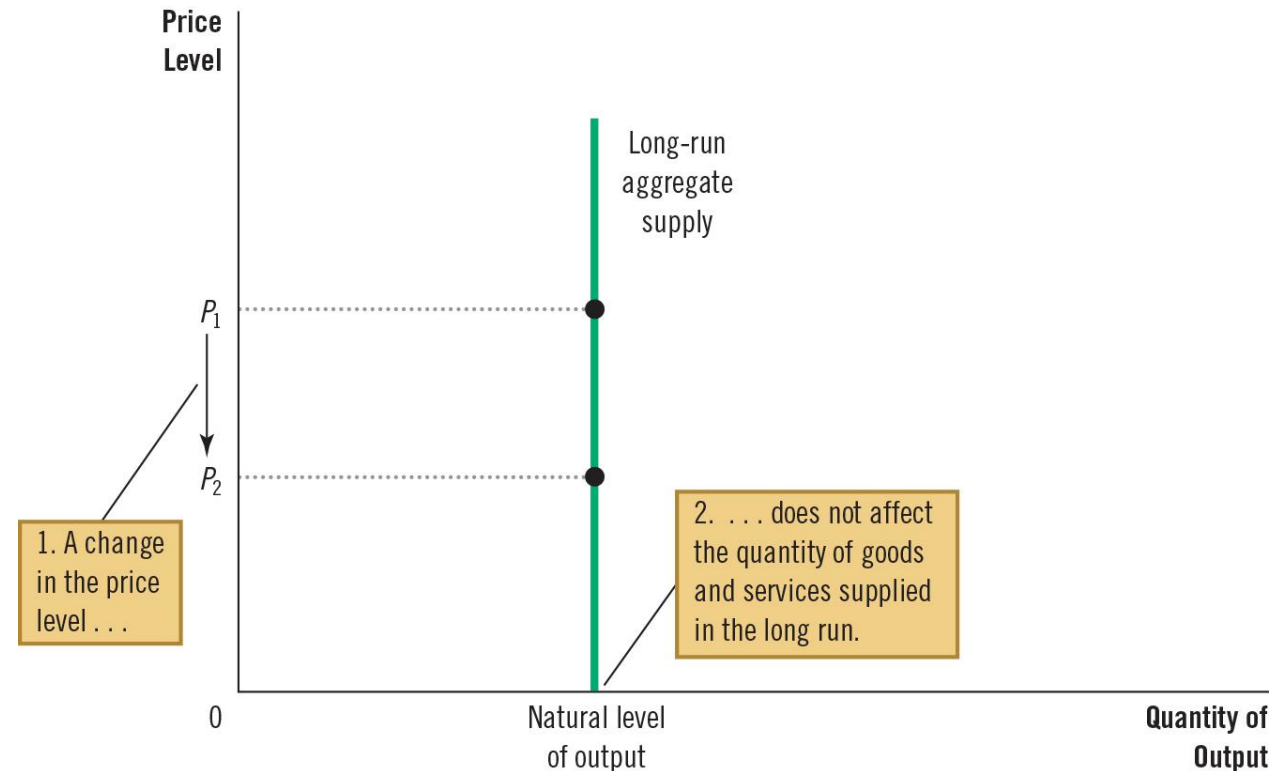
The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Vertical in the Long Run

- In the long run, an economy's production of goods and services (its real GDP) depends on its supplies of labor, capital, and natural resources and on the available technology used to turn these factors of production into goods and services
- Because the price level does not affect the long-run determinants of real GDP, the long-run aggregate-supply curve is vertical

Figure 4 The Long-Run Aggregate-Supply Curve

- In the long run, the quantity of output supplied depends on the economy's quantities of labor, capital, and natural resources and on the technology for turning these inputs into output.
- Because the quantity supplied does not depend on the overall price level, the long-run aggregate-supply curve is vertical at the natural level of output.



Why the Long-Run Aggregate-Supply Curve Might Shift

- **Natural level of output***
 - Production of goods and services that an economy achieves in the long run when unemployment is at its normal rate
- Any change in the economy that alters the natural level of output shifts the long-run aggregate-supply curve
- Output in the classical model depends on labor, capital, natural resources, and technological knowledge

Using Aggregate Demand and Aggregate Supply to Depict Long-Run Growth and Inflation (1 of 2)

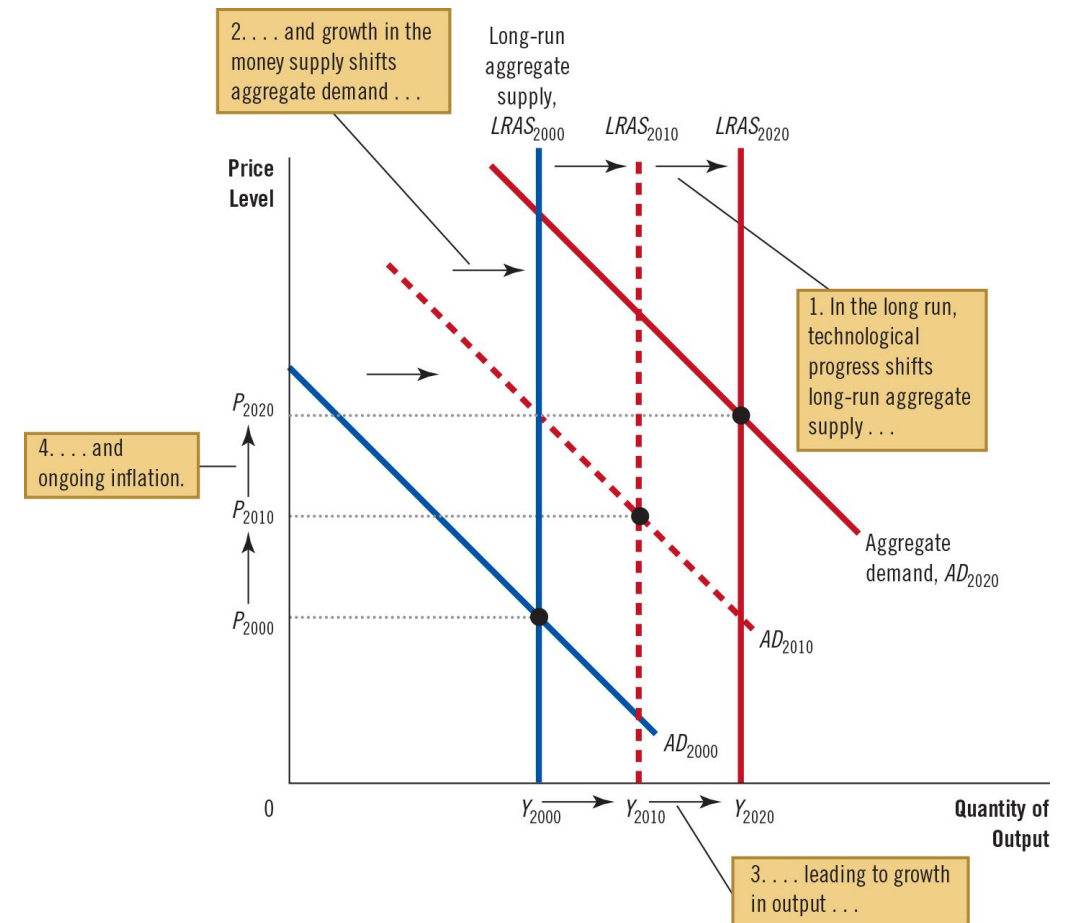
- Economy's long-run trends
 - Both *AD* and *LRAS* curves shift
- Short-run fluctuations in output and the price level should be viewed as deviations from long-run trends of output growth and inflation

Using Aggregate Demand and Aggregate Supply to Depict Long-Run Growth and Inflation (2 of 2)

- Continual shifts of *LRAS* curve to right
 - Technological progress
- *AD* curve shifts to right
 - Monetary policy
 - The Fed increases money supply over time
- Result
 - Continuing growth in output
 - Continuing inflation

Figure 5 Long-Run Growth and Inflation in the Model of Aggregate Demand and Aggregate Supply

- As the economy becomes better able to produce goods and services, primarily because of technological progress, the long-run aggregate-supply curve shifts to the right. At the same time, as the Fed increases the money supply, the aggregate-demand curve also shifts to the right. In this figure, output grows from Y_{2000} to Y_{2010} and then to Y_{2020} , and the price level rises from P_{2000} to P_{2010} and then to P_{2020} . Thus, the model of aggregate demand and aggregate supply offers a new way to describe the classical analysis of growth and inflation.



Why the Aggregate-Supply Curve Slopes Upward in the Short Run

- Aggregate supply curve slopes upward in the short-run
- Theories that explain why the AS curve slopes upward in short-run
 - Sticky-wage theory
 - Sticky-price theory
 - Misperceptions theory
- Common theme: *surprise*
 - The actual price level in the economy deviates from the price level that people *expected*

The Sticky-Wage Theory

- Nominal wages are slow to adjust to changing economic conditions
 - Long-term contracts (workers and firms)
 - Slowly changing social norms
 - Notions of fairness (influence wage setting)
- Nominal wages are based on expected prices
 - Don't respond immediately when actual price level is different from what was expected

The Sticky-Price Theory

- Prices of some goods and services
 - Slow to adjust to changing economic conditions
 - **Menu costs:** Costs to changing prices
- Suppose that each firm announces its prices in advance based on the economic conditions it expects for the coming year
- Price level $<$ Expected
 - Firms: Incentive to produce less output
- Price level $>$ Expected
 - Firms: Incentive to produce more output

The Misperceptions Theory

- Changes in the overall price level
 - Can temporarily mislead suppliers about
 - Changes in individual markets
 - E.g., when the overall price level falls below the level that suppliers expected, they may *mistakenly* believe that their *relative* prices have fallen
 - Suppliers respond to changes in level of prices
 - Change in quantity supplied of goods and services

Why the Aggregate-Supply Curve Slopes Upward in the Short Run

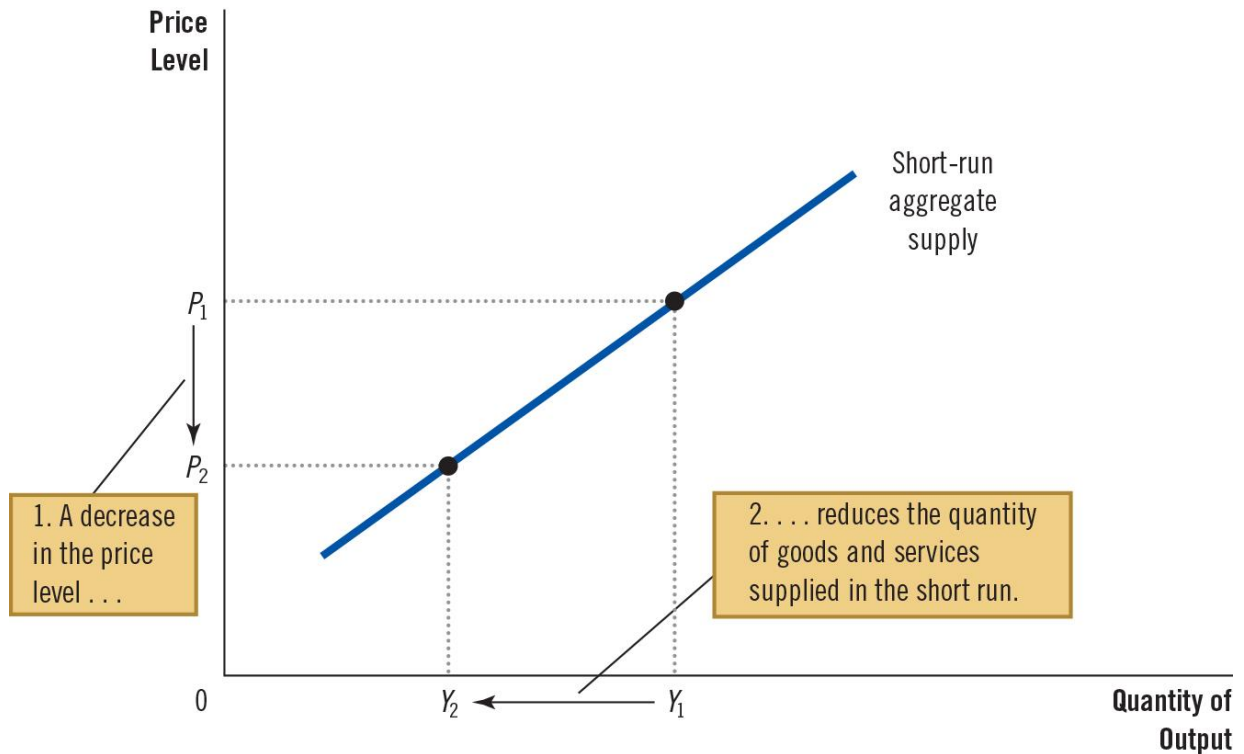
- All three suggest that output deviates in the short run from its natural level when the actual price level deviates from the price level that people had expected

$$\begin{array}{l} \text{Quantity} \\ \text{of output} \\ \text{supplied} \end{array} = \begin{array}{l} \text{Natural} \\ \text{level of} \\ \text{output} \end{array} + a \left(\begin{array}{l} \text{Actual} \\ \text{price} \\ \text{level} \end{array} - \begin{array}{l} \text{Expected} \\ \text{price} \\ \text{level} \end{array} \right)$$

- $a > 0$ determines how much output responds to unexpected changes in the price level

Figure 6 The Short-Run Aggregate-Supply Curve

- In the short run, a fall in the price level from P_1 to P_2 reduces the quantity of output supplied from Y_1 to Y_2 .
- ***This positive relationship could be due to sticky wages, sticky prices, or misperceptions.***
- Over time, wages, prices, and perceptions adjust, so this positive relationship is only temporary.



Why the Short-Run Aggregate-Supply Curve Might Shift (1 of 5)

- **Shifts Arising from Changes in Labor**

- An increase in the quantity of labor available (perhaps due to a fall in the natural rate of unemployment) shifts the aggregate-supply curve to the right
- A decrease in the quantity of labor available (perhaps due to a rise in the natural rate of unemployment) shifts the aggregate-supply curve to the left

Why the Short-Run Aggregate-Supply Curve Might Shift (2 of 5)

- **Shifts Arising from Changes in Capital**

- An increase in physical or human capital shifts the aggregate-supply curve to the right
- A decrease in physical or human capital shifts the aggregate-supply curve to the left

Why the Short-Run Aggregate-Supply Curve Might Shift (3 of 5)

- **Shifts Arising from Changes in Natural Resources**
 - An increase in the availability of natural resources shifts the aggregate-supply curve to the right.
 - A decrease in the availability of natural resources shifts the aggregate-supply curve to the left.

Why the Short-Run Aggregate-Supply Curve Might Shift (4 of 5)

- **Shifts Arising from Changes in Technology**
 - An advance in technological knowledge shifts the aggregate-supply curve to the right
 - A decrease in the available technology (perhaps due to government regulation) shifts the aggregate-supply curve to the left

Why the Short-Run Aggregate-Supply Curve Might Shift (5 of 5)

- **Shifts Arising from Changes in the Expected Price Level**
 - An increase in the expected price level *reduces* the quantity of goods and services supplied and shifts the short-run aggregate-supply curve to the left
 - A decrease in the expected price level *raises* the quantity of goods and services supplied and shifts the short-run aggregate-supply curve to the right

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Two Causes of Economic Fluctuations

The Long-Run Equilibrium

- Assumption
 - Economy begins in long-run equilibrium
- Long-run equilibrium
 - Intersection of *AD* and *LRAS* curves
 - Natural level of output
 - Actual price level
 - Intersection of *AD* and short-run *AS* curve
 - Expected price level = Actual price level

Figure 7 The Long-Run Equilibrium

- The long-run equilibrium of the economy is found where the aggregate-demand curve crosses the long-run aggregate-supply curve (point A).
- When the economy reaches this long-run equilibrium, the expected price level will have adjusted to equal the actual price level.
- As a result, the short-run aggregate-supply curve crosses this point as well.

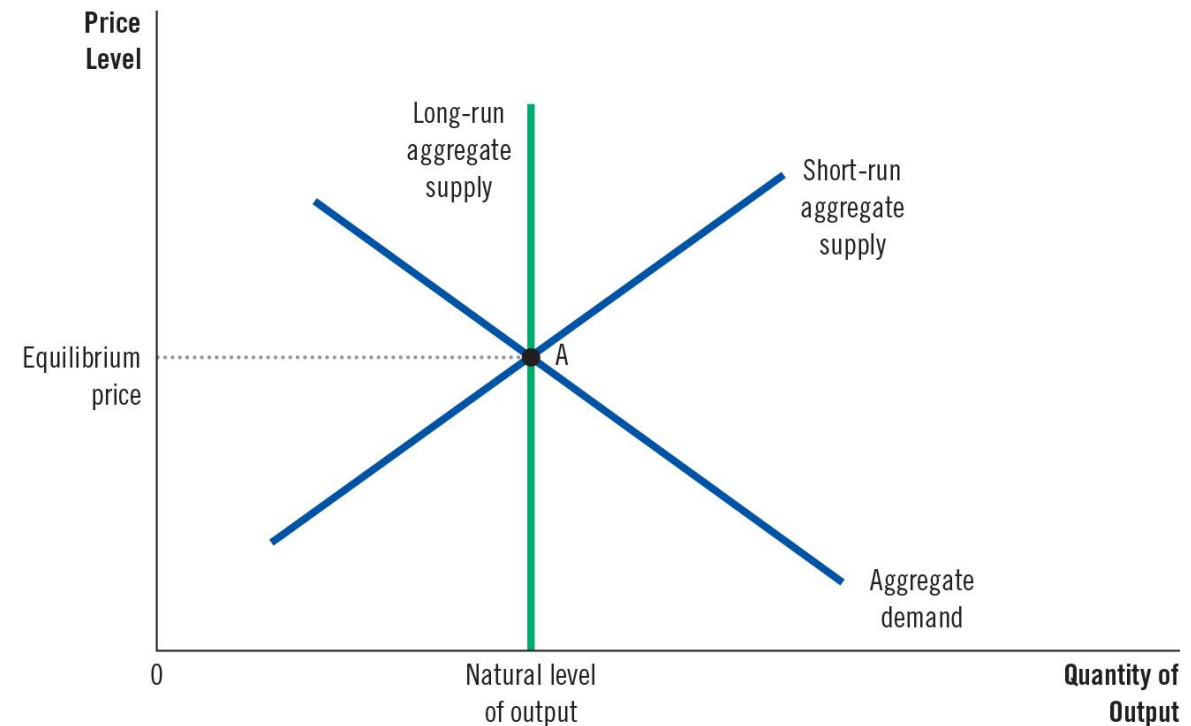


Figure 8 A Contraction in Aggregate Demand

- A fall in aggregate demand is represented by a leftward shift in the aggregate-demand curve from AD_1 to AD_2 .
- In the short run, the economy moves from point A to point B.
- Output falls from Y_1 to Y_2 , and the price level falls from P_1 to P_2 .
- But *as the expected price level adjusts to P_3* , the short-run aggregate-supply curve shifts to the right from AS_1 to AS_2 , and the economy reaches point C, where the new aggregate-demand curve crosses the long-run aggregate-supply curve.
- In the long run, the price level falls to P_3 , and output returns to its natural level, Y_1 .

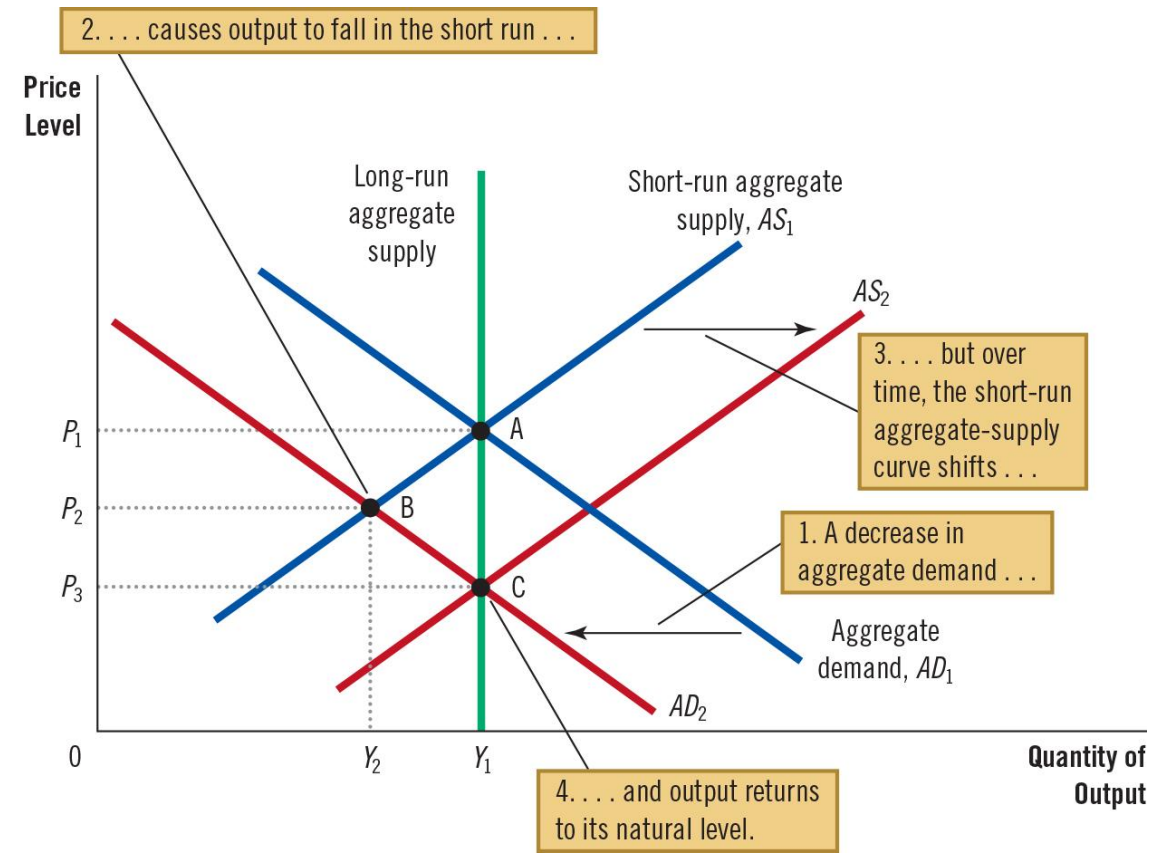
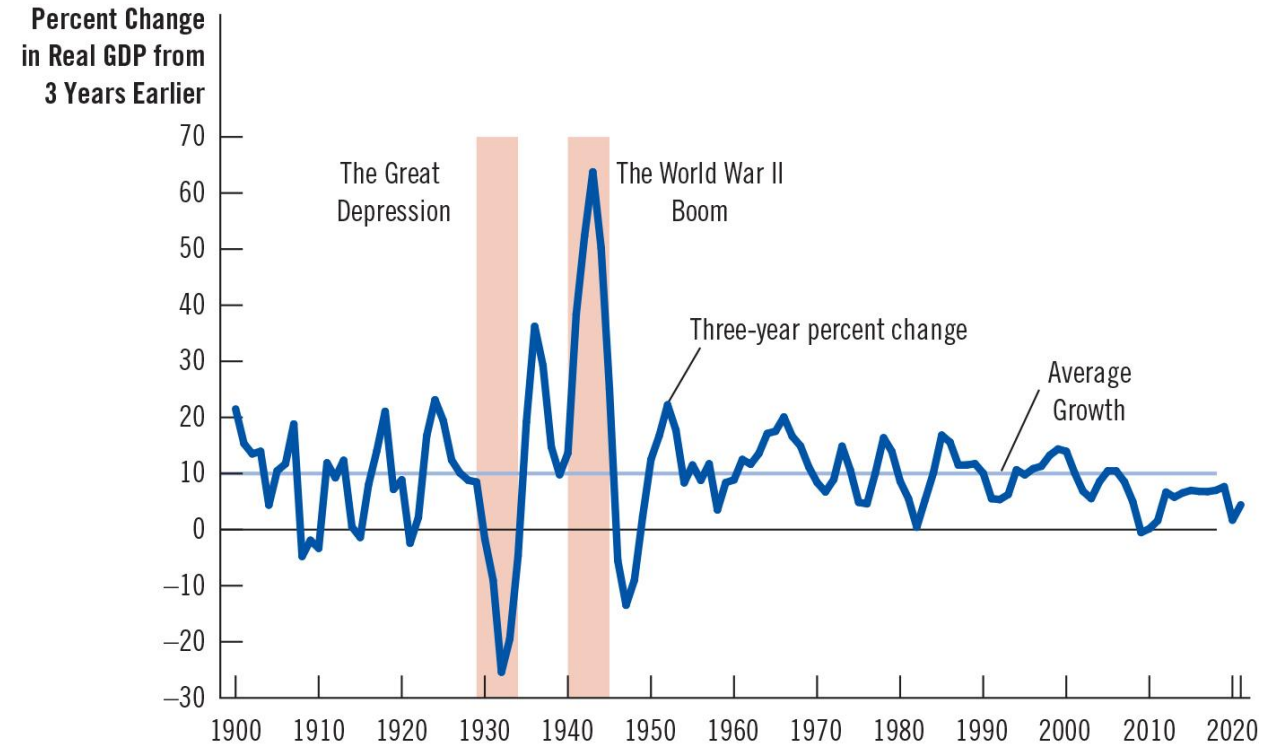


Figure 9 U.S. Real GDP Growth since 1900

Over the course of U.S. economic history, two fluctuations stand out as especially large. During the early 1930s, the economy endured the Great Depression, when the production of goods and services plummeted. During the early 1940s, the United States entered World War II, and production rose rapidly. Both events are usually explained by large shifts in aggregate demand.



Source: Louis D. Johnston and Samuel H. Williamson, “What Was GDP Then?” <http://www.measuringworth.com/usgdp/>; Department of Commerce.

The Effects of a Shift in Aggregate Demand

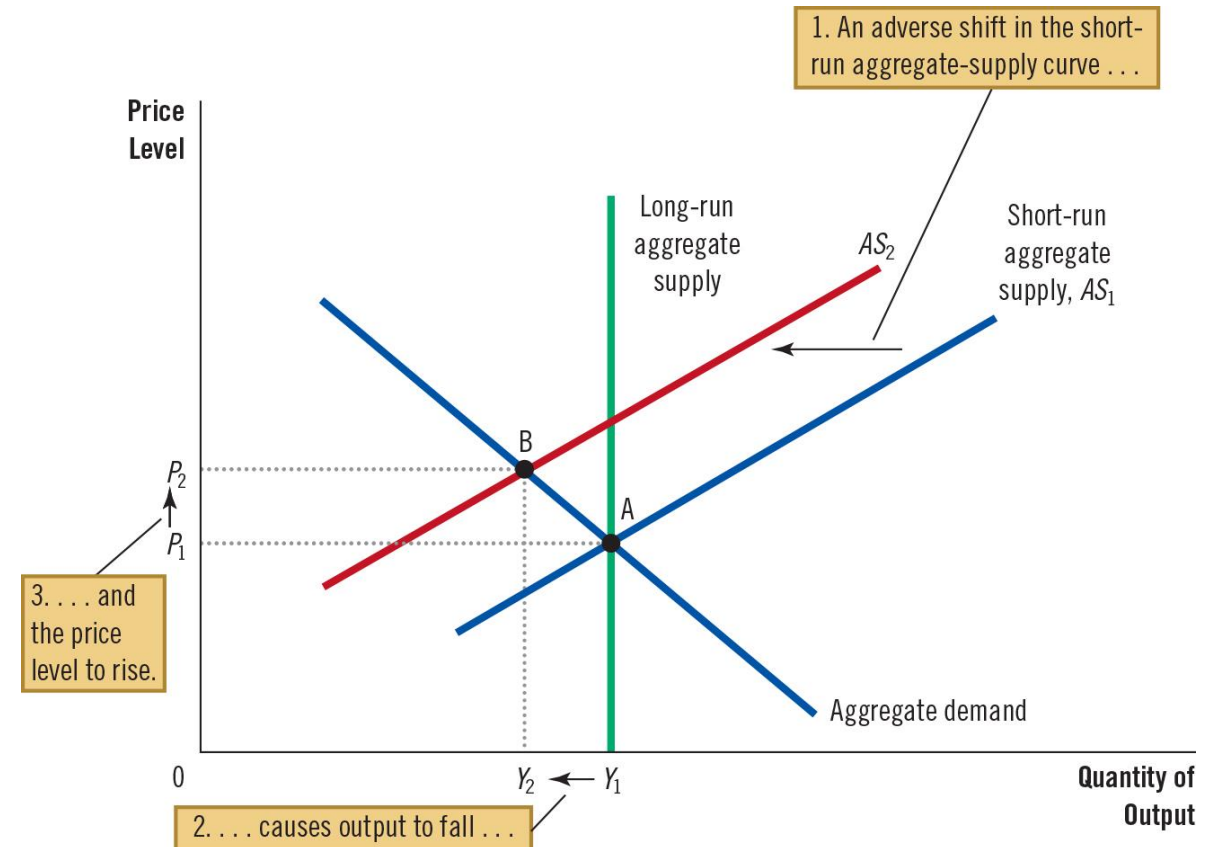
- To sum up, this story about shifts in aggregate demand has three important lessons:
 - In the short run, shifts in aggregate demand cause fluctuations in the economy's output of goods and services
 - In the long run, shifts in aggregate demand affect the overall price level but do not affect output
 - Because policymakers influence aggregate demand, they can potentially mitigate the severity of economic fluctuations

The Effects of a Shift in Aggregate Supply

- When the short-run aggregate-supply curve shifts to the left, the effect is **stagnation** (falling output) and **inflation** (rising prices)—a combination called **stagflation***
- Over time, as wages, prices, and perceptions adjust, the short-run aggregate-supply curve shifts back to the right, returning the price level and output to their original levels

Figure 10 An Adverse Shift in Aggregate Supply

- When some event increases firms' costs, the short-run aggregate-supply curve shifts to the left from AS_1 to AS_2 .
- The economy moves from point A to point B.
- The result is stagflation: Output falls from Y_1 to Y_2 , and the price level rises from P_1 to P_2 .



Wage-Price Spiral and Transition back to the Long-Run Equilibrium

- Stagflation affects (sticky) nominal wages
 - Firms and workers may, at first, respond to the higher level of prices by setting higher nominal wages
 - Firms' costs will rise yet again, and the short-run aggregate-supply curve will shift farther to the left
 - Making the problem of stagflation even worse
- **Wage-price spiral**
 - Higher prices leading to higher wages, which in turn leads to even higher prices

Wage-Price Spiral and Transition back to the Long-Run Equilibrium

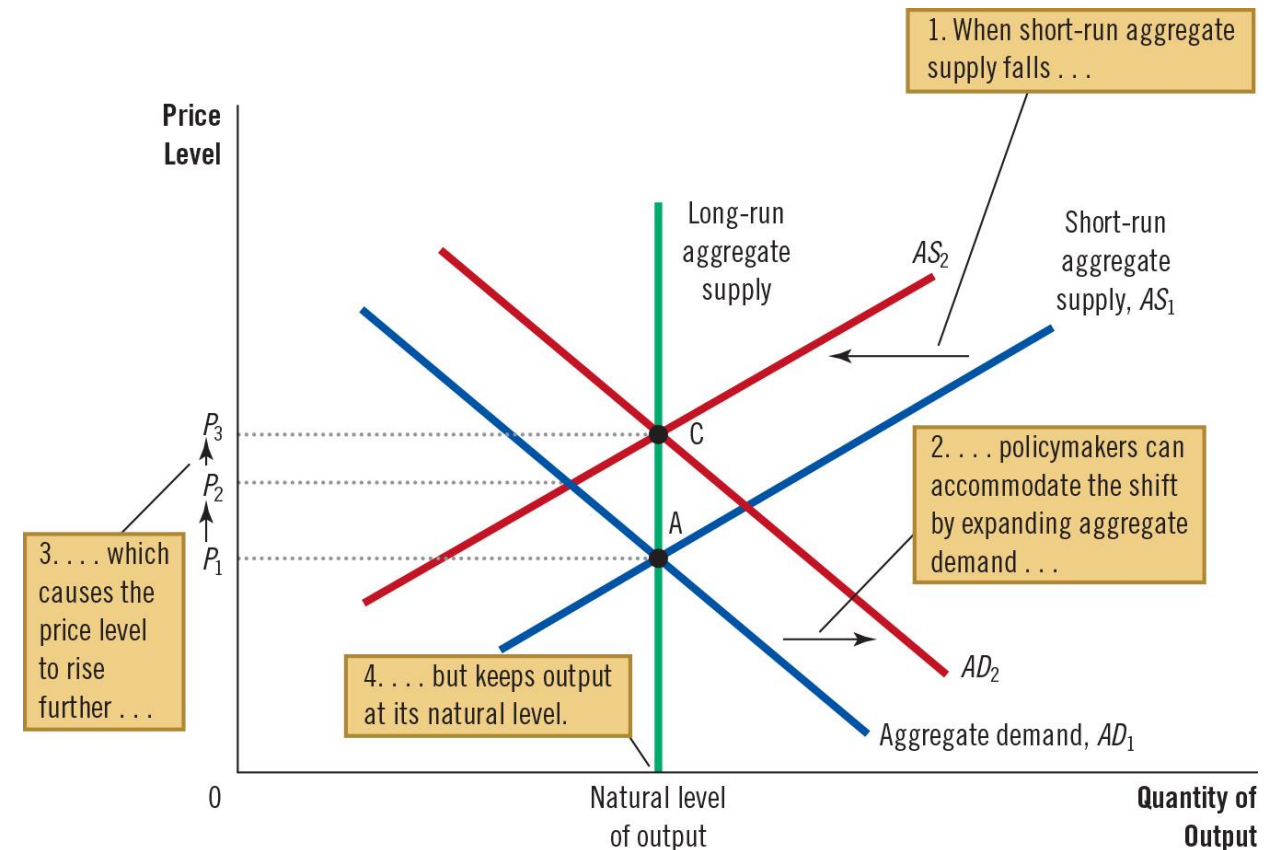
- At some point, the spiral of ever-rising wages and prices will slow
 - The low level of output and employment will put downward pressure on wages
 - As nominal wages fall, producing goods and services becomes more profitable, and the short-run aggregate-supply curve shifts to the right
 - The price level falls, and the quantity of output approaches its natural level
- In the long run, the economy returns to point A

Accommodating an Adverse Shift in Aggregate Supply

- Monetary and fiscal policymakers might attempt to offset some of the effects of the shift in the short-run aggregate-supply curve by shifting the aggregate-demand curve
- Policymakers are said to **accommodate** the shift in aggregate supply
 - An accommodative policy accepts a permanently higher level of prices to maintain a higher level of output and employment

Figure 11 Accommodating an Adverse Shift in Aggregate Supply

- Faced with an adverse shift in aggregate supply from AS_1 to AS_2 , policymakers who can influence aggregate demand might try to shift the aggregate-demand curve to the right from AD_1 to AD_2 .
- The economy would move from point A to point C.
- This policy would prevent the supply shift from reducing output in the short run, but the price level would permanently rise from P_1 to P_3 .



The Effects of a Shift in Aggregate Demand

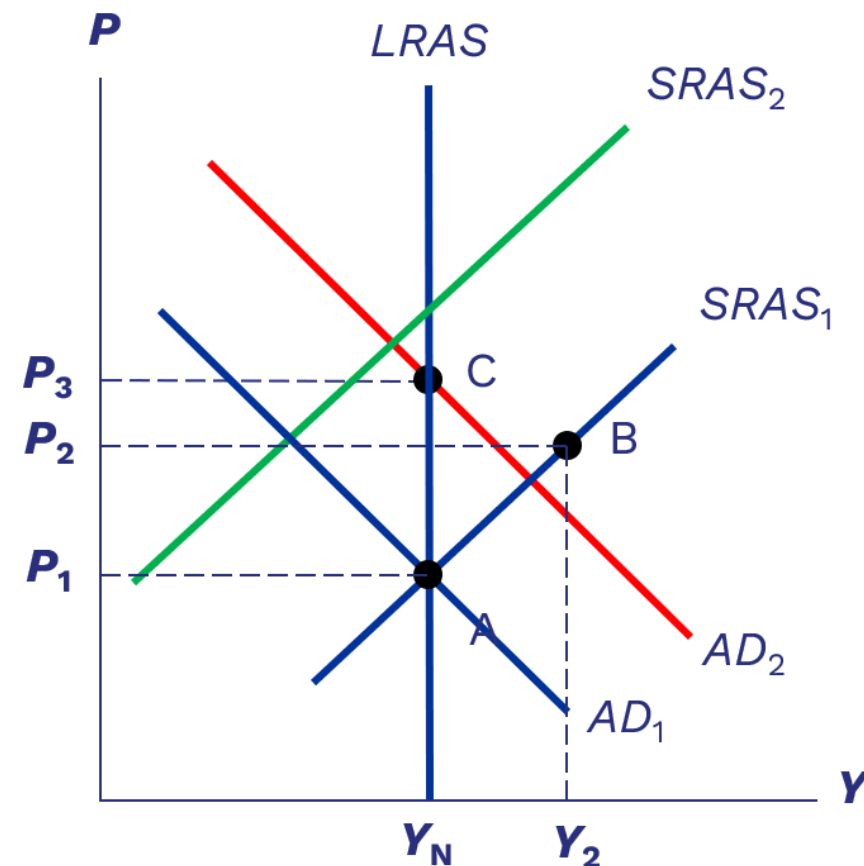
- To sum up, this story about shifts in aggregate supply has two important lessons:
 - Shifts in aggregate supply can cause stagflation—a combination of recession (falling output) and inflation (rising prices).
 - Policymakers who can influence aggregate demand can mitigate the adverse impact on output but only at the cost of exacerbating the problem of inflation.

Active Learning 2: Working with the Model

- Draw the $AD-AS$ diagram for the U.S. economy starting in a long-run equilibrium (point A)
 - A boom occurs in Canada. Use your diagram to determine the SR and LR effects on U.S. GDP, the price level, and unemployment

Active Learning 2: Answers

- Event: Boom in Canada
 1. Affects NX , AD curve
 2. Shifts AD right
 3. SR equilibrium at point B
 - P and Y higher, unemployment lower
 4. Over time, P_E rises, $SRAS$ shifts left, until LR equilibrium at C
 - Y and unemployment back at initial levels



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Conclusion

Conclusion

- This chapter had two goals
 - First, it discussed some of the important facts about short-run fluctuations in economic activity
 - Second, it introduced a basic model to explain those fluctuations, called the model of aggregate demand and aggregate supply
- We continue our study of this model in the next chapter to understand more fully what causes economic fluctuations and how policymakers might respond to them

Think-Pair-Share Activity

You are watching the evening news on television. The news anchor reports that union wage demands are much higher this year because the workers anticipate an increase in the rate of inflation. Your roommate says, “Inflation is a self-fulfilling prophecy. If workers think there are going to be higher prices, they demand higher wages. This increases the cost of production and firms raise their prices. Expecting higher prices simply causes higher prices.”

- A. Is this true in the short run? Explain.
- B. If policymakers do nothing and allow the economy to adjust to the natural level of output on its own, does expecting higher prices cause higher prices in the long run? Explain.
- C. If policymakers accommodate the adverse supply shock, does the expectation of higher prices cause higher prices in the long run? Explain.

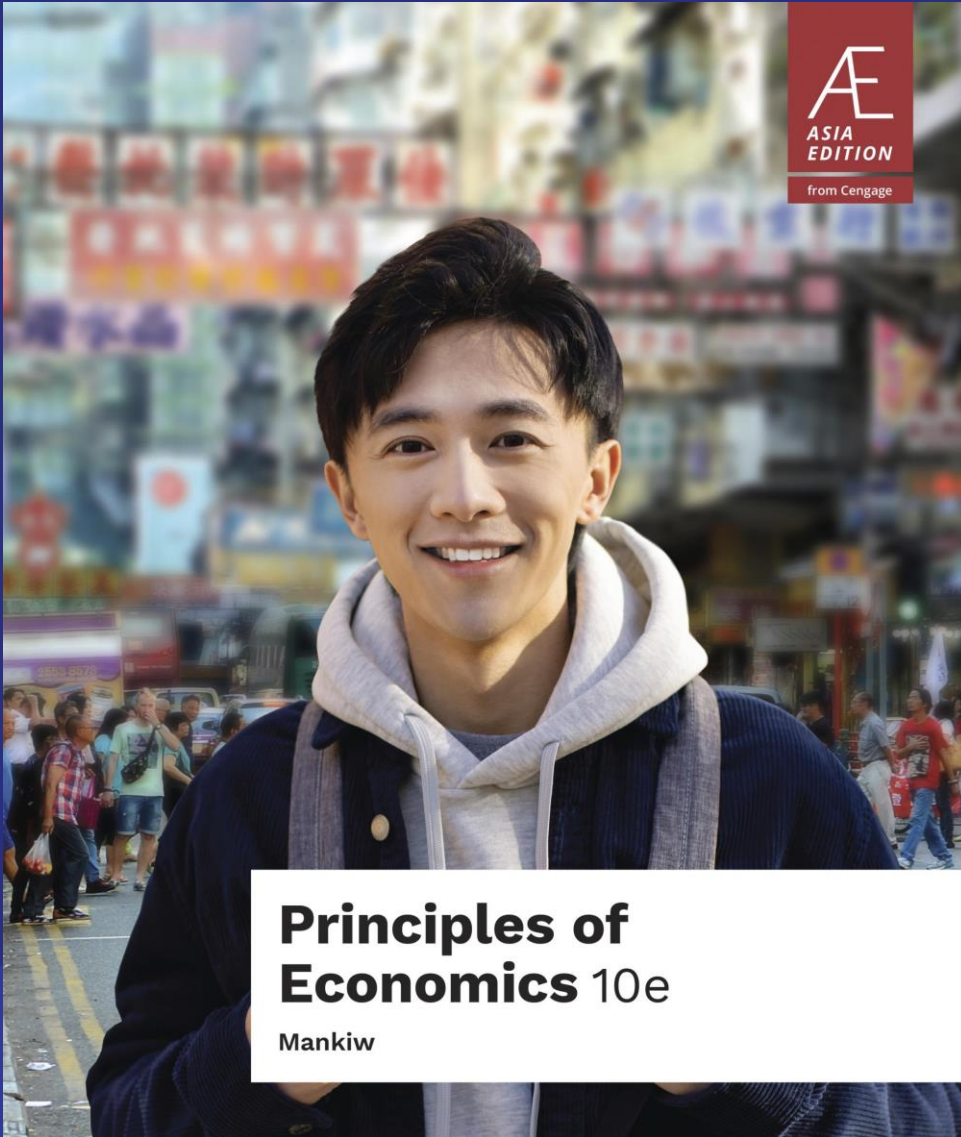
Self-Assessment

- What are two macroeconomic variables that decline when the economy goes into a recession? Which macroeconomic variable rises during a recession?

Summary

Click the link to review the objectives for this presentation.

[Link to Objectives](#)



Principles of Economics, 10e

Chapter 35: The Influence of Monetary and Fiscal Policy on Aggregate Demand

Chapter Objectives (1 of 3)

By the end of this chapter, you should be able to:

- Derive the short-run and long-run effects on output and prices according to the AD-AS model, given a scenario about an economic shock.
- Illustrate the short-run impact of a change in the price level under liquidity preference theory according to the model of aggregate demand and aggregate supply.
- Explain how open market operations impact the money supply.
- Explain the benefits and challenges of using monetary policy to address economic imbalances.

Chapter Objectives (2 of 3)

- Describe the concept of a liquidity trap.
- Explain the benefits and challenges of using fiscal policy to address economic imbalances.
- Given a graph of the aggregate-demand curve, determine the effect of a change in fiscal policy on that curve.
- Explain the multiplier effect of a change in fiscal policy.
- Explain how expansionary fiscal policy causes crowding out.
- Explain how government borrowing can lead to crowding out.

Chapter Objectives (3 of 3)

- Explain the effect of tax policy on aggregate demand.
- Given a scenario about an economy's current state, determine the appropriate stabilization policy to restore the natural rate of output.
- Discuss the pros and cons of employing stabilization policies.

35-1

How Monetary Policy Influences Aggregate Demand

Aggregate Demand (1 of 2)

- Aggregate-demand (AD) curve slopes downward for three reasons
 - The wealth effect
 - The interest-rate effect
 - The exchange-rate effect
- These three effects work simultaneously to increase the quantity of goods and services demanded when the price level falls (opposite occurs when the price level rises)

Aggregate Demand (2 of 2)

- For the U.S. economy
 - Wealth effect is least important
 - Money holdings are a small part of household wealth
 - The exchange-rate effect is not large
 - Exports and imports are a small fraction of GDP
 - The interest-rate effect is the most important reason for the downward slope of the aggregate-demand curve

The Theory of Liquidity Preference

- **Theory of liquidity preference***

- Keynes's theory that the interest rate adjusts to bring money supply and money demand into balance
 - Nominal interest rate and real interest rate
- Assumption: Expected rate of inflation is constant
- In this case, nominal and real interest rates differ by a constant
- For the rest of this chapter, changes in the interest rate refer to both the real interest rate and the nominal interest rate

Money Supply

- Money supply
 - Assumed fixed by the Fed, does not depend on interest rate
- Tools the Fed uses to change the money supply
 - Open market operations
 - Change the interest rate it pays on reserves
 - Change reserve requirements
 - Change the discount rate

Money Demand

- Money demand
 - Reflects how much wealth people want to hold in liquid form
 - Assume household wealth includes only two assets
 - Cash – liquid but pays no interest
 - Bonds – pay interest but not as liquid
 - A household’s “money demand” reflects its preference for liquidity

Equilibrium in the Money Market (1 of 2)

- According to the theory of liquidity preference, the interest rate adjusts to balance the supply and demand for money
- Equilibrium interest rate
 - Quantity of money demanded exactly balances the quantity of money supplied

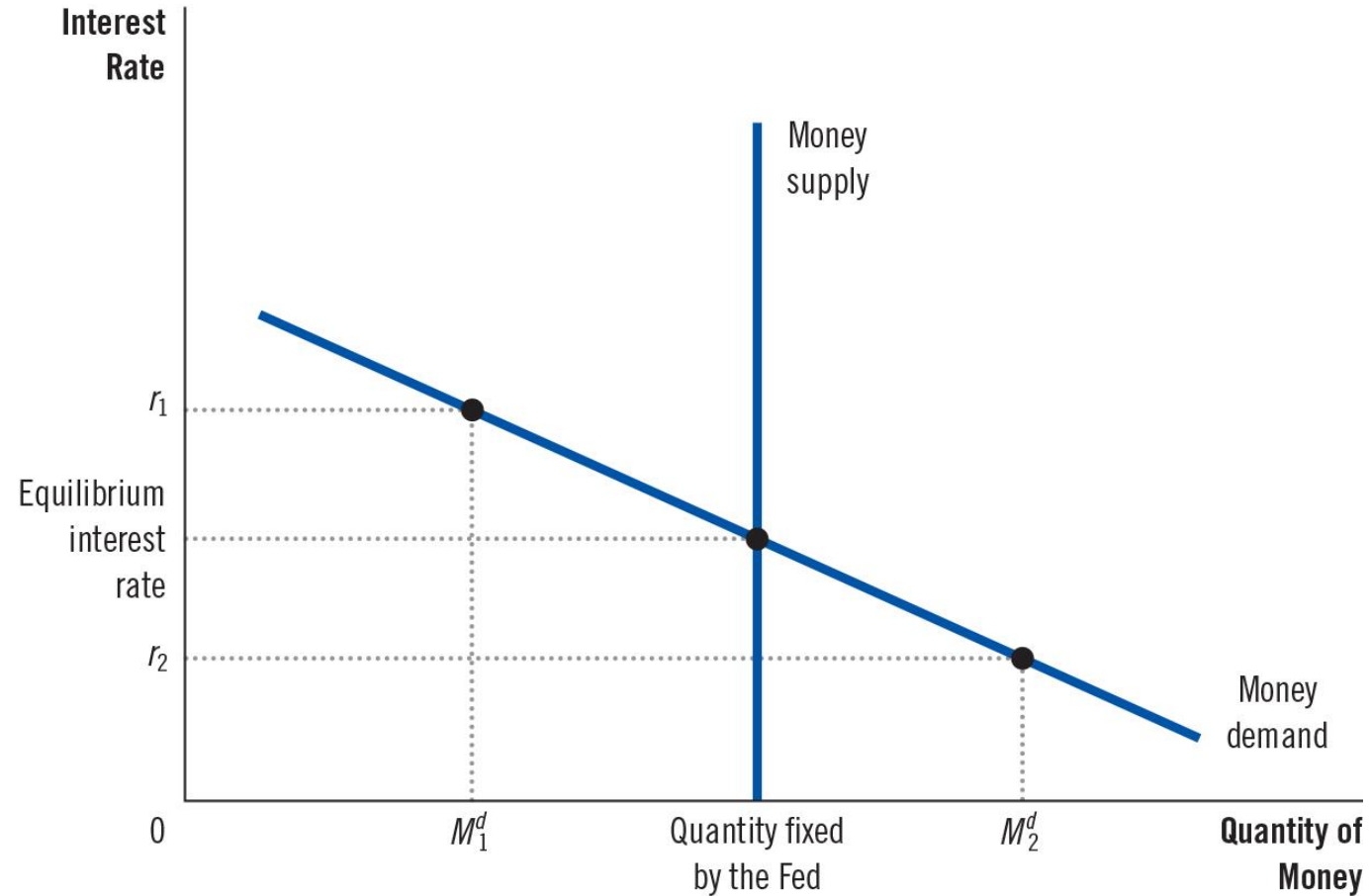
Equilibrium in the Money Market (2 of 2)

- If interest rate $>$ equilibrium
 - Quantity of money people want to hold less than quantity supplied
 - People holding the surplus buy interest-bearing assets
 - Interest rate falls
- If interest rate $<$ equilibrium
 - Quantity of money people want to hold more than quantity supplied
 - People increase their holdings of money sell interest-bearing assets
 - Interest rates rises

Figure 1 Equilibrium in the Money Market (1 of 2)

According to the theory of liquidity preference, the interest rate adjusts to bring the quantity of money supplied and the quantity of money demanded into balance. If the interest rate is above the equilibrium level (such as at r_1), the quantity of money people want to hold (M_1^d) is less than the quantity the Fed has created, and this surplus puts downward pressure on the interest rate. Conversely, if the interest rate is below the equilibrium level (such as at r_2), the quantity of money people want to hold (M_2^d) exceeds the quantity the Fed has created, and this shortage puts upward pressure on the interest rate. In this manner, the theory says, the forces of supply and demand in the market for money push the interest rate toward the equilibrium interest rate at which people are content holding the quantity of money the Fed has created.

Figure 1 Equilibrium in the Money Market (2 of 2)



Active Learning 1: Determinants of Money Demand

- What happens to money demand in the following two scenarios?
 - A. Suppose r rises, but Y and P are unchanged
 - B. Suppose P rises, but Y and r are unchanged

Active Learning 1: Answers

- A. Recall that r is the opportunity cost of holding money
- An increase in r reduces the quantity of money demanded: Households attempt to buy bonds to take advantage of the higher interest rate
 - Hence, an increase in r causes a decrease in the quantity of money demanded, other things equal
- B. If Y is unchanged, people will want to buy the same amount of goods and services
- Since P is higher, they will need more money to do so
 - Hence, an increase in P causes an increase in money demand, other things equal

The Downward Slope of the Aggregate-Demand Curve

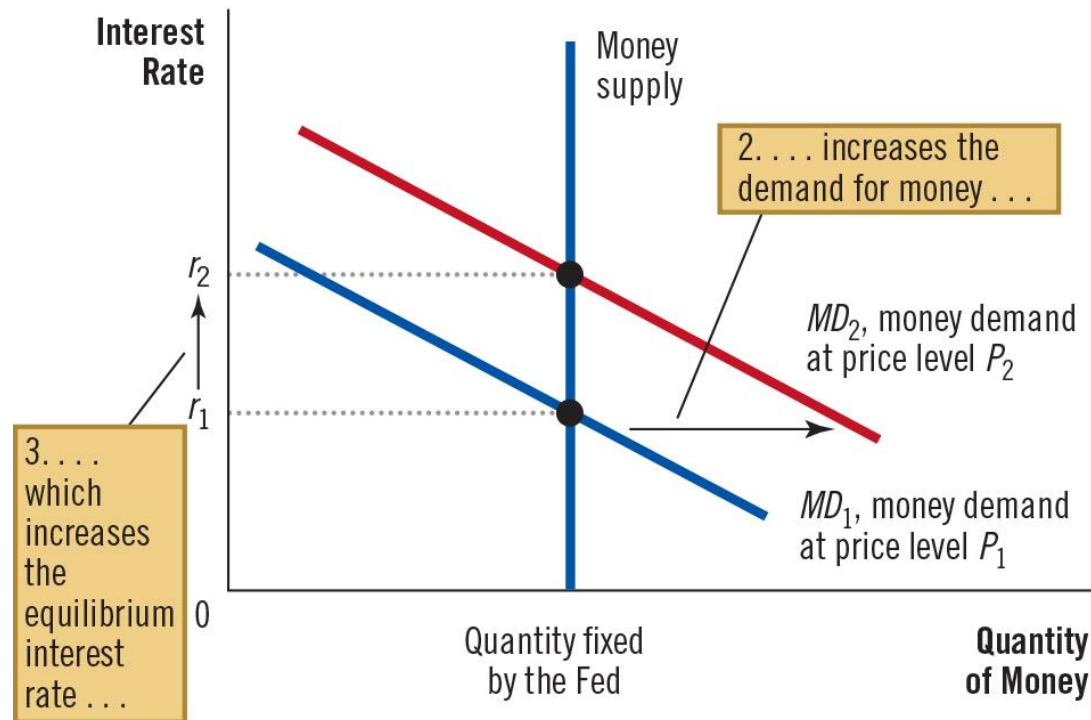
- Negative relationship between the price level and the quantity of goods and services demanded
 1. A higher price level raises money demand
 2. Higher money demand leads to a higher interest rate
 3. A higher interest rate reduces the quantity of goods and services demanded

Figure 2 The Money Market and the Slope of the Aggregate-Demand Curve (1 of 2)

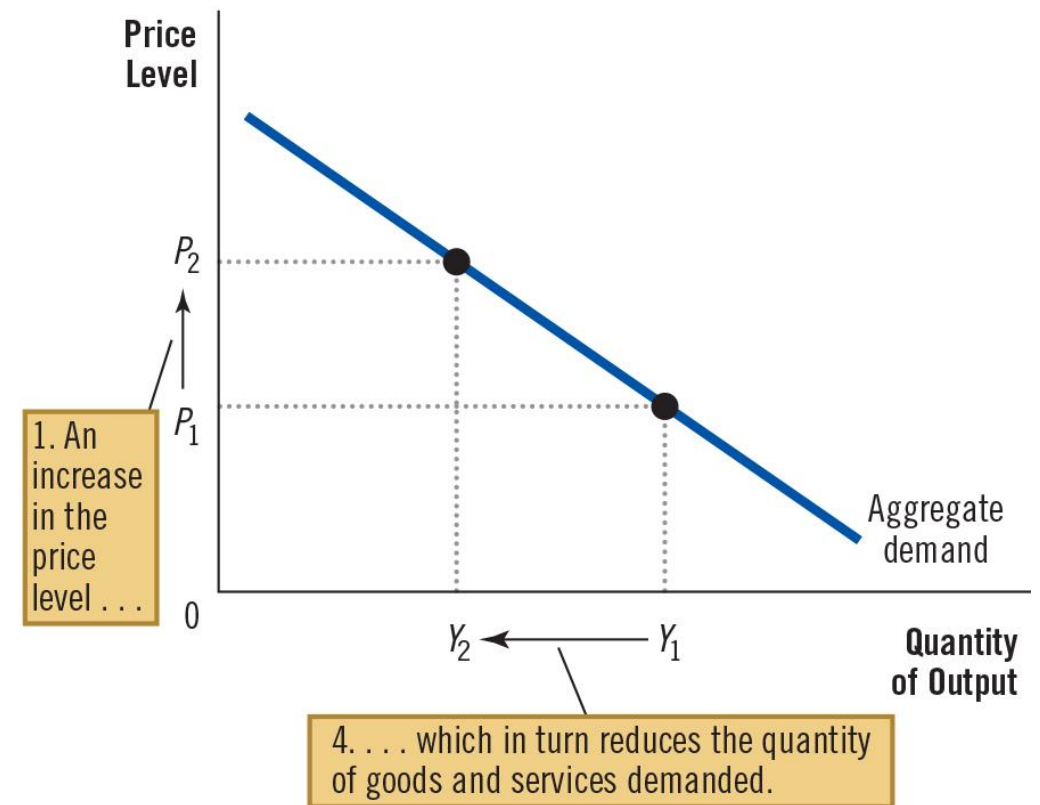
An increase in the price level from P_1 to P_2 shifts the money demand curve to the right, as in panel (a). This increase in money demand causes the interest rate to rise from r_1 to r_2 . Because the interest rate is the cost of borrowing, the increase in the interest rate reduces the quantity of goods and services demanded from Y_1 to Y_2 . This negative relationship between the price level and quantity demanded is represented by a downward-sloping aggregate-demand curve, as in panel (b).

Figure 2 The Money Market and the Slope of the Aggregate-Demand Curve (2 of 2)

(a) The Money Market



(b) The Aggregate-Demand Curve

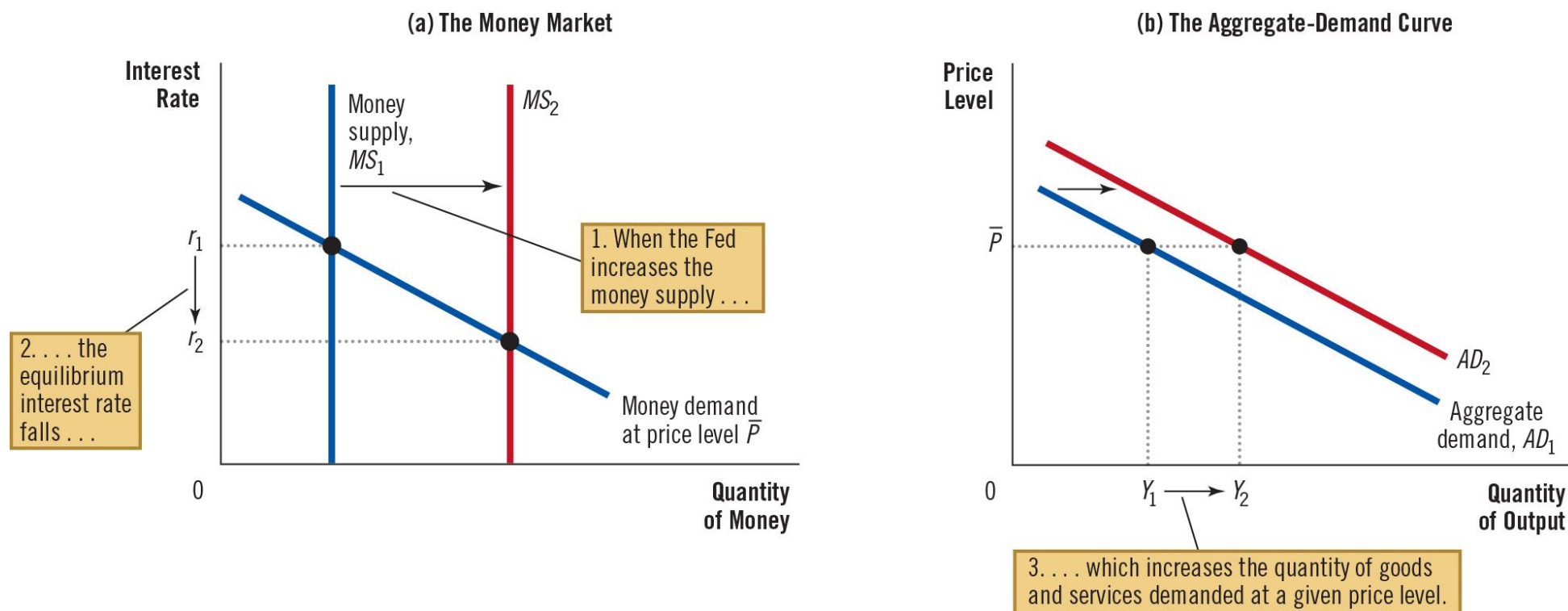


Changes in the Money Supply

- When the Fed increases the money supply
 - Lowers the interest rate and increases the quantity of goods and services demanded for any price level
 - Aggregate-demand curve shifts to the right
- When the Fed contracts the money supply
 - Raises the interest rate and reduces the quantity of goods and services demanded for any price level
 - Aggregate-demand curve to the left

Figure 3 A Monetary Injection

In panel (a), an increase in the money supply from MS_1 to MS_2 reduces the equilibrium interest rate from r_1 to r_2 . When the interest rate falls, the cost of borrowing drops, raising the quantity of goods and services demanded at a given price level from Y_1 to Y_2 . In panel (b), therefore, the aggregate-demand curve shifts to the right from AD_1 to AD_2 .



The Role of Interest-Rate Targets in Fed Policy

- Monetary policy can be described either in terms of the money supply or in terms of the interest rate
 - Changes in monetary policy aimed at expanding aggregate demand can be described either as increasing the money supply or as reducing the interest rate
 - Changes in monetary policy aimed at contracting aggregate demand can be described either as decreasing the money supply or as raising the interest rate

Active Learning 2: Monetary Policy

- For each of the events below
 - Determine the short-run effects on output
 - Determine how the Fed should adjust the money supply and interest rates to stabilize output
- A. Congress tries to balance the budget by cutting government spending
- B. A stock market boom increases household wealth
- C. War breaks out in the Middle East, causing oil prices to soar

Active Learning 2: Answers

- A. Cutting government spending would reduce aggregate demand and output. To stabilize output, the Fed should increase MS and reduce r to increase aggregate demand.
- B. Increased household wealth would increase aggregate demand, raising output above its natural rate.
- C. Rising oil prices typically lead to increased production costs, decreased consumer spending, and a leftward shift in the aggregate supply curve. The combination of decreased output and higher prices can result in stagflation. To stabilize output, the Fed should increase MS and lower r to increase aggregate demand.

The Zero Lower Bound (1 of 2)

- **Liquidity trap**

- If interest rates have already fallen to around zero, monetary policy may no longer be effective
- Aggregate demand, production, and employment may be “trapped” at low levels
- Zero lower bound for interest rates justifies setting the target rate of inflation higher
 - Moderate inflation gives monetary policymakers more room to stimulate the economy when needed

The Zero Lower Bound (2 of 2)

- A central bank has other tools to expand the economy even after its interest rate target hits its lower bound of zero
 - **Forward guidance:** Commit itself to keeping interest rates low for an extended period
 - Even if the central bank's current target for the interest rate cannot fall any further, the promise that interest rates will remain low may help stimulate investment spending
 - **Quantitative easing:** Buy a larger variety of financial instruments (mortgages, corporate debt, and longer-term government bonds)
 - Lower the interest rates on these kinds of loans
 - Increase the quantity of bank reserves

35-2

How Fiscal Policy Influences Aggregate Demand

Fiscal Policy

- **Fiscal policy***
 - The setting of the levels of government spending and taxation by government policymakers by government policymakers

*Words accompanied by an asterisk are key terms from the chapter.

Changes in Government Purchases

- When the government alters its own purchases of goods and services, it shifts the aggregate-demand curve directly
- Two macroeconomic effects cause the size of the shift in aggregate demand to differ from the change in government purchases
 - The multiplier effect suggests the shift in aggregate demand could be larger
 - The crowding-out effect suggests the shift in aggregate demand could be smaller

The Multiplier Effect

- **Multiplier effect***
 - Additional shifts in aggregate demand that result when expansionary fiscal policy increases income and thereby increases consumer spending

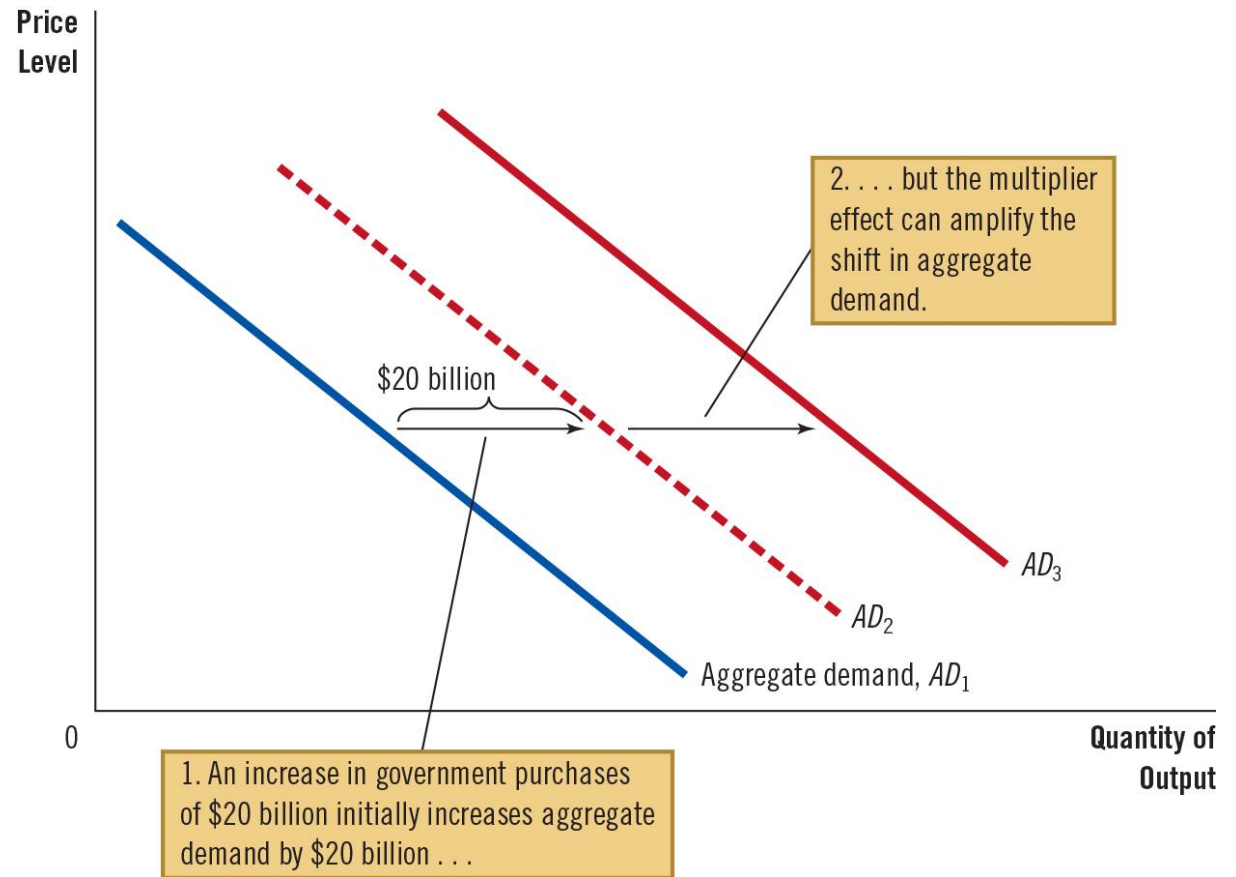
*Words accompanied by an asterisk are key terms from the chapter.

A Formula for the Spending Multiplier

- How big is the multiplier effect?
 - Depends on how much consumers respond to increases in income
- Marginal propensity to consume (*MPC*)
 - Fraction of extra income that households consume rather than save
- For example, if the MPC is $\frac{3}{4}$, for every extra dollar a household earns, the household spends \$0.75 ($\frac{3}{4}$ of the dollar) and saves \$0.25

Figure 4 The Multiplier Effect

- An increase in government purchases of \$20 billion can shift the aggregate-demand curve to the right by more than \$20 billion.
- This multiplier effect arises because increases in aggregate income stimulate additional spending by consumers.



Spending Multiplier Example (1 of 2)

- With an MPC of $\frac{3}{4}$ when the workers and owners of Boeing earn \$20 billion from the government contract, they increase their consumer spending by
 - $\frac{3}{4} \times \$20 \text{ billion} = \15 billion
- Additional consumer spending raises income for the workers and owners of the firms that produce the consumption goods by the same amount
 - Consumers increase spending again, this time by $MPC \times (MPC \times \$20 \text{ billion})$

Spending Multiplier Example (2 of 2)

- Spending multiplier = $1/(1 - MPC)$

Change in government purchases \$ 20 billion

First change in consumption $MPC \times \$ 20 \text{ billion}$

Second change in consumption $MPC^2 \times \$ 20 \text{ billion}$

Third Change in consumption $MPC^3 \times \$ 20 \text{ billion}$

Etc. Etc.

Total change in demand = $(1 + MPC + MPC^2 + MPC^3 + \dots) \times \20 billion

Other Applications of the Multiplier Effect

- The multiplier effect tends to amplify the effects of fiscal policy on aggregate demand
 - Also applies to any event that alters spending on any component of GDP—consumption, investment, government purchases, or net exports

The Crowding-Out Effect

- **Crowding-out effect***
 - The offset in aggregate demand that results when expansionary fiscal policy raises the interest rate and thereby reduces investment spending
 - Reduces the net increase in aggregate demand
 - The size of the *AD* shift may be smaller than the initial fiscal expansion

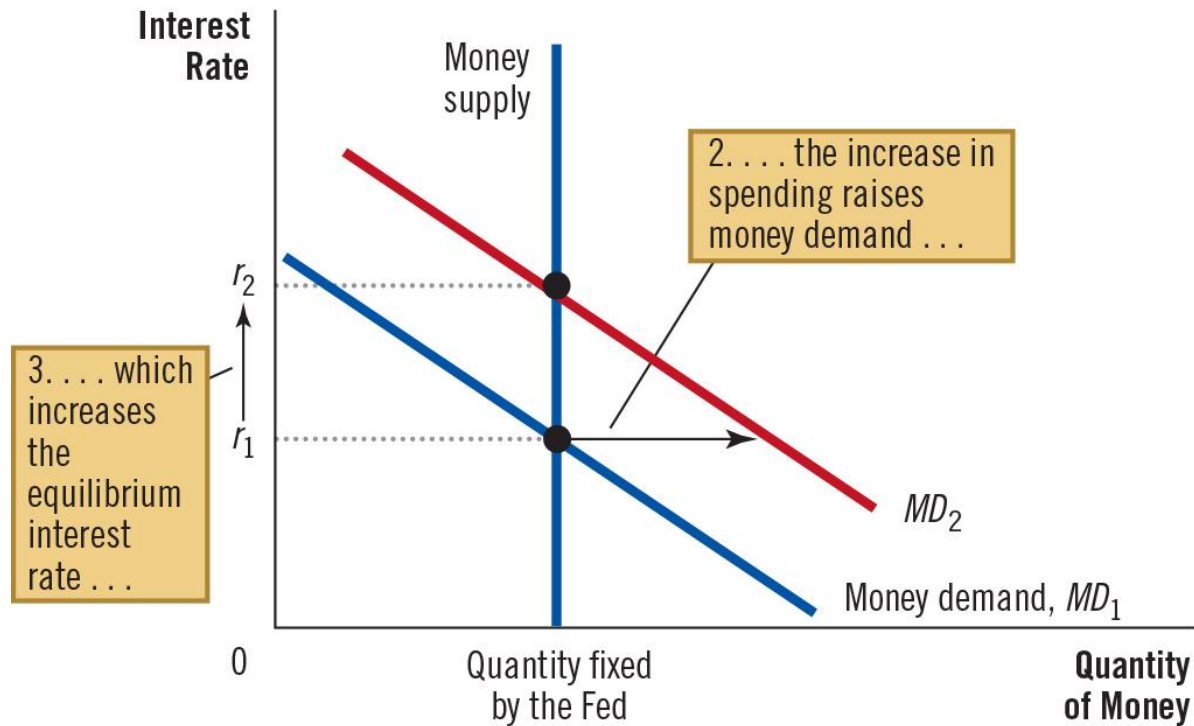
*Words accompanied by an asterisk are key terms from the chapter.

Figure 5 The Crowding-Out Effect (1 of 2)

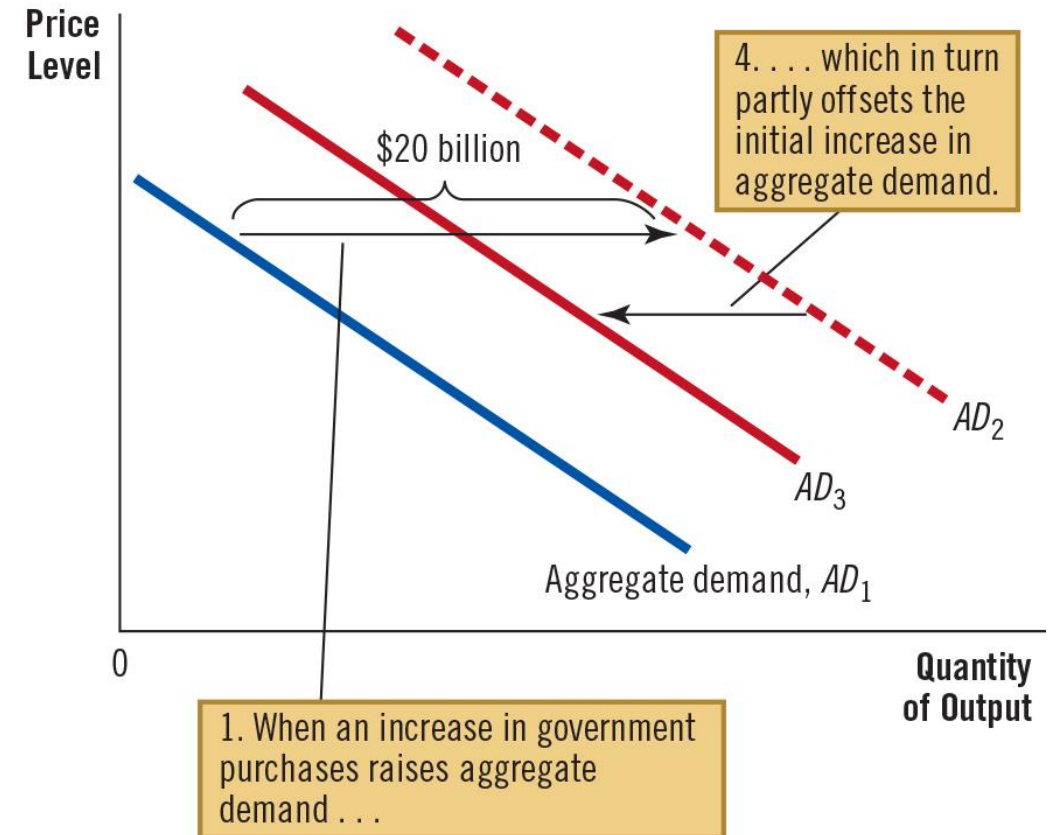
Panel (a) shows the money market. When the government increases its purchases of goods and services, income increases, raising the demand for money from MD_1 to MD_2 and increasing the equilibrium interest rate from r_1 to r_2 . Panel (b) shows the effects on aggregate demand. The initial impact of the increase in government purchases shifts the aggregate-demand curve from AD_1 to AD_2 . Yet because the interest rate is the cost of borrowing, the increase in the interest rate tends to reduce the quantity of goods and services demanded, particularly for investment goods. This crowding out of investment partially offsets the impact of the fiscal expansion on aggregate demand. In the end, the aggregate-demand curve shifts only to AD_3 .

Figure 5 The Crowding-Out Effect (2 of 2)

(a) The Money Market



(b) The Shift in Aggregate Demand



Changes in Taxes

- A tax cut
 - Increases households' take-home pay
 - Households respond by spending a portion of this extra income, shifting AD to the right
 - The size of the shift is affected by the multiplier and crowding-out effects
- Another factor: Households' perception
 - Permanent tax cut – large impact on AD
 - Temporary tax cut – small impact on AD

Active Learning 3: Fiscal Policy Effects

- The economy is in recession. Policymakers think that shifting the AD curve rightward by \$200 billion would end the recession.
 - A. If $MPC = 0.8$ and there is no crowding out, how much should Congress increase G to end the recession?
 - B. If there is crowding out, will Congress need to increase G more or less than this amount?

Active Learning 3: Answers

A. Multiplier = $1 / (1 - MPS) = 1 / (1 - .8) = 5$

- Increase G by \$40B to shift aggregate demand by

- $\Delta Y = \text{multiplier} \times \Delta G = 5 \times \$40b = \$200B$

B. Crowding out reduces the impact of G on AD . To offset this, Congress should increase G by a larger amount.

35-3

Using Policy to Stabilize the Economy

The Case for Active Stabilization Policy

(1 of 2)

- Advocates of active stabilization policy say that changes in attitudes by households and firms shift aggregate demand and that, if the government does not respond, the result is undesirable and unnecessary fluctuations in output and employment
 - Keynes emphasized key role of aggregate demand in explaining short-run fluctuations
 - Aggregate demand fluctuates because of largely irrational waves of pessimism and optimism (animal spirits)

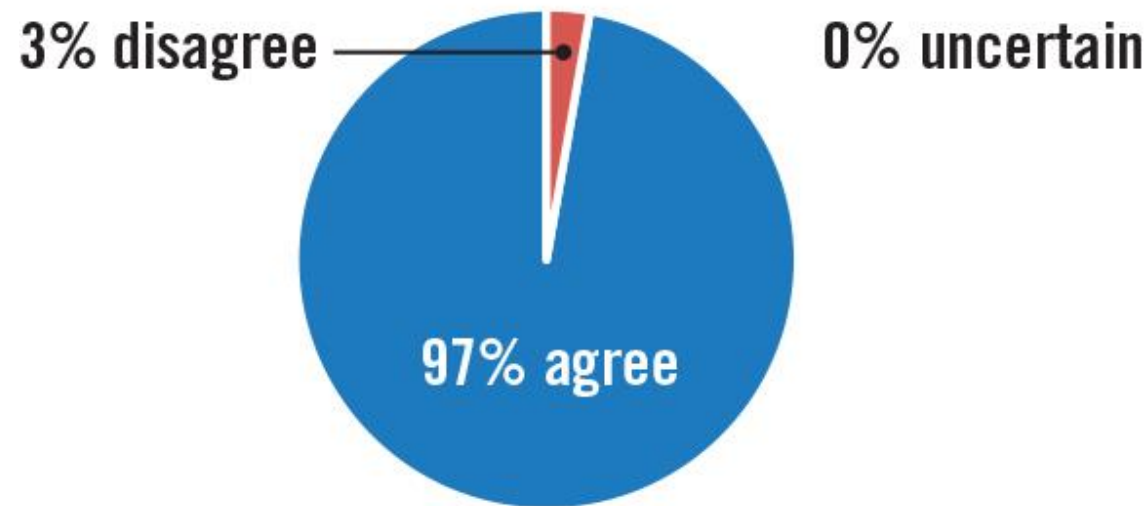
The Case for Active Stabilization Policy (2 of 2)

- Government should use policy to reduce these fluctuations
 - When GDP falls below its natural rate, use expansionary monetary or fiscal policy to prevent or reduce a recession
 - When GDP rises above its natural rate, use contractionary policy to prevent or reduce an inflationary boom

Ask the Experts: Economic Stimulus A

“Because of the American Recovery and Reinvestment Act, ARRA, of 2009, the U.S. unemployment rate was lower at the end of 2010 than it would have been without the stimulus bill.”

What do economists say?



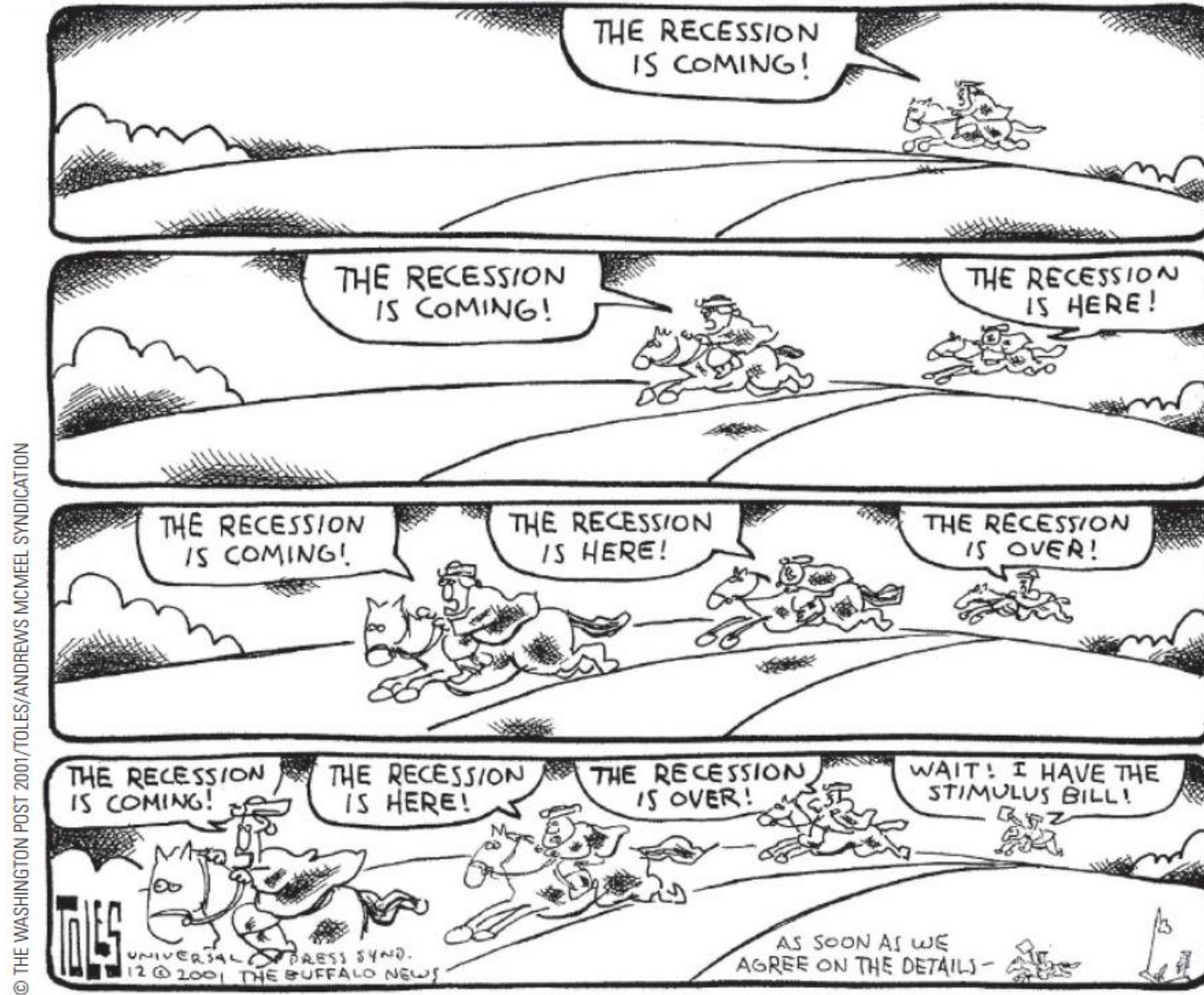
Source: IGM Economic Experts Panel, July 29, 2014.

The Case against Active Stabilization Policy (1 of 2)

- Advocates of more passive policy say that monetary and fiscal policy work with such long lags that attempts at stabilizing the economy often end up being destabilizing
- Monetary policy affects economy with a long lag
 - Firms make investment plans in advance, so I takes time to respond to changes in r
- Fiscal policy also works with a long lag
 - Changes in G and T require acts of Congress and legislative process can take months or years

The Case against Active Stabilization Policy (2 of 2)

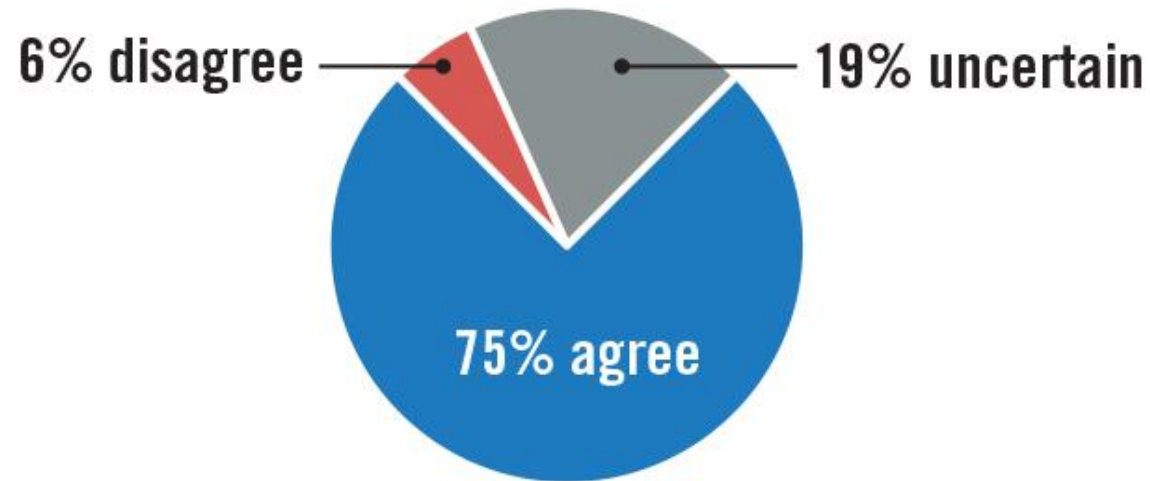
- Due to these long lags
 - Critics of active policy argue that such policies may destabilize the economy rather than help it
 - By the time the policies affect aggregate demand, the economy's condition may have changed
- Contend that policymakers should focus on long-run goals like economic growth and low inflation



Ask the Experts: Economic Stimulus B

“Taking into account all of the ARRA’s economic consequences—including the economic costs of raising taxes to pay for the spending, its effects on future spending, and any other likely future effects—the benefits of the stimulus will end up exceeding its costs.”

What do economists say?



Source: IGM Economic Experts Panel, July 29, 2014.

Automatic Stabilizers (1 of 2)

- **Automatic stabilizers***
 - Changes in fiscal policy that stimulate aggregate demand when the economy goes into a recession but that occur without policymakers having to take any deliberate action

*Words accompanied by an asterisk are key terms from the chapter.

Automatic Stabilizers (2 of 2)

- The tax system
 - In recession, taxes fall automatically, which stimulates aggregate demand
- Some government spending
 - In recession, more people apply for public assistance (welfare, unemployment insurance)
 - Government spending on these programs automatically rises, which stimulates aggregate demand
- Automatic stabilizers in the U.S. economy are not sufficiently strong to prevent recessions completely

35-4

Conclusion

Conclusion

- Policy instruments influence the aggregate demand for goods and services
- Time horizons are important
 - When Congress alters government spending or taxes, it needs to consider both the long-run effects on growth and the short-run effects on employment
 - When the Fed changes the money supply and interest rates, it must recognize the long-run effect on inflation as well as the short-run effect on production
 - In all parts of government, policymakers must keep in mind both long-run and short-run goals

Think-Pair-Share Activity

The news reports that the Fed raised interest rates by a quarter of a percent today to head off future inflation. The report then moves to interviews with prominent politicians. The response of a member of Congress to the Fed's move is negative. She says, "The Consumer Price Index has not increased, yet the Fed is restricting growth in the economy, supposedly to fight inflation. My constituents will want to know why they are going to have to pay more when they get a loan, and I don't have a good answer. I think this is an outrage and I think Congress should have hearings on the Fed's policymaking powers."

- A. What interest rate did the Fed raise?
- B. State the Fed's policy in terms of the money supply.
- C. Why might the Fed raise interest rates before the CPI starts to rise?
- D. Many economists believe that the Fed needs to be independent of politics. Use the congresswoman's statement to explain why so many economists argue for Fed independence

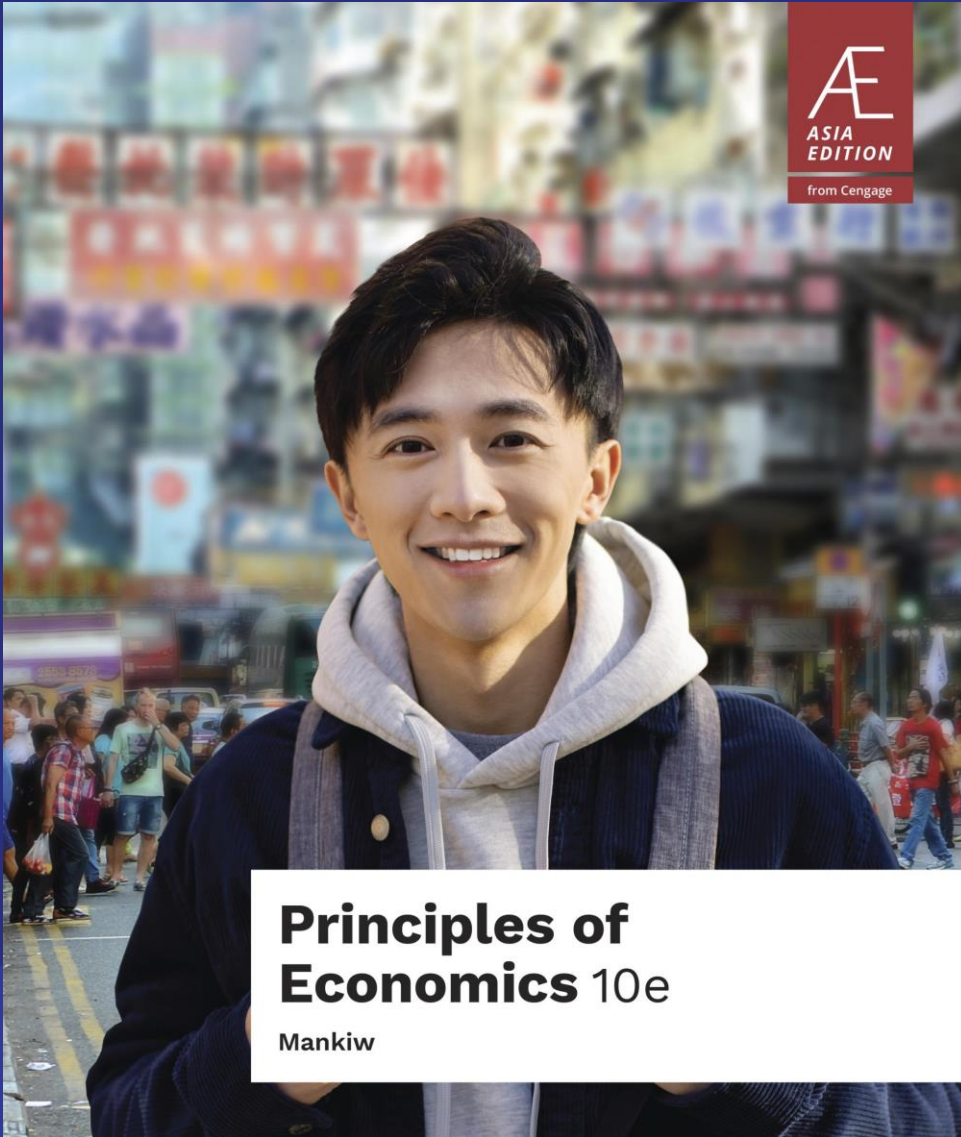
Self-Assessment

- Suppose that survey measures of consumer confidence indicate a wave of pessimism is sweeping the country. If policymakers do nothing, what will happen to aggregate demand? What should the Fed do? If the Fed does nothing, what might Congress do?

Summary

Click the link to review the objectives for this presentation.

[Link to Objectives](#)



Principles of Economics, 10e

Chapter 36: The Short-Run Trade-off between Inflation and Unemployment

Chapter Objectives (1 of 2)

By the end of this chapter, you should be able to:

- Examine the trade-off between inflation and unemployment.
- Derive the short-run Phillips curve, given a scenario on market outcomes.
- Determine the effect of a change in monetary policy, given a graph of the short-run and long-run Phillips curve.
- Contrast the slope of the short-run Phillips curve with the slope of the long-run Phillips curve.
- Explain the relationship between expectations and inflation using the Phillips curve.

Chapter Objectives (2 of 2)

- Explain why a natural rate of unemployment exists.
- Given a scenario on market outcomes, derive the long-run Phillips curve.
- Given data on the unemployment and inflation rate, determine what happened to the short-run Phillips curve over the 20th century.
- Calculate the sacrifice ratio given a country's inflation rate and total production.

36-1

The Phillips Curve

Inflation and Unemployment

- In the long run, inflation and unemployment are unrelated
 - Inflation rate depends mainly on growth in the money supply
 - Natural rate of unemployment depends on various features of the labor market
 - Job search, minimum-wage laws, union power, and efficiency wages
- In the short run, society faces a trade-off between inflation and unemployment

Origins of the Phillips Curve

- **Phillips curve***
 - A curve that shows the short-run trade-off between inflation and unemployment
- 1958: A.W. Phillips
 - Nominal wage growth was negatively correlated with unemployment in the U.K.
- 1960: Paul Samuelson and Robert Solow
 - Negative correlation between inflation and unemployment
 - Named it “the Phillips Curve”

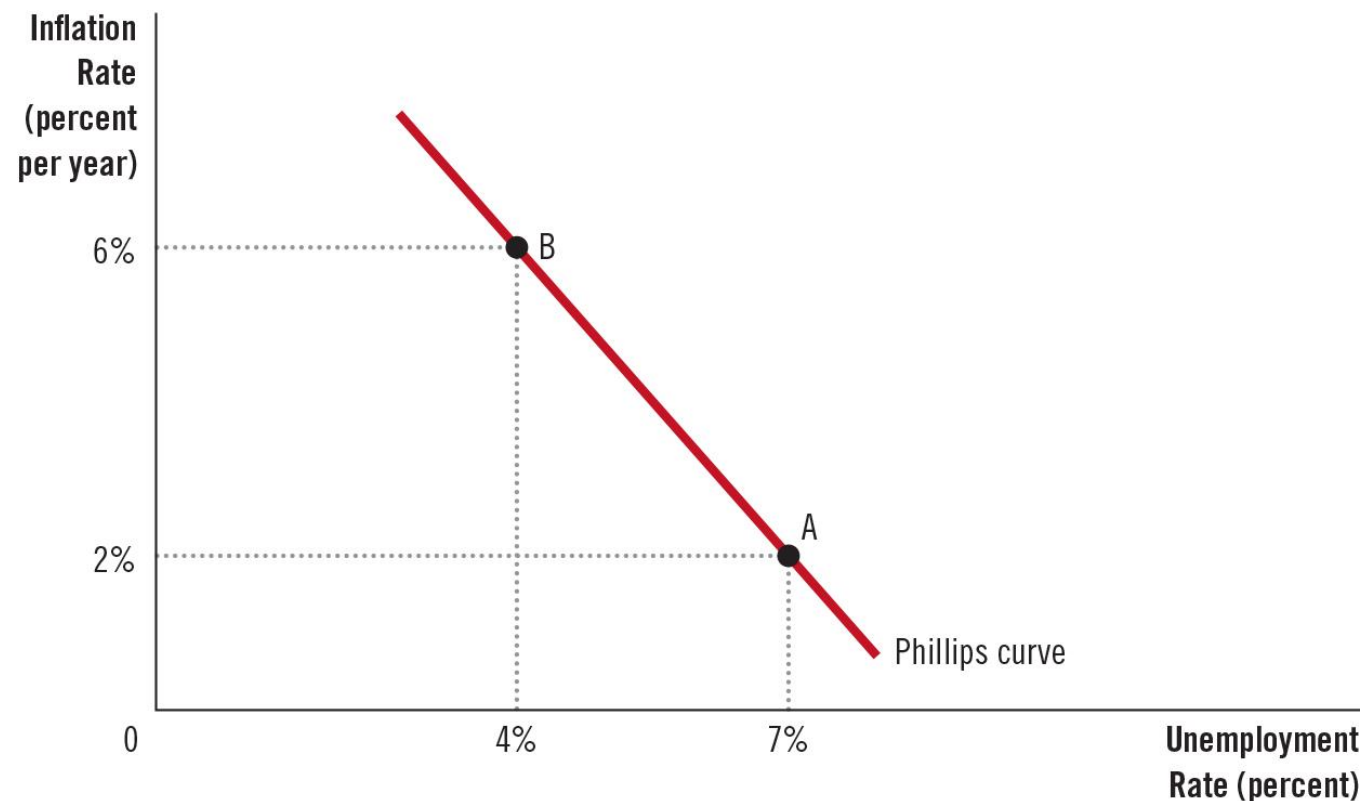
*Words accompanied by an asterisk are key terms from the chapter.

The Phillips Curve: A Policy Menu?

- Policymakers face a trade-off between inflation and unemployment
- Fiscal and monetary policy can influence aggregate-demand curve and policymakers could choose any point on Phillips curve
 - By expanding aggregate demand, policymakers can choose a point with higher inflation and lower unemployment
 - By contracting aggregate demand, policymakers can choose a point with lower inflation and higher unemployment

Figure 1 The Phillips Curve

- The Phillips curve illustrates a negative association between the inflation rate and the unemployment rate.
- At point A, inflation is low, and unemployment is high.
- At point B, inflation is high, and unemployment is low.

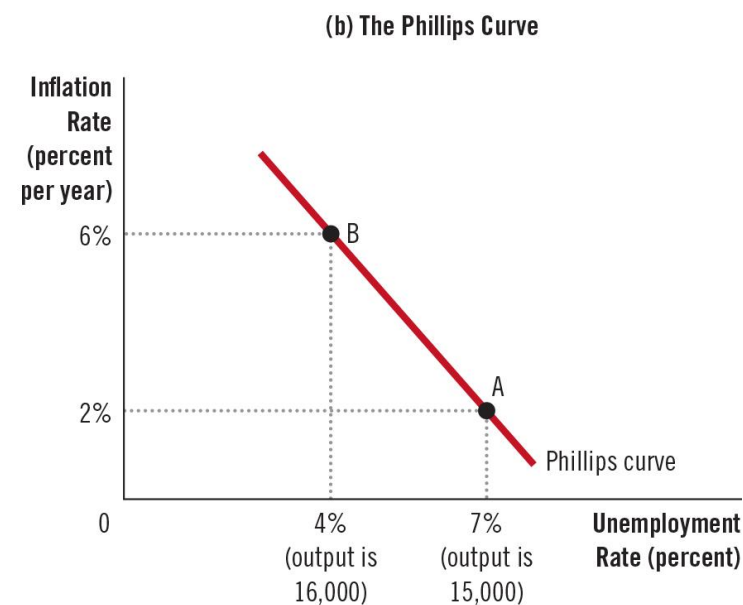
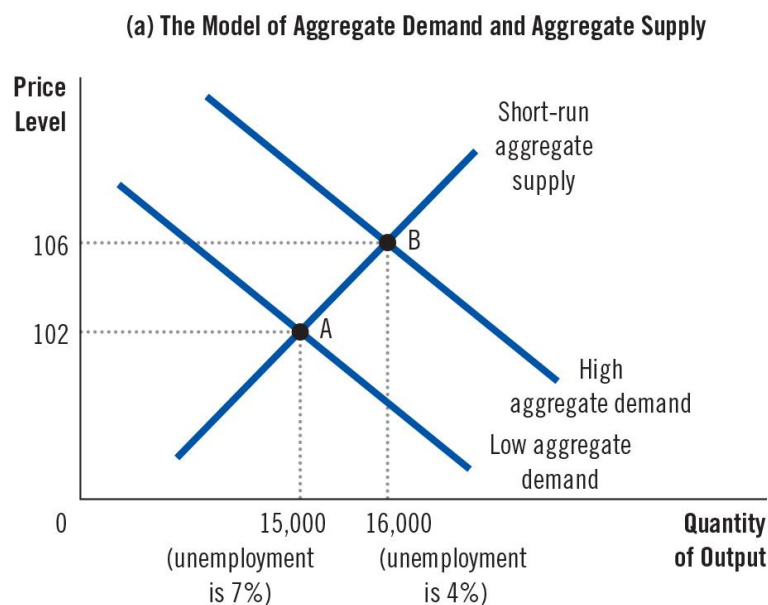


Aggregate Demand, Aggregate Supply, and the Phillips Curve

- Phillips curve shows combinations of inflation and unemployment that arise in the short run as shifts in the aggregate-demand curve move the economy along the short-run aggregate-supply curve
- For example, an increase in the aggregate demand
 - Larger output and a higher price level
 - Lower unemployment
 - Higher inflation

Figure 2 How the Phillips Curve Is Related to the Model of Aggregate Demand and Aggregate Supply

This figure assumes a price level of 100 for the year 2025 and charts possible outcomes for the year 2026. Panel (a) shows the model of aggregate demand and aggregate supply. If aggregate demand is low, the economy is at point A. Output is low (15,000), and the price level is low (102). If aggregate demand is high, the economy is at point B. Output is high (16,000), and the price level is high (106). Panel (b) shows the implications for the Phillips curve. Point A, which arises when aggregate demand is low, has high unemployment (7 percent) and low inflation (2 percent). Point B, which arises when aggregate demand is high, has low unemployment (4 percent) and high inflation (6 percent).



36-2

Shifts in the Phillips Curve: The Role of Expectations

The Long-Run Phillips Curve (1 of 2)

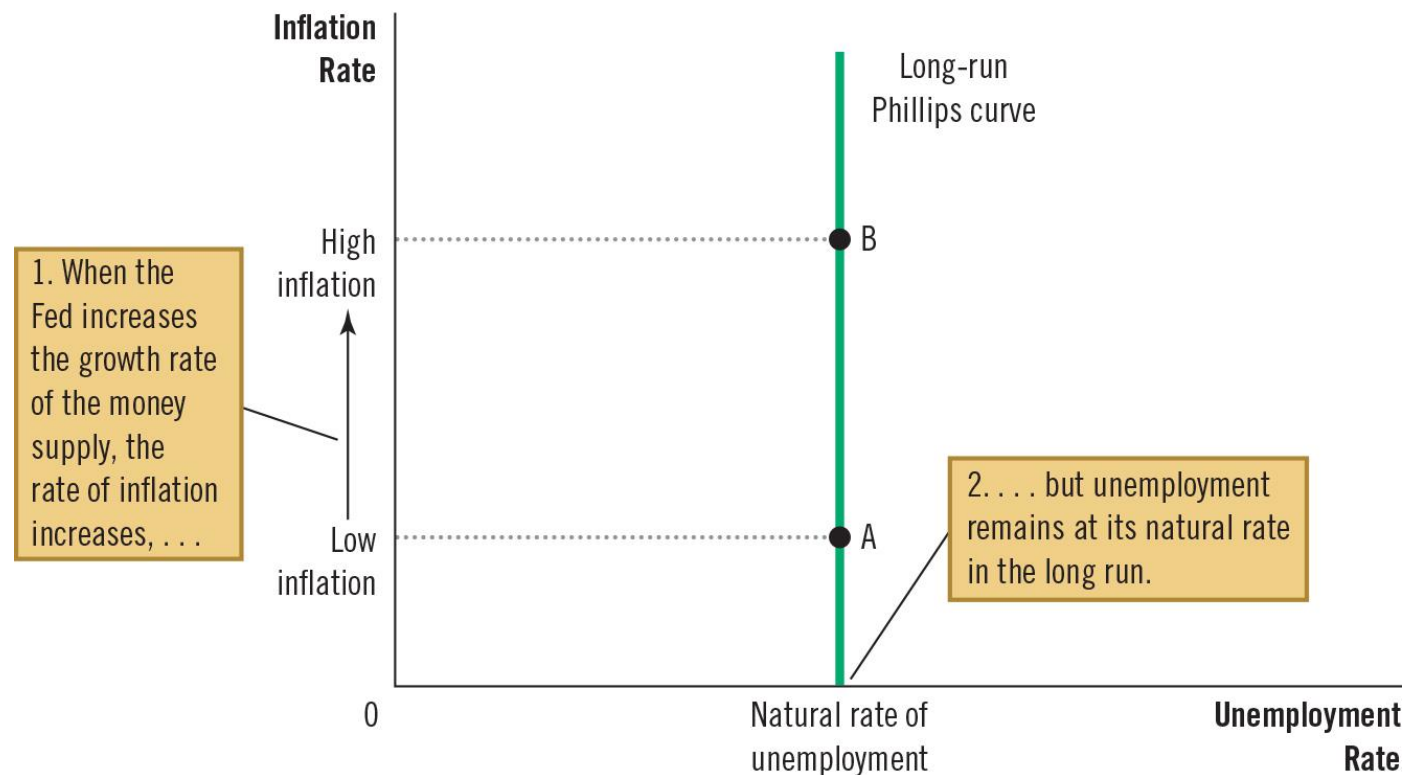
- 1968, Milton Friedman, Edmund Phelps
 - Classical theory points to growth in money supply as primary determinant of inflation
 - In the long run
 - Inflation and unemployment would not be related
 - Expected inflation adjusts to changes in actual inflation
 - Short-run Phillips curve shifts
 - Long-run Phillips curve is vertical at the natural rate of unemployment

The Long-Run Phillips Curve (2 of 2)

- According to Friedman, monetary policymakers face a long-run Phillips curve that is vertical
 - If Fed increases money supply slowly
 - Inflation rate is low
 - Unemployment at **natural rate**
 - If Fed increases money supply quickly
 - Inflation rate is high
 - Unemployment at **natural rate**

Figure 3 The Long-Run Phillips Curve

- According to Friedman and Phelps, there is no trade-off between inflation and unemployment in the long run.
- Growth in the money supply determines the inflation rate.
- Regardless of the inflation rate, the unemployment rate gravitates toward its natural rate.
- As a result, the long-run Phillips curve is vertical.



Vertical Long-Run Phillips Curve (1 of 2)

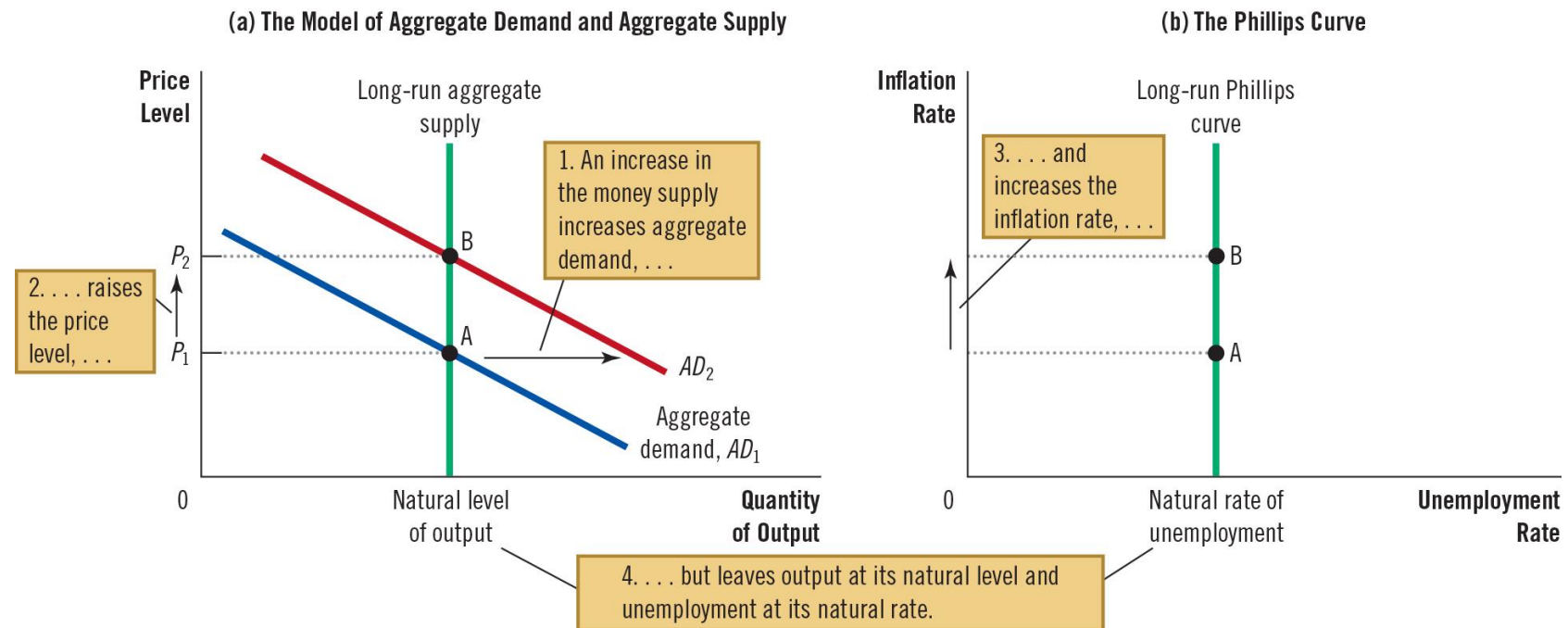
- Vertical long-run Phillips curve is an expression of classical idea of *monetary neutrality*
- Vertical long-run aggregate-supply curve and vertical long-run Phillips curve imply that monetary policy
 - Influences nominal variables (price level and inflation rate)
 - Does not influence real variables (output and unemployment)

Vertical Long-Run Phillips Curve (2 of 2)

- In the long run, regardless of monetary policy pursued by the Fed
 - Output is at its natural level
 - Unemployment is at its natural rate

Figure 4 How the Long-Run Phillips Curve Is Related to the Model of Aggregate Demand and Aggregate Supply

Panel (a) shows the model of aggregate demand and aggregate supply with a vertical aggregate-supply curve. When expansionary monetary policy shifts the aggregate-demand curve to the right from AD_1 to AD_2 , the equilibrium moves from point A to point B. The price level rises from P_1 to P_2 , while output remains the same. Panel (b) shows the long-run Phillips curve, which is vertical at the natural rate of unemployment. In the long run, expansionary monetary policy moves the economy from lower inflation (point A) to higher inflation (point B) without changing the rate of unemployment.



The Meaning of “Natural” (1 of 2)

- Natural rate of unemployment
 - Unemployment rate toward which economy gravitates in the long run
 - Not necessarily socially desirable
 - Not constant over time
 - Beyond influence of monetary policy

The Meaning of “Natural” (2 of 2)

- Labor-market policies can affect natural rate of unemployment
- If policy change reduces natural rate of unemployment
 - Long-run Phillips curve shifts left
 - Long-run aggregate-supply curve shifts right
 - For any given rate of money growth and inflation
 - Lower unemployment
 - Higher output

Reconciling Theory and Evidence (1 of 2)

- Evidence (Phillips, Samuelson, Solow)
 - Philips curve slopes downward
- Theory (Friedman and Phelps)
 - Philips curve is vertical in the long run
- Friedman and Phelps bridged gap between theory and evidence by introducing expected inflation
 - **Expected inflation:** Measure of how much people expect price level to change

Reconciling Theory and Evidence (2 of 2)

- Friedman and Phelps
 - Short-run aggregate-supply curve slopes upward
 - Long-run aggregate-supply curve is vertical
 - Long-run Phillips curve is also vertical
 - Expectations are key to understanding how short run and long run are related

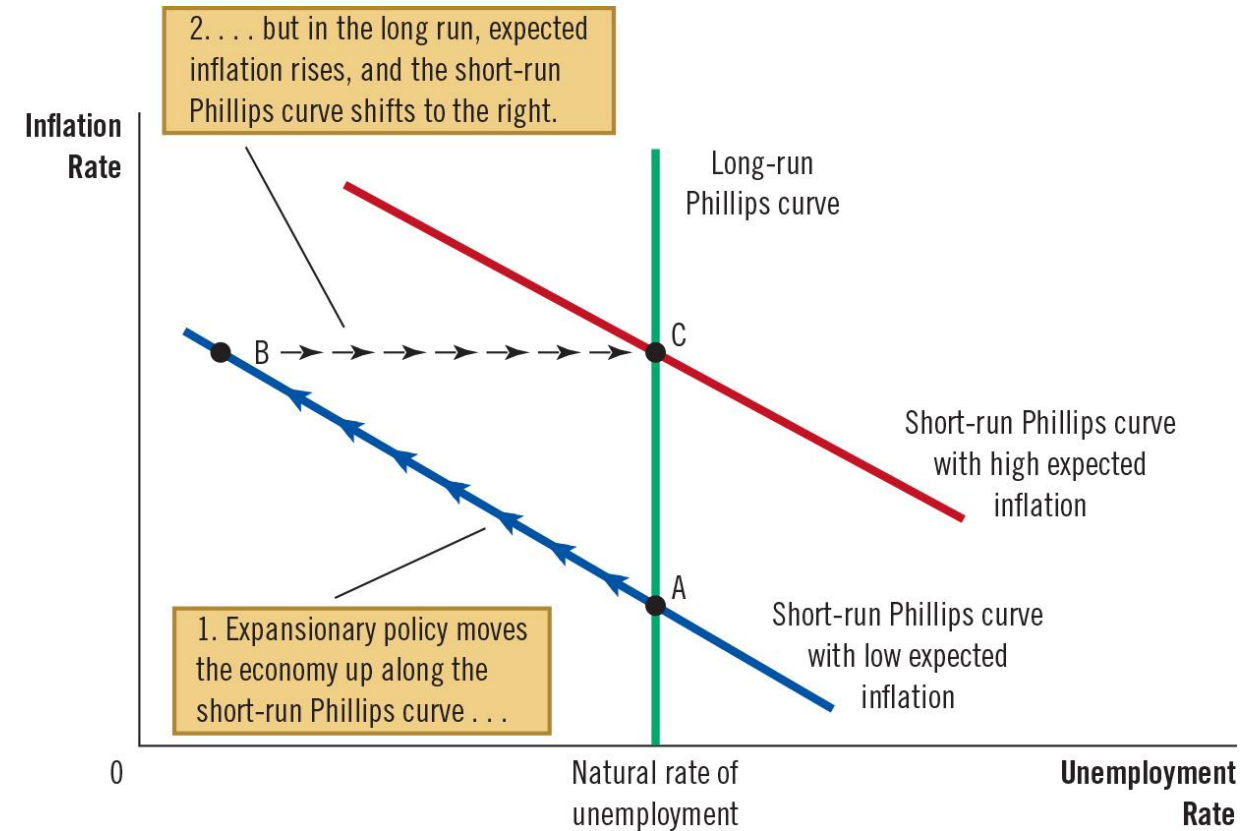
The Short-Run Phillips Curve

Unemployment rate = Natural rate of unemployment – $\alpha(\text{Actual inflation} - \text{Expected inflation})$

- Short run
 - Fed can reduce unemployment-rate below the natural unemployment-rate by making inflation greater than expected
- Long run
 - Expectations catch up to reality, unemployment-rate goes back to natural unemployment-rate whether inflation is high or low

Figure 5 How Expected Inflation Shifts the Short-Run Phillips Curve

- The higher the expected rate of inflation, the higher the curve representing the short-run trade-off between inflation and unemployment will be. At point A, expected inflation and actual inflation are equal at a low rate, and unemployment is at its natural rate. If the Fed pursues an expansionary monetary policy, the economy moves from point A to point B in the short run. At point B, expected inflation is still low, but actual inflation is high. Unemployment is below its natural rate. In the long run, expected inflation rises, and the economy moves to point C. At point C, expected inflation and actual inflation are both high, and unemployment is back to its natural rate.

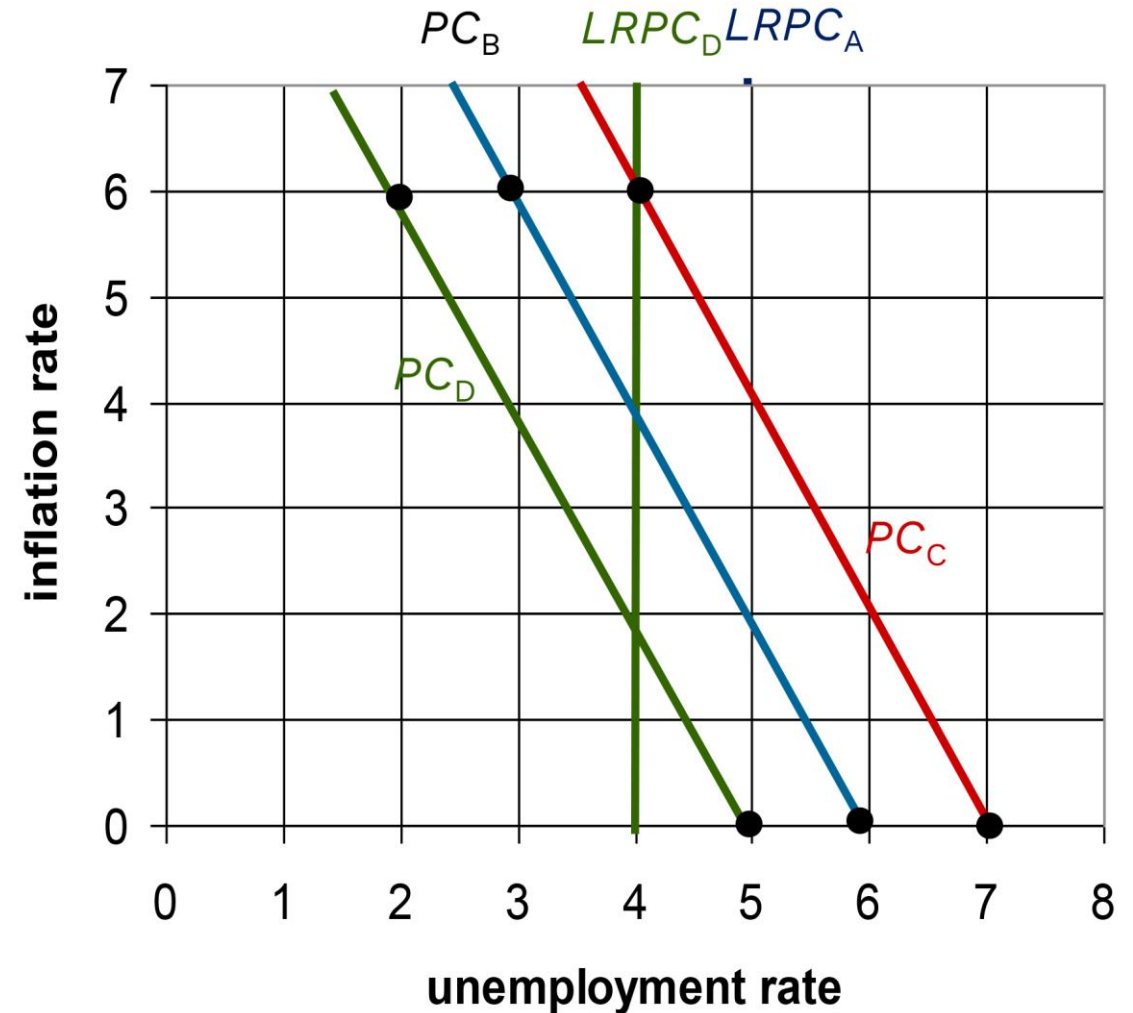


Active Learning 1: A Numerical Example

- Natural rate of unemployment = 5%; Expected inflation = 2%; $\alpha = 0.5$
 - A. Plot the long-run Phillips curve
 - B. Find the unemployment-rate for each of these values of actual inflation: 0%, 6%
 - Sketch the short-run PC
 - C. Suppose expected inflation rises to 4%
 - Repeat part B
 - D. Instead, suppose the natural rate falls to 4%
 - Draw the new long-run Phillips curve, then repeat part B

Active Learning 1: Answers

- An increase in expected inflation shifts PC to the right
- A fall in the natural rate shifts both curves to the left



The Natural Experiment for the Natural-Rate Hypothesis

- **Natural-rate hypothesis***
 - Claim that unemployment eventually returns to its normal, or natural rate, regardless of the rate of inflation
 - Predicted by Friedman and Phelps in 1968
 - Invertedly tested by policymakers in late 1960s, early 1970s

*Words accompanied by an asterisk are key terms from the chapter.

Figure 6 The Phillips Curve in the 1960s

- This figure uses annual data from 1961 to 1968 on the unemployment rate and on the inflation rate (as measured by the GDP deflator) to show the negative relationship between inflation and unemployment.

Source: U.S. Department of Labor; U.S. Department of Commerce.

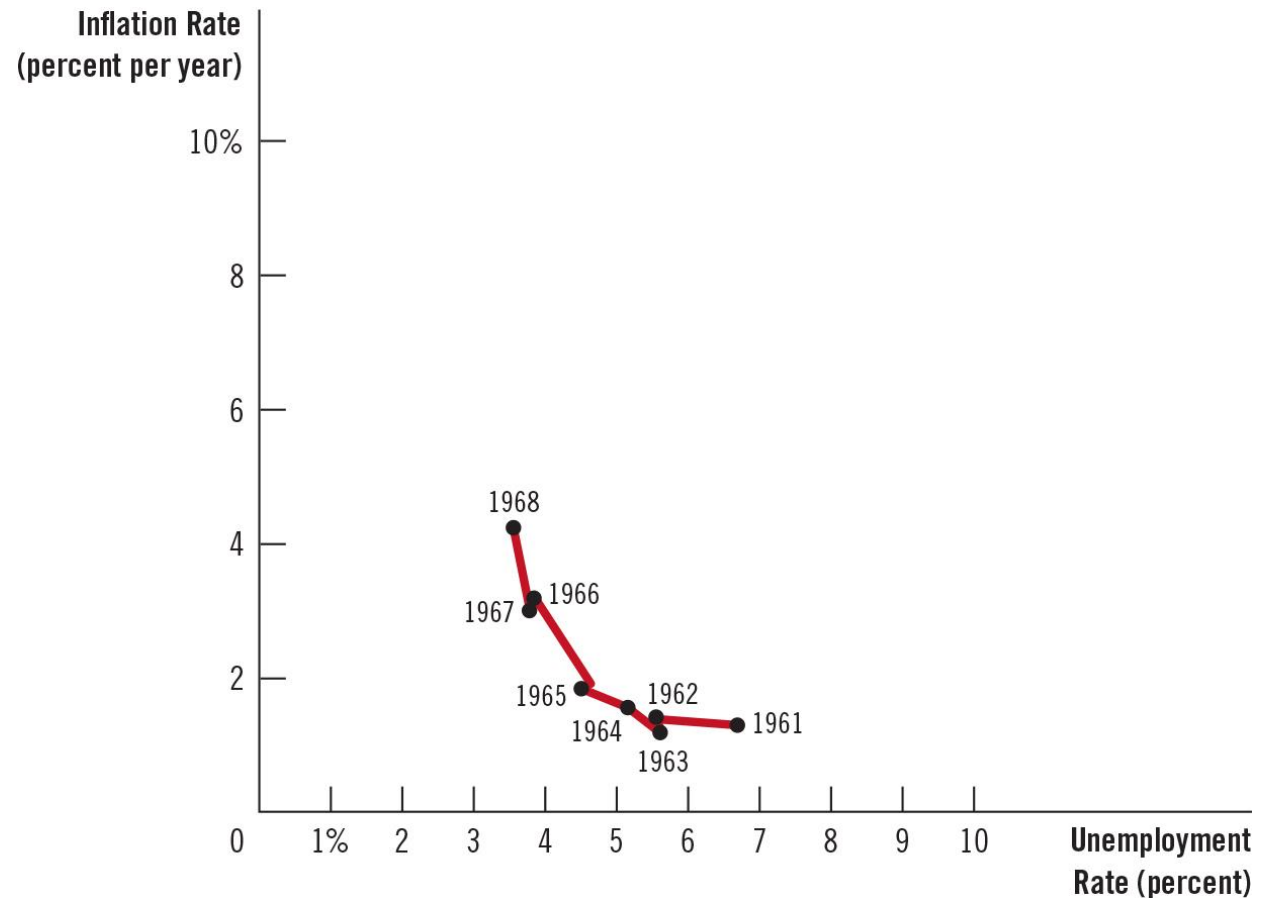
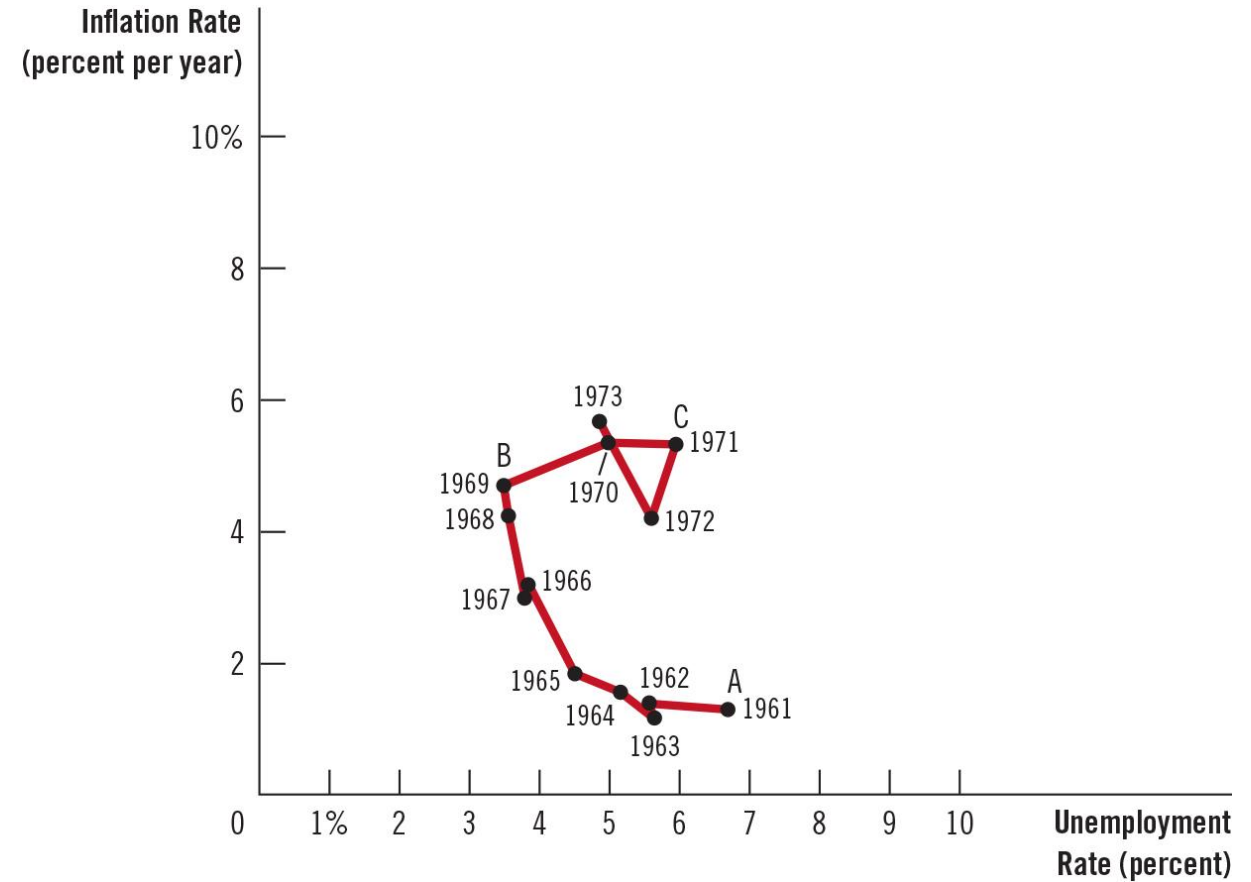


Figure 7 The Breakdown of the Phillips Curve

- This figure shows annual data from 1961 to 1973 on the unemployment rate and on the inflation rate (as measured by the GDP deflator).
- The Phillips curve of the 1960s breaks down in the early 1970s, just as Friedman and Phelps had predicted.
- Notice that the points labeled A, B, and C in this figure correspond roughly to the points in Figure 5.



36-3

Shifts in the Phillips Curve: The Role of Supply Shocks

Supply Shocks (1 of 2)

- **Supply shock***
 - Event that directly alters firms' costs and prices, shifting the economy's aggregate-supply curve and thus the Phillips curve
- For example, higher oil prices in 1974 and 1979
 - 1973: Fed chose to accommodate the first shock with faster money growth
 - Result: Higher expected inflation, which further shifted Phillips curve
 - 1979: Oil prices surged again, worsening the Fed's trade-off

*Words accompanied by an asterisk are key terms from the chapter.

Supply Shocks (2 of 2)

- An adverse supply shock, such as an increase in world oil prices, gives policymakers a less favorable trade-off between inflation and unemployment
- After an adverse supply shock policymakers have to accept
 - A higher rate of inflation for any given rate of unemployment, or
 - A higher rate of unemployment for any given rate of inflation

Figure 8 An Adverse Shock to Aggregate Supply

Panel (a) shows the model of aggregate demand and aggregate supply. When the aggregate-supply curve shifts to the left from AS_1 to AS_2 , the equilibrium moves from point A to point B. Output falls from Y_1 to Y_2 , and the price level rises from P_1 to P_2 . Panel (b) shows the short-run trade-off between inflation and unemployment. The adverse shock in aggregate supply moves the economy from a point with lower unemployment and lower inflation (point A) to a point with higher unemployment and higher inflation (point B). The short-run Phillips curve shifts to the right from PC_1 to PC_2 . Policymakers now face a worse set of options for inflation and unemployment.

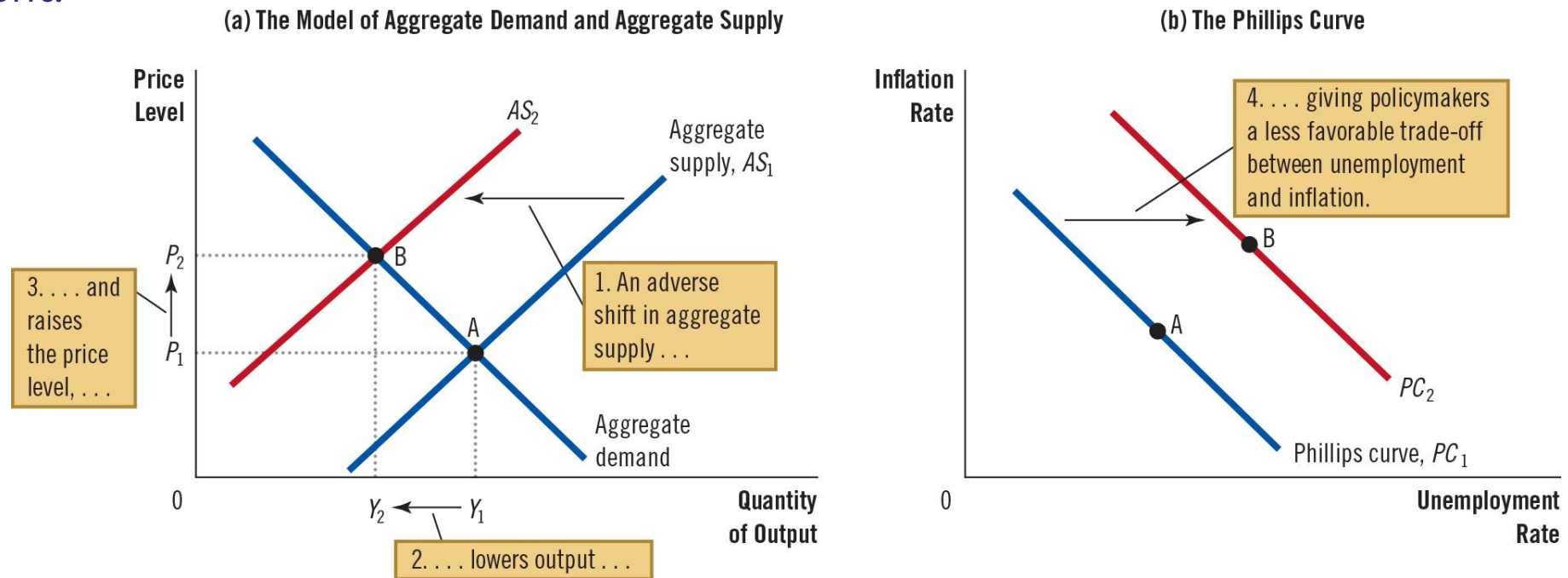
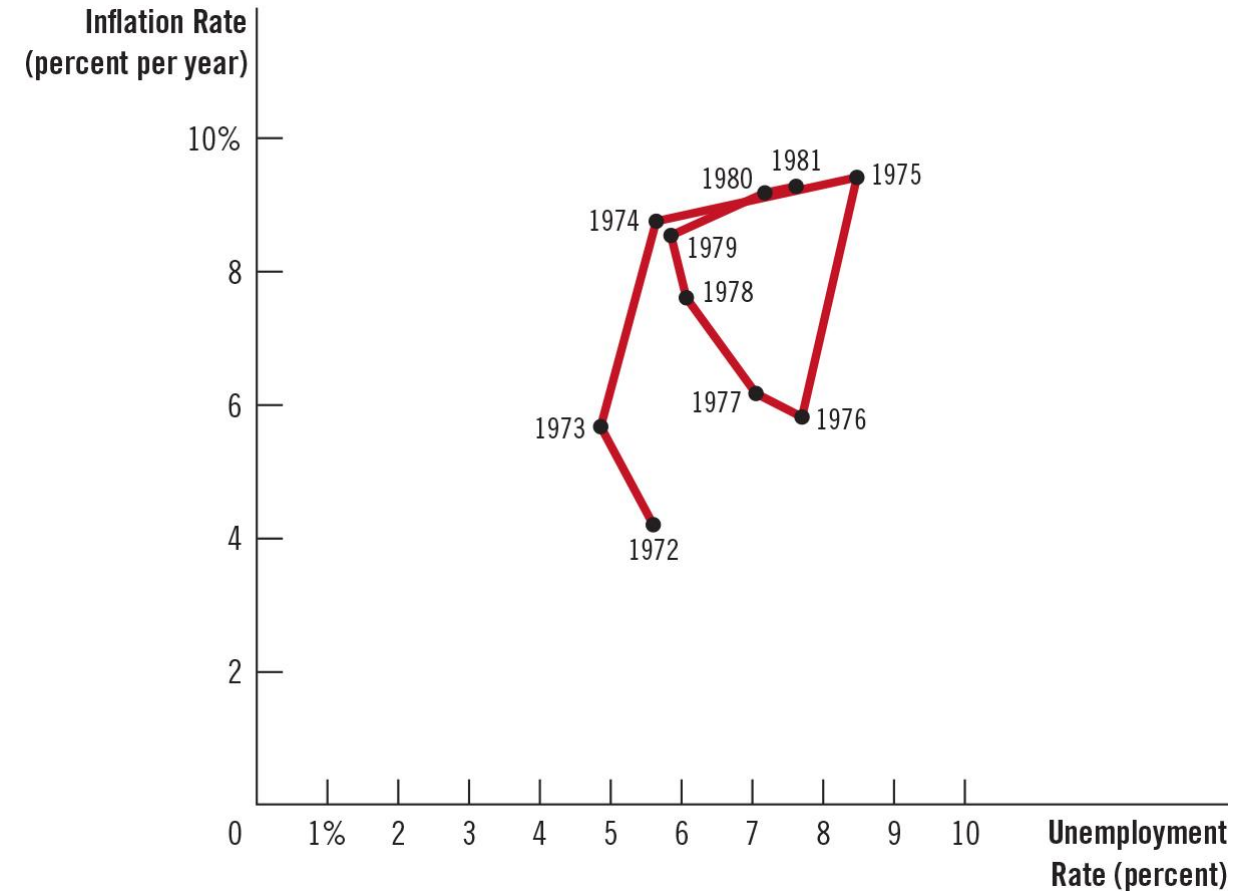


Figure 9 The Supply Shocks of the 1970s

- This figure shows annual data from 1972 to 1981 on the unemployment rate and on the inflation rate (as measured by the GDP deflator).
- In the periods 1973–1975 and 1978–1981, increases in world oil prices led to higher inflation and higher unemployment.



Source: U.S. Department of Labor; U.S. Department of Commerce.

36-4

The Cost of Reducing Inflation

Disinflation and Deflation

- Disinflation
 - A reduction in the inflation rate
- Deflation
 - A reduction in the price level

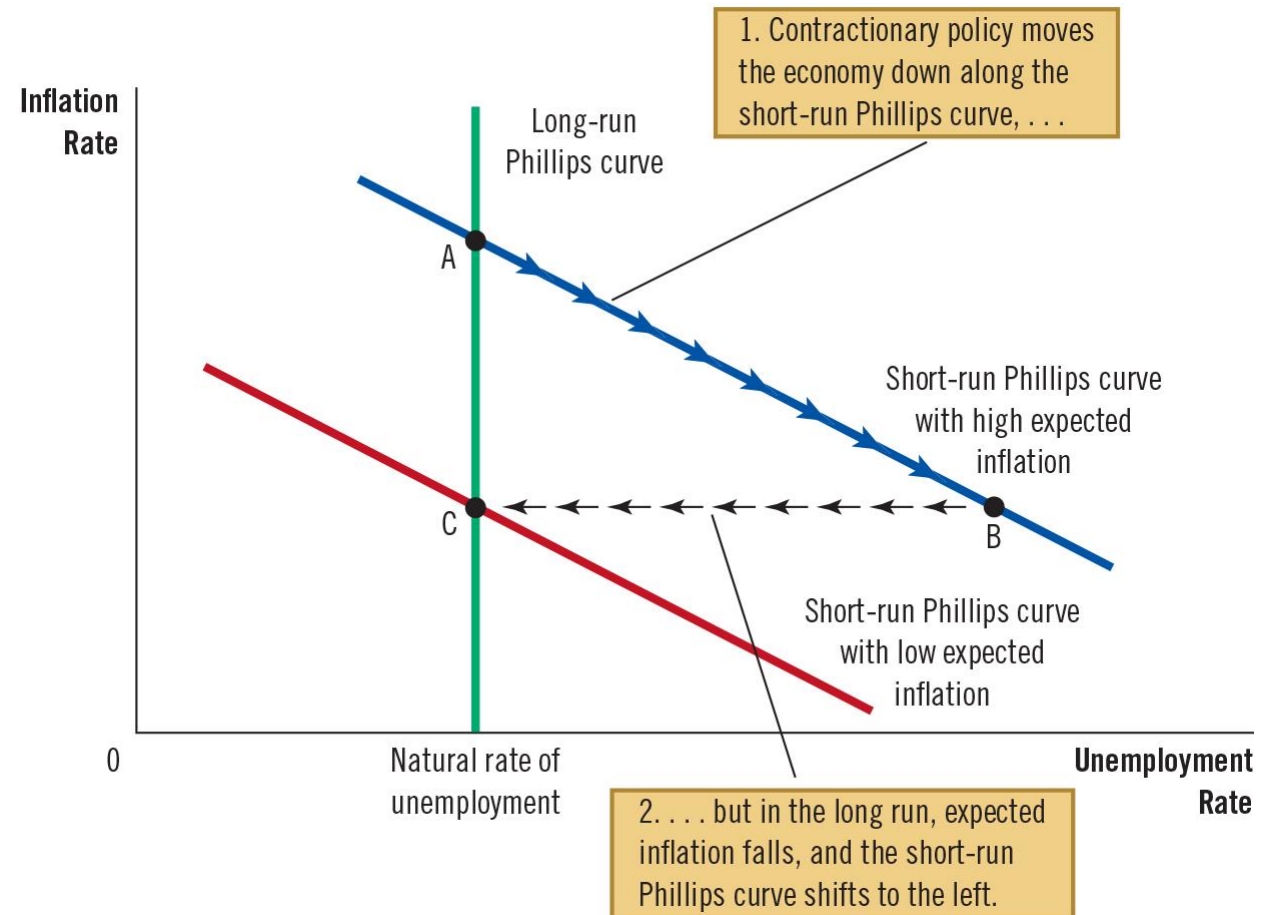
Disinflationary Monetary Policy

- To reduce inflation
 - Fed has to pursue contractionary monetary policy, which reduces aggregate demand
- Short run: Output falls and unemployment rises
- Long run: Output and unemployment return to their natural rates

Figure 10 Disinflationary Monetary Policy in the Short Run and Long Run

- When the Fed pursues contractionary monetary policy to reduce inflation, the economy moves along a short-run Phillips curve from point A to point B.
- Over time, expected inflation falls, and the short-run Phillips curve shifts downward.
- When the economy reaches point C, unemployment is back at its natural rate.

Source: U.S. Department of Labor; U.S. Department of Commerce.



The Sacrifice Ratio (1 of 2)

- **Sacrifice ratio***
 - Number of percentage points of annual output lost in the process of reducing inflation by 1 percentage point
 - Typical estimate: Sacrifice ratio of 5
 - To reduce inflation rate 1%, must sacrifice 5% of a year's output

*Words accompanied by an asterisk are key terms from the chapter.

The Sacrifice Ratio (2 of 2)

- 1979: 10% inflation
 - To reduce inflation by 6% annual output would fall by 30%
- Can spread cost over time: To reduce inflation by 6%
 - Sacrifice 6% of output for 5 years
 - Sacrifice 3% of output for 10 years

Rational Expectations and the Possibility of Costless Disinflation

- **Rational expectations***
 - Theory that people optimally use all the knowledge they have, including information about government policies, when forecasting the future
- Early proponents: Robert Lucas, Thomas Sargent, Robert Barro
 - Implied that disinflation could be much less costly

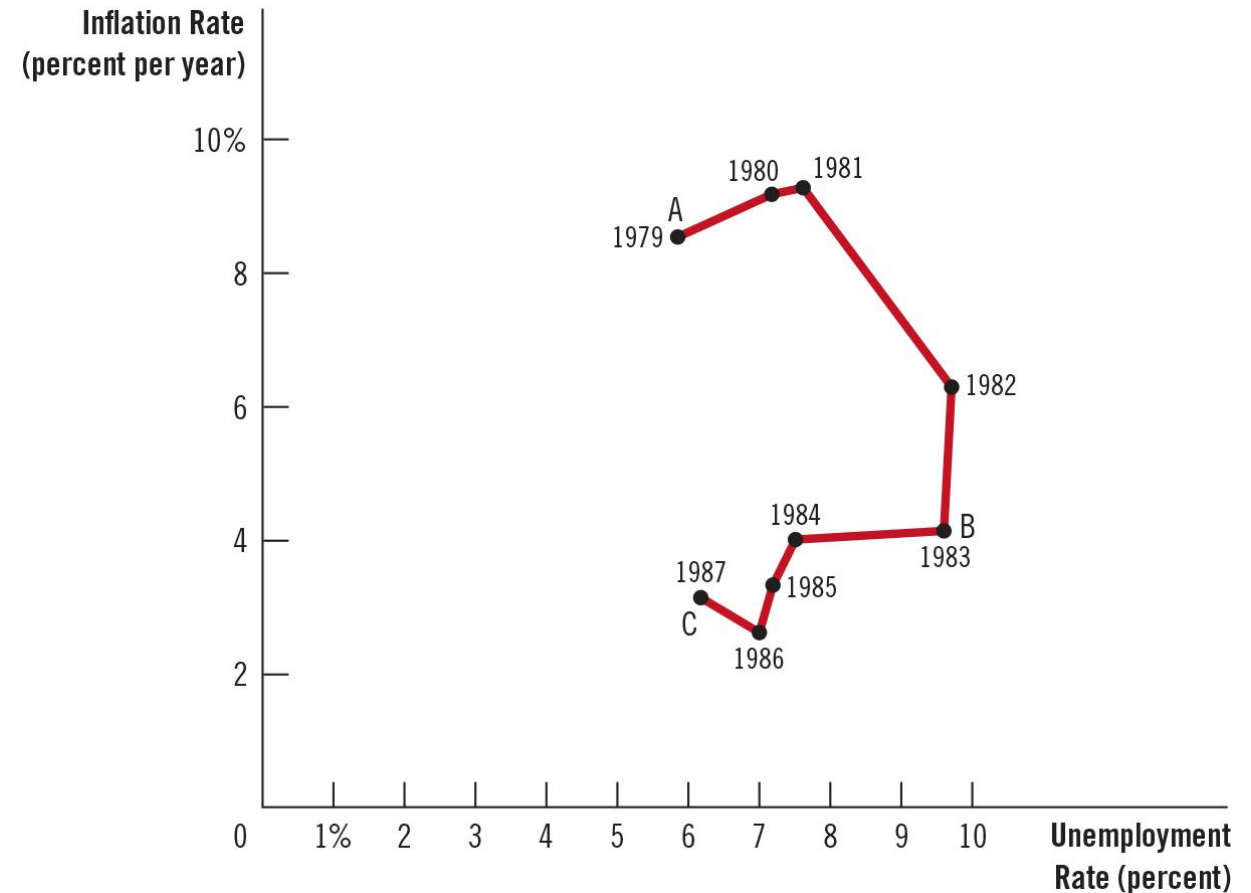
*Words accompanied by an asterisk are key terms from the chapter.

The Volcker Disinflation

- Fed Chair Paul Volcker
 - Appointed in late 1979 under high inflation and unemployment
 - Changed Fed policy to disinflation
- 1981–1984: Fiscal policy was expansionary
 - Fed policy had to be very contractionary to reduce inflation
 - Success: Inflation fell from 10% to 4%, but at the cost of high unemployment

Figure 11 The Volcker Disinflation

- This figure shows unemployment and inflation from 1979 to 1987.
- The reduction in inflation (as measured by the GDP deflator) came at the cost of very high unemployment in 1982 and 1983.
- Note that the points labeled A, B, and C in this figure correspond roughly to the points in Figure 10.



Source: U.S. Department of Labor; U.S. Department of Commerce.

36-5

Recent History

The Great Recession (1 of 2)

- Early 2000s
 - Housing market boom turned to bust in 2006
 - Household wealth fell
 - Millions of mortgage defaults and foreclosures
 - Heavy losses at financial institutions
- Result: Sharp drop in aggregate demand, steep rise in unemployment

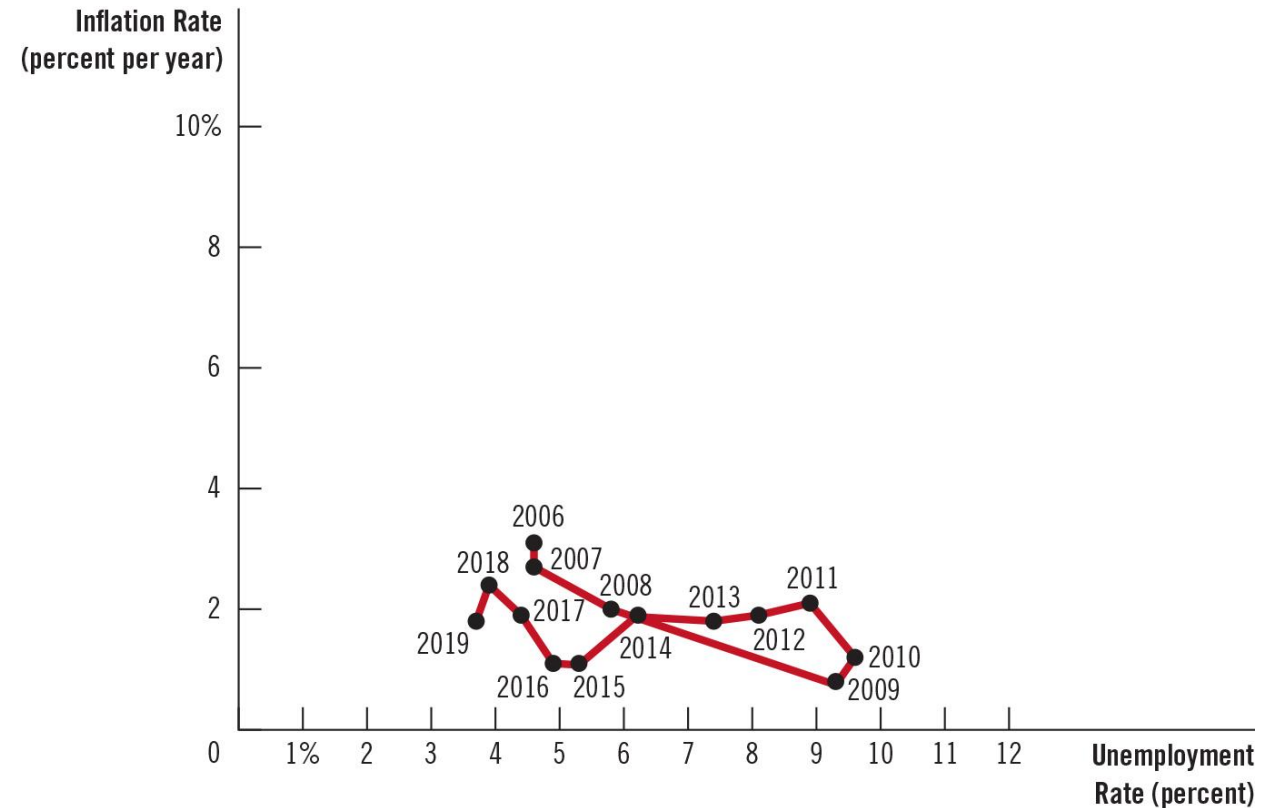
The Great Recession (2 of 2)

- 2007 to 2010: Decline in aggregate demand
 - Raised unemployment (from below 5% to 10%)
 - Reduced the rate of inflation (from 3% to 1%)
- After 2010, Slow recovery
 - Unemployment gradually declined
 - Rate of inflation remained between 1 and 2%
 - Expected inflation steady at about 2%
 - Short-run Phillips curve relatively stable

Figure 13 The Phillips Curve during and after the Recession of 2008–2009

- This figure shows annual data from 2006 to 2019 on the unemployment rate and on the inflation rate (as measured by the GDP deflator).
- A financial crisis caused aggregate demand to plummet, leading to much higher unemployment and pushing inflation down to a very low level.

Source: U.S. Department of Labor; U.S. Department of Commerce.



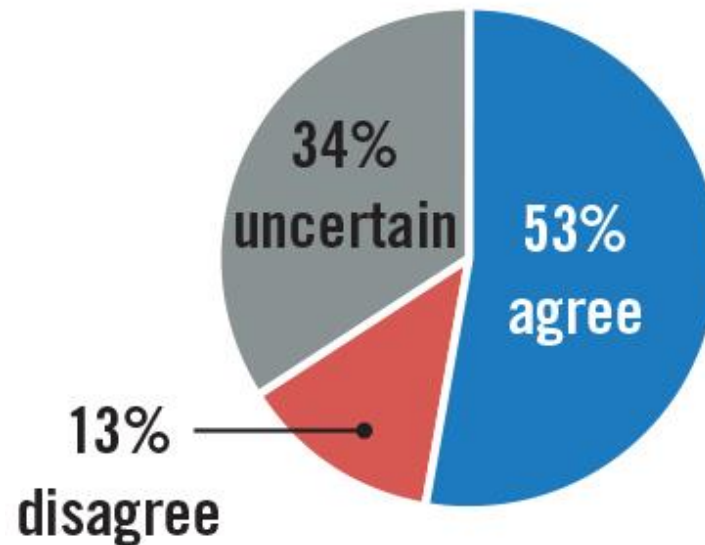
The Pandemic

- 2020: Coronavirus pandemic led to sharp recession
 - Decline in aggregate demand and aggregate supply
 - Unemployment-rate jumped from 3.5 to 14.8%
 - CPI fell by 1% (brief period of deflation)
- Aggregate demand recovered quickly
 - Expansionary monetary and fiscal policies

Ask the Experts: The Inflation of 2021–2022 A

“The current combination of US fiscal and monetary policy poses a serious risk of prolonged higher inflation.”

What do economists say?



Source: IGM Economic Experts Panel, November 23, 2021, January 11, 2022.

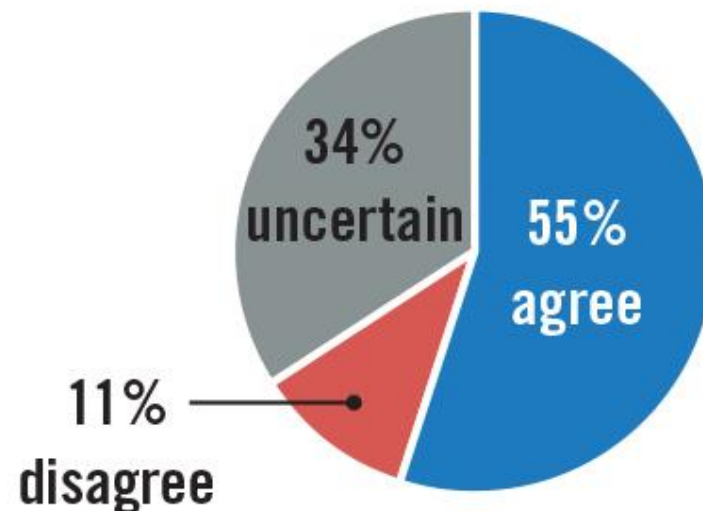
The Pandemic and Supply Chains

- Consistently adverse effect on aggregate supply
 - Early: Non-essential businesses closed
 - After restrictions relaxed: People reluctant to return to work
- Disruption of global supply chains
 - Inability of some businesses to obtain critical inputs further contracted aggregate supply

Ask the Experts: The Inflation of 2021–2022 B

“The supply bottlenecks that are currently contributing to rising prices can be reasonably expected to abate without causing inflation over the longer term to be above the Fed’s target.”

What do economists say?



Source: IGM Economic Experts Panel, November 23, 2021, January 11, 2022.

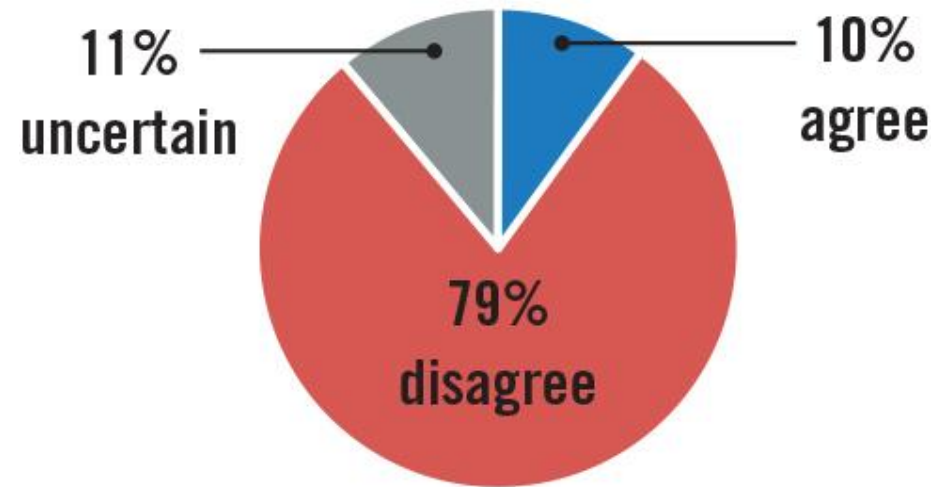
The Pandemic and Inflation

- End of 2021
 - Unemployment rate below 5 percent
 - Consumer price index rose to 7.5 percent (January 2022)
- Policymakers: Inflation surge transitory
- Some economists: Monetary and fiscal expansion had been excessive
 - Inflation would not soon return to the Fed's target of 2 percent

Ask the Experts: The Inflation of 2021–2022 C

“A significant factor behind today’s higher US inflation is dominant corporations in uncompetitive markets taking advantage of their market power to raise prices in order to increase their profit margins.”

What do economists say?



Source: IGM Economic Experts Panel, November 23, 2021, January 11, 2022.

36-6

Conclusion

Conclusion

- We discussed ideas of many of the best economists of the 20th century
 - Phillips curve of Phillips, Samuelson, and Solow
 - Natural-rate hypothesis of Friedman and Phelps
 - Rational-expectations theory of Lucas, Sargent, and Barro
- Milton Friedman (1968)
 - “There is always a temporary trade-off between inflation and unemployment; there is no permanent trade-off...But how long, you will say, is “temporary”?...”

Think-Pair-Share Activity (1 of 2)

A worldwide drought has reduced food production. Inflation has increased; unemployment has risen above the natural rate. Americans are frustrated with their government.

Your roommate says, “This economic mess has got to be somebody’s fault—probably the president or Congress. A year ago, both inflation and unemployment were lower. We need to vote in some policymakers that know how to get rid of this inflation and unemployment.”

Think-Pair-Share Activity (2 of 2)

- A. Whose fault is the stagflation that is present in the economy?
- B. Are the current inflation and unemployment choices facing the economy better or worse than before the supply shock? What has happened to the short-run Phillips curve?
- C. If policymakers increase aggregate demand in response to the supply shock, in what direction will the economy move along the new short-run Phillips curve? What will happen to inflation and unemployment?
- D. If policymakers decrease aggregate demand in response to the supply shock, in what direction will the economy move along the new short-run Phillips curve? What will happen to inflation and unemployment?
- E. Is there a policy that can immediately reduce both inflation and unemployment? Explain.

Self-Assessment

- The Fed decides to reduce inflation. Use the Phillips curve to show the short-run and long-run effects of this policy. How might the short-run costs be reduced?

Summary

Click the link to review the objectives for this presentation.

[Link to Objectives](#)