Monetary Theory and Policy

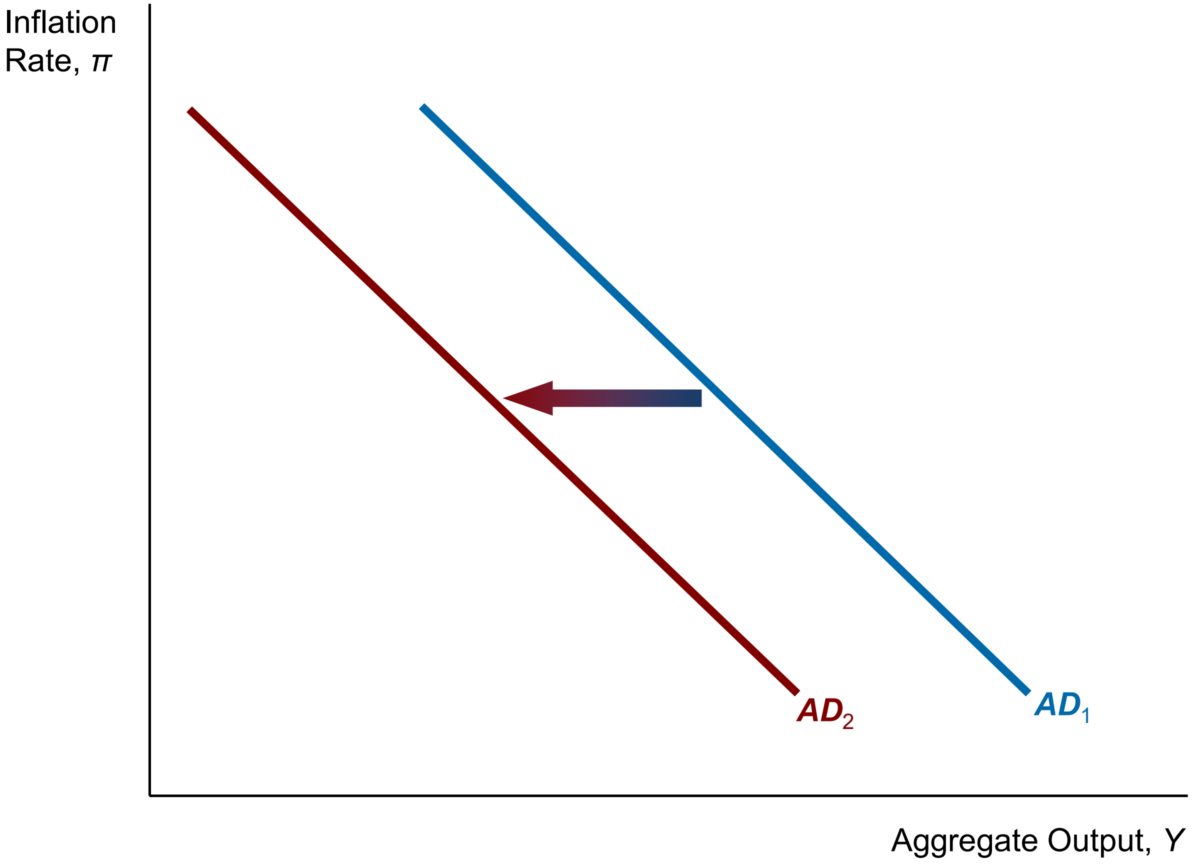
Chapter 22： Aggregate Demand and Supply Analysis

Aggregate Demand

- Aggregate demand is made up of four component parts:
  - **consumption expenditure**: the total demand for consumer

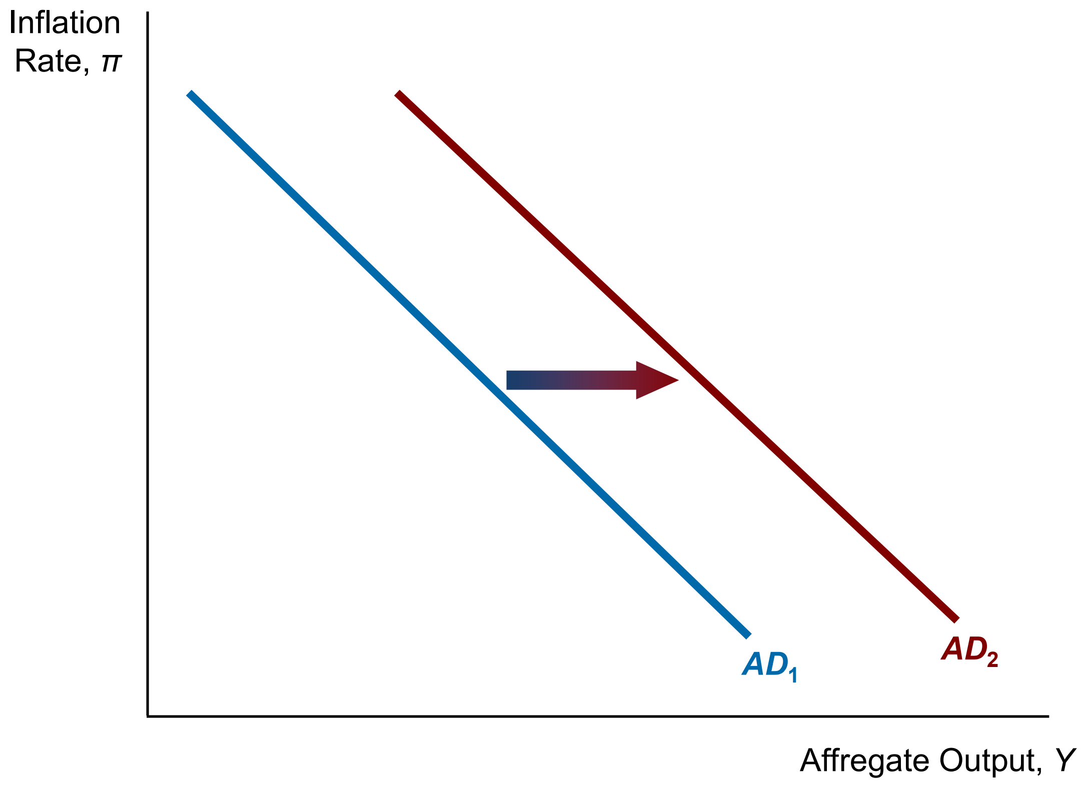
    goods and services
  - **planned investment spending**: the total planned spending by business firms on new machines, factories, and other capital goods, plus planned spending on new homes
  - **government purchases**: spending by all levels of government (federal, state, and local) on goods and services
  - **net exports**: the net foreign spending on domestic goods and services

Figure 1 Leftward Shift in the Aggregate Demand Curve



$\bar{r}\uparrow, \bar{G}\downarrow, \bar{T}\uparrow, \overline{NX}\downarrow, \bar{C}\downarrow, \bar{I}\downarrow, \bar{f}\uparrow$ decreases aggregate demand and shifts the *AD* curve to the left

Figure 2 Rightward Shift in the Aggregate Demand Curve



Increases aggregate demand and shifts the *AD* curve to the right

$\bar{r}\downarrow$,$\bar{G}\uparrow$,$\bar{T}\downarrow$,$\overline{NX}\uparrow$,$\bar{C}\uparrow$,$\bar{I}\uparrow$,$\bar{f}\downarrow$

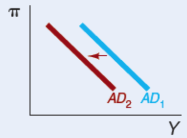
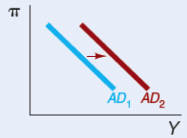
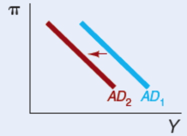
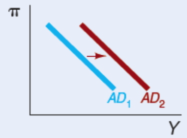
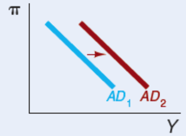
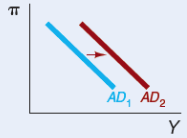
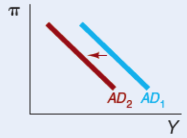
Factors that Shift the Aggregate Demand Curve

- An increase in the money supply
  shifts AD to the right: holding velocity constant, an increase in the money supply increases the quantity of aggregate demand at each price level.
- An increase in spending from any of
  the components *C, I, G, NX,* will also shift AD to the right.

Summary Table 1 Factors That Shift the Aggregate Demand Curve

SUMMARY TABLE 1

Factors That Shift the Aggregate Demand Curve

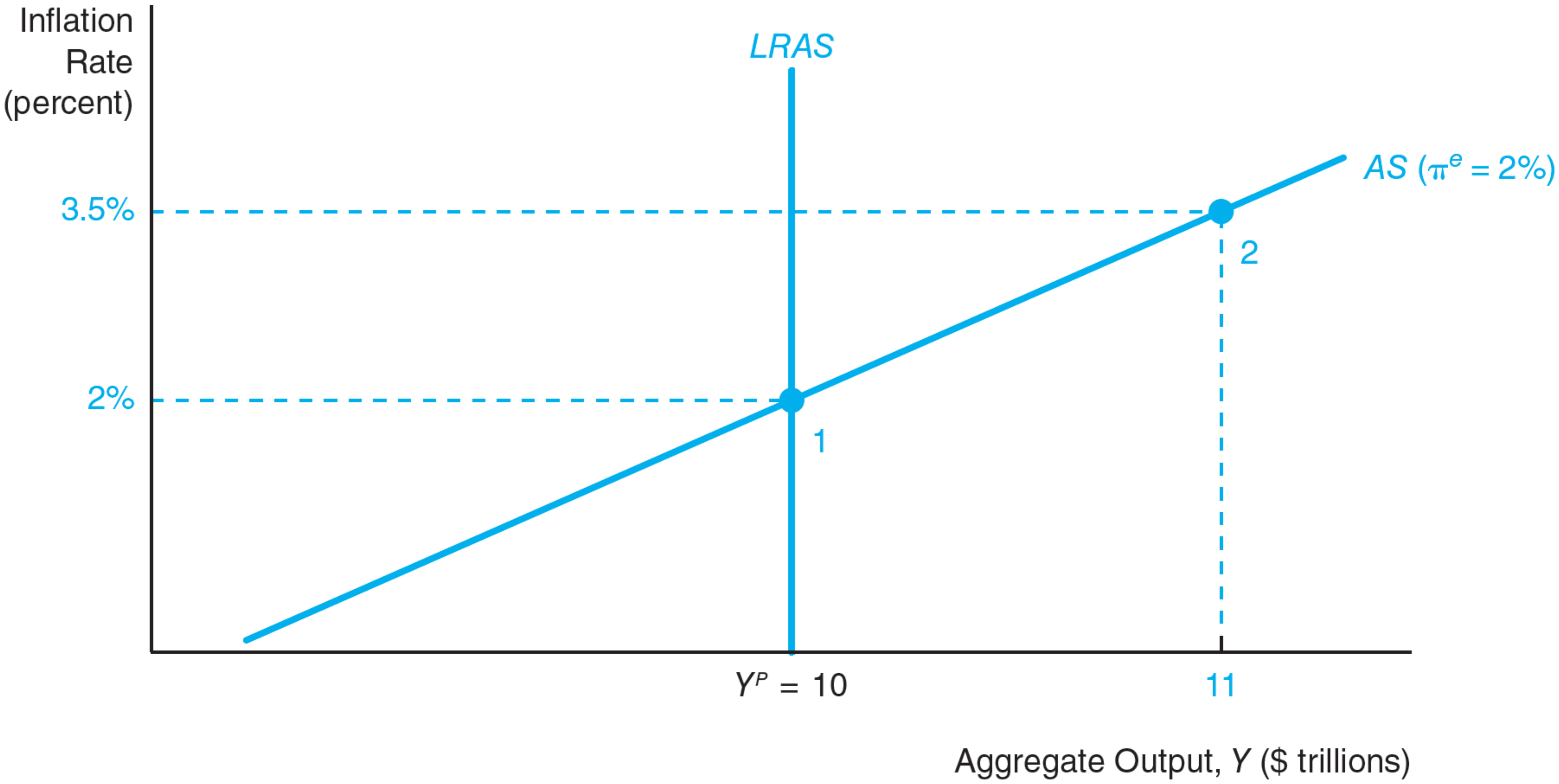
Factor	Change	Shift in Aggregate Demand Curve
Autonomous monetary policy, $\bar{r}$	↑	
Government purchases, $\bar{G}$	↑	
Taxes, $\bar{T}$	↑	
Autonomous net exports, $\overline{NX}$	↑	
Autonomous consumption expenditure, $\bar{C}$	↑	
Autonomous investment, $\bar{I}$	↑	
Financial frictions, $\bar{f}$	↑	

Note: Only increases (↑) in the factors are shown. The effect of decreases in the factors would be the opposite of those indicated in the "Shift" column.

Aggregate Supply

- **Long-run aggregate supply curve:**
  - Determined by amount of capital and labor and the available technology
  - Vertical at the natural rate of output generated by the natural rate of unemployment
- **Short-run aggregate supply curve:**
  - Wages and prices are sticky
  - Generates an upward sloping *SRAS* as firms attempt to take advantage of short-run profitability when price level rises

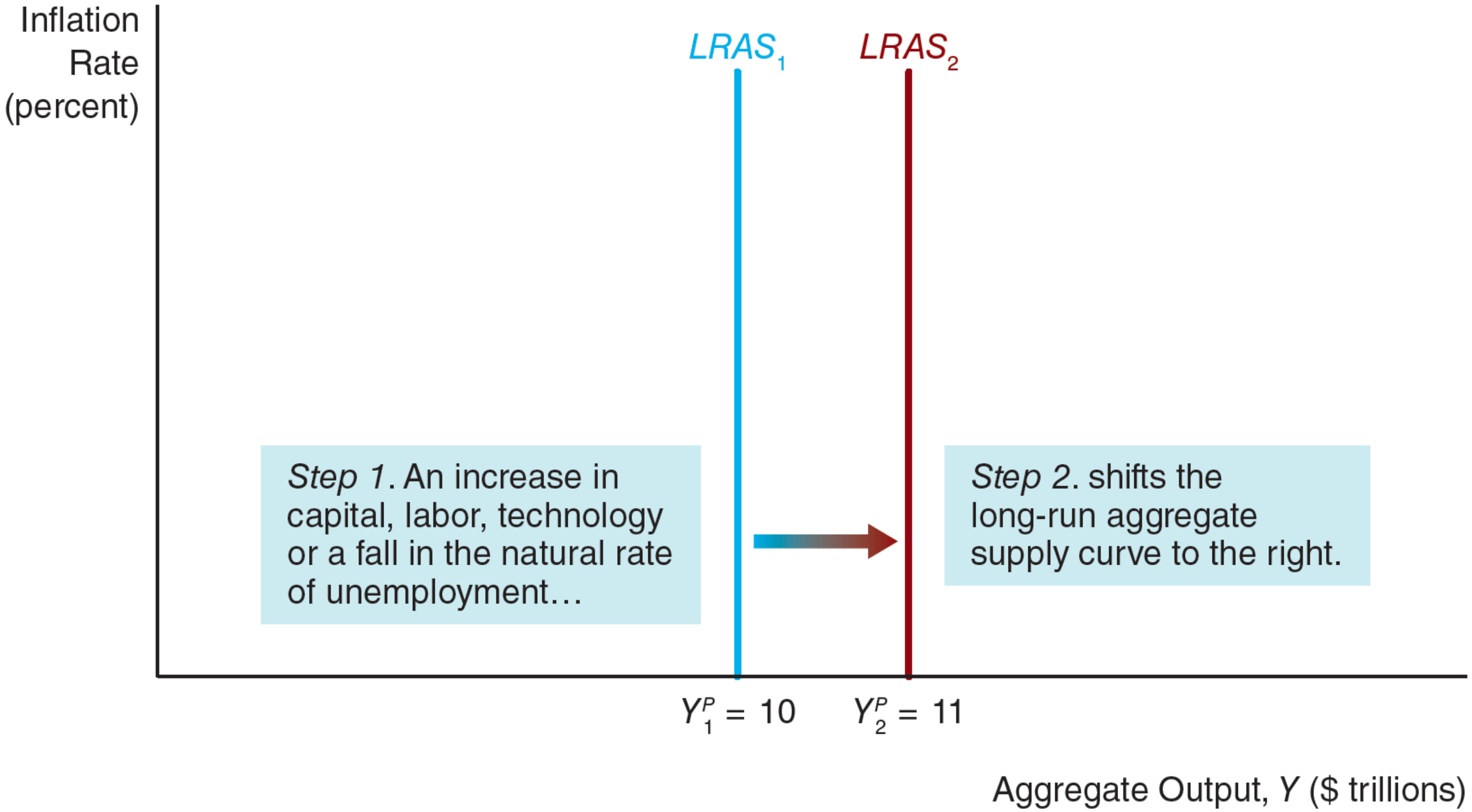
Figure 3 Long- and Short-Run Aggregate Supply Curves



Shifts in Aggregate Supply Curves

- Shifts in the long run aggregate supply curve
  - The long-run aggregate supply curve shifts to the right from when there is:
    1. An increase in the total amount of capital in the economy
    2. An increase in the total amount of labor supplied in the economy
    3. An increase in the available technology, or
    4. A decline in the natural rate of unemployment
  - An opposite movement in these variables shifts the LRAS curve to the left.

Figure 4 Shift in the Long-Run Aggregate Supply Curve



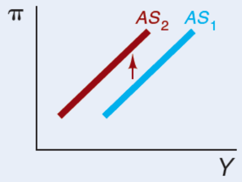
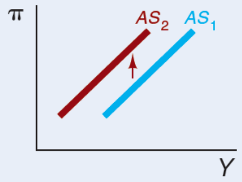
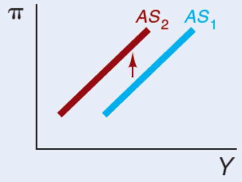
Shifts in the Short-Run Aggregate Supply Curve

- There are three factors that can shift the short-run aggregate supply curve:
  1. Expected inflation
  2. Price shocks
  3. A persistent output gap

Summary Table 2 Factors That Shift the Short-Run Aggregate Supply Curve

SUMMARY TABLE 2

Factors That Shift the Short-Run Aggregate Supply Curve

Factor	Change	Shift in Supply Curve
Expected inflation, π^e	↑	
Inflation shock, ρ	↑	
Persistent output gap, $(Y - Y^P)$	↑	

Note: Only increases (↑) in the factors are shown. The effect of decreases in the factors would be the opposite of those indicated in the "Shift" column.

Figure 5 Shift in the Short-Run Aggregate Supply Curve from Changes in Expected Inflation and Price Shocks

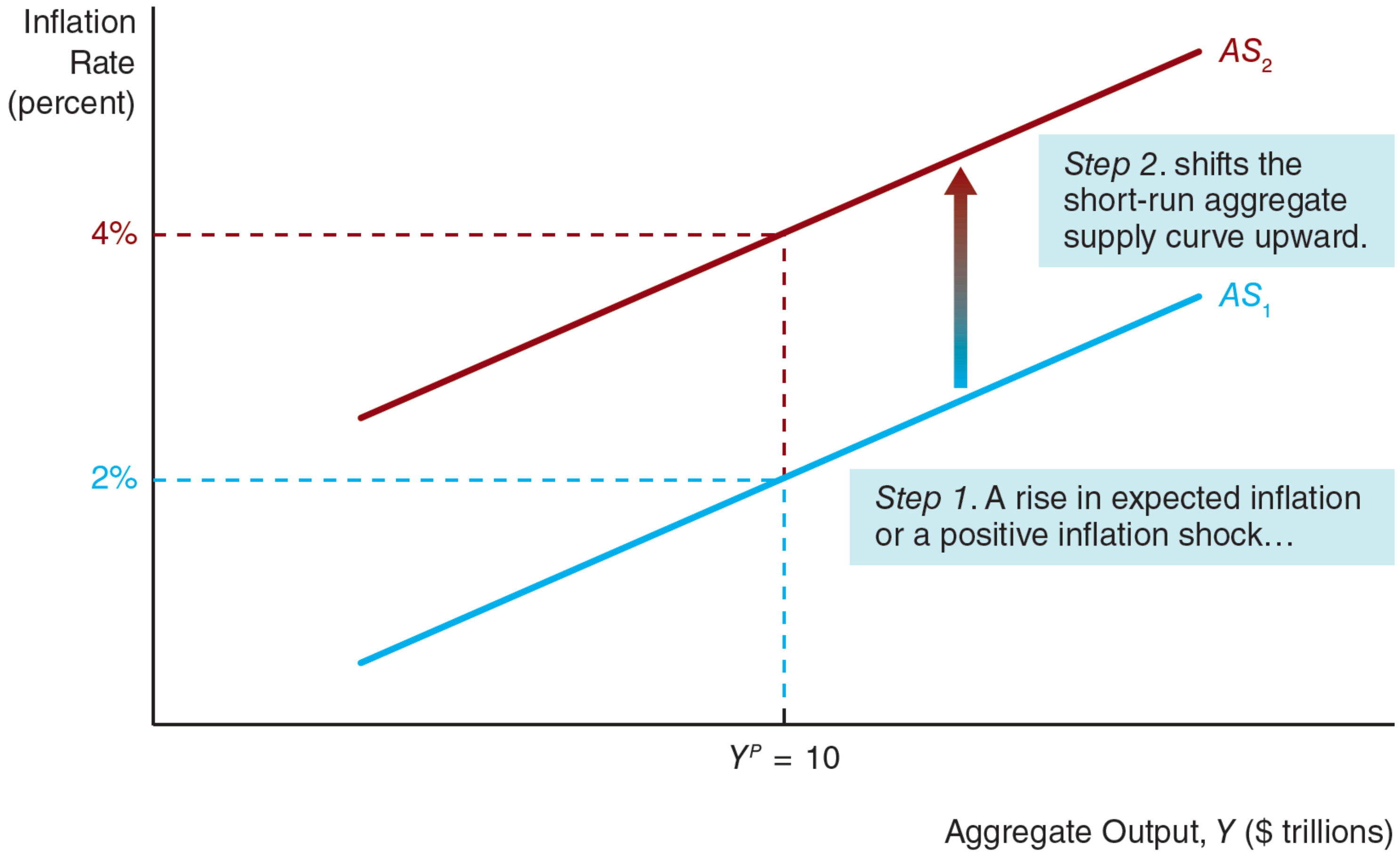
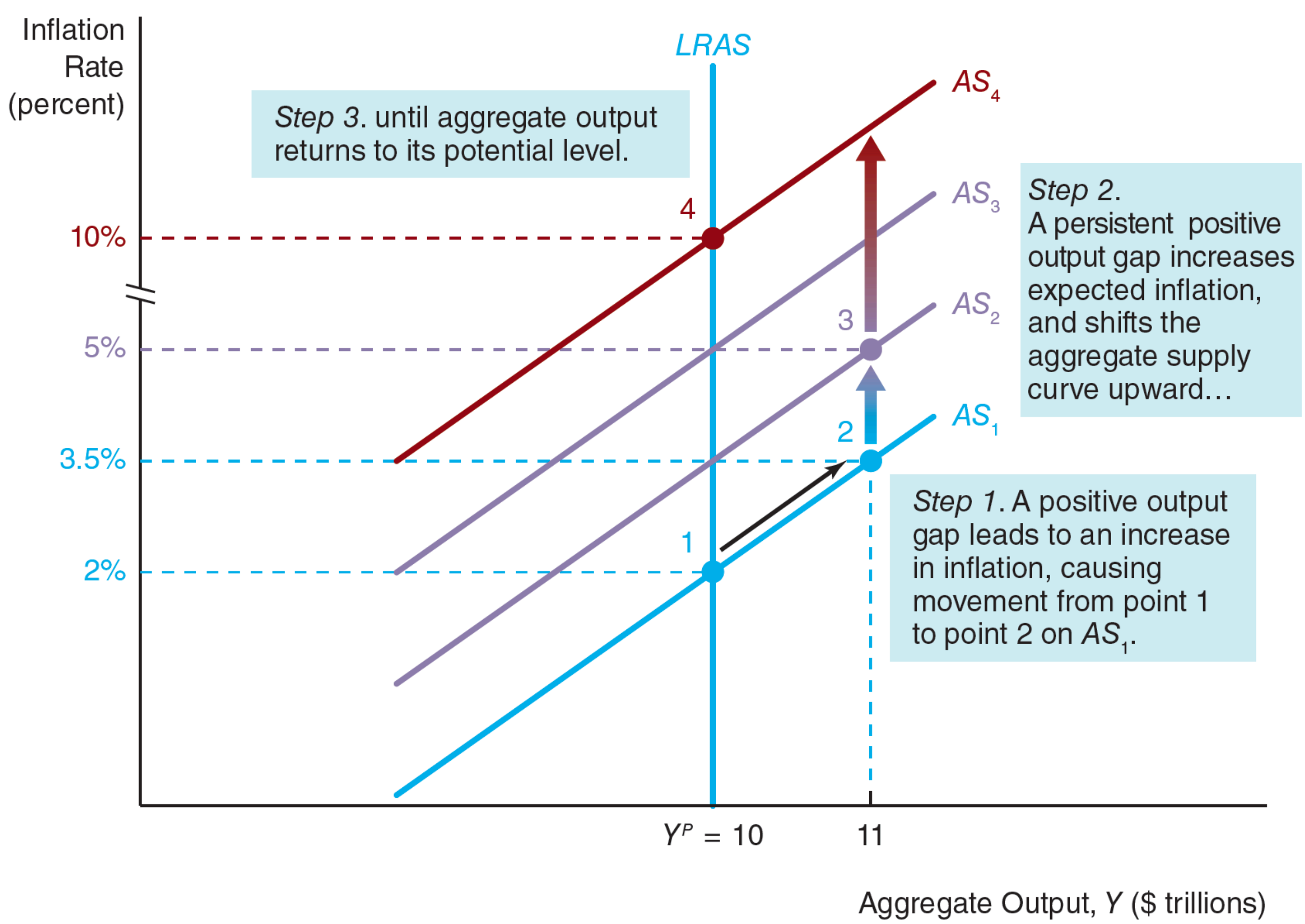


Figure 6 Shift in the Short-Run Aggregate Supply Curve from a Persistent Positive Output Gap



Equilibrium in Aggregate Demand and Supply Analysis

- We can now put the aggregate demand and supply curves together to describe **general equilibrium** in the economy, when all markets are simultaneously in equilibrium at the point where the quantity of aggregate output demanded equals the quantity of aggregate output supplied.

Short-Run Equilibrium

- Figure 7 illustrates a short-run equilibrium in which the quantity of aggregate output demanded equals the quantity of output supplied.
- In Figure 8, the short-run aggregate demand curve *AD* and the short-run aggregate supply curve *AS* intersect at point E with an equilibrium level of aggregate output at Y^* and an equilibrium inflation rate at π^*.

Figure 7 Short-Run Equilibrium

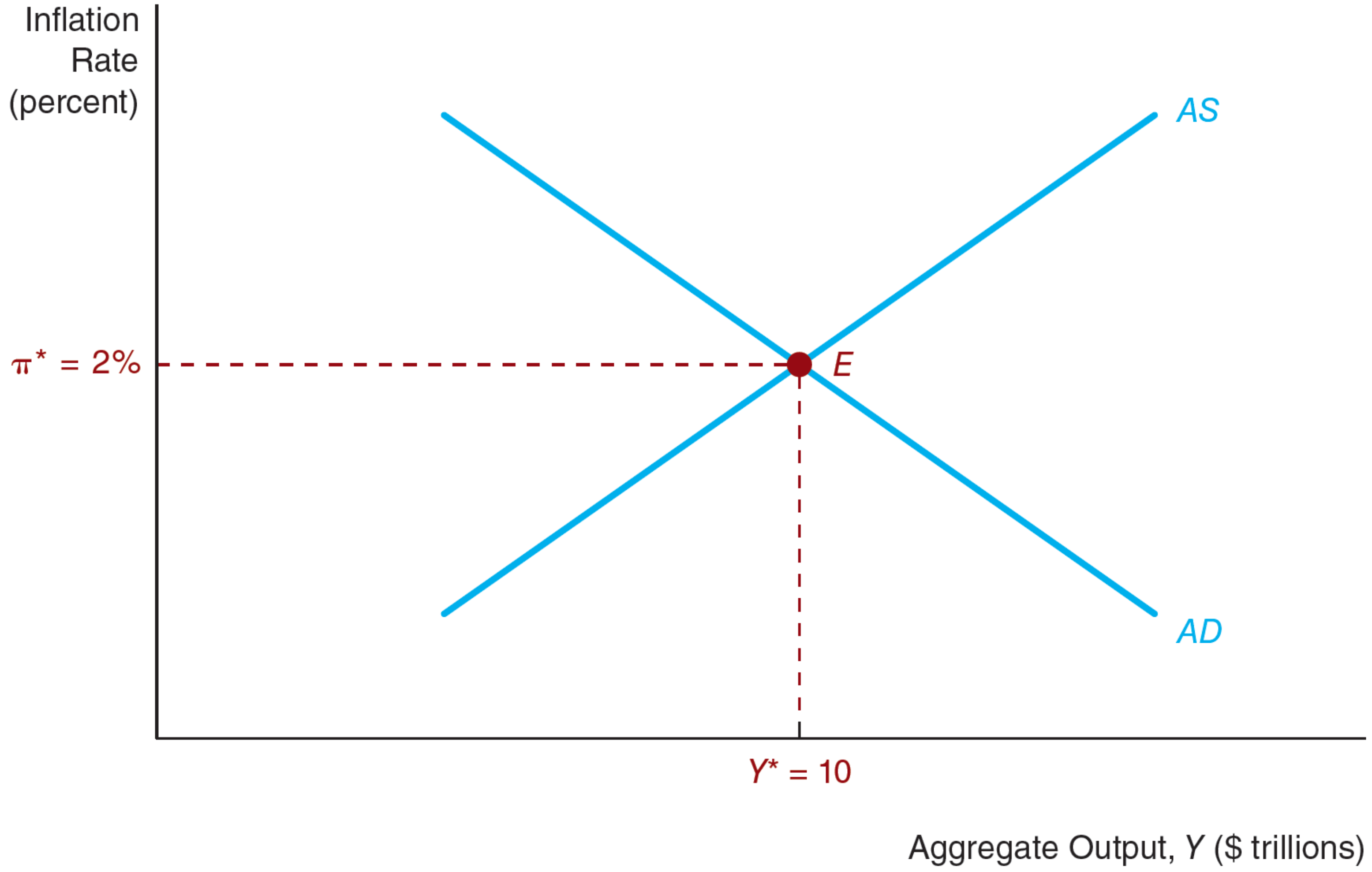
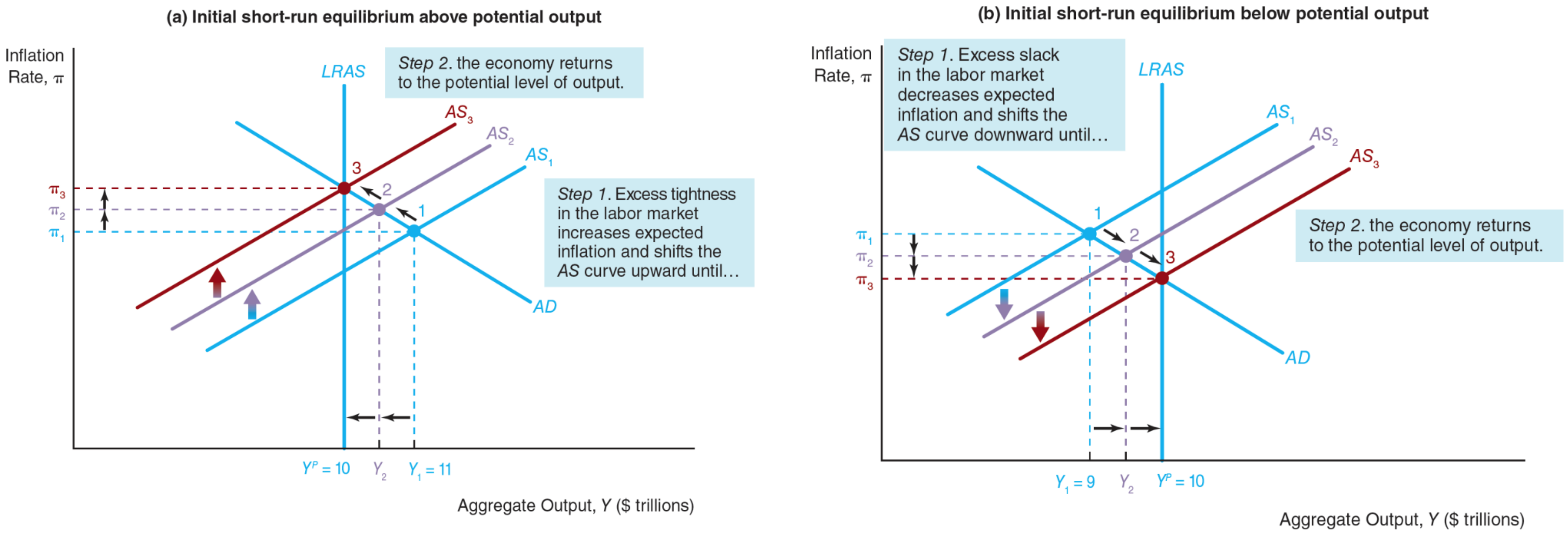


Figure 8 Adjustment to Long-Run Equilibrium



Self-Correcting Mechanism

- Regardless of where output is initially, it returns eventually to the natural rate.
- **Slow:**
  - Wages are inflexible, particularly downward
  - Need for active government policy
- **Rapid:**
  - Wages and prices are flexible
  - Less need for government intervention

Changes in Equilibrium: Aggregate Demand Shocks

- With an understanding of the distinction between the short-run and long-run equilibria, we are now ready to analyze what happens when there are demand shocks, shocks that cause the aggregate demand curve to shift.

Figure 9 Positive Demand Shock

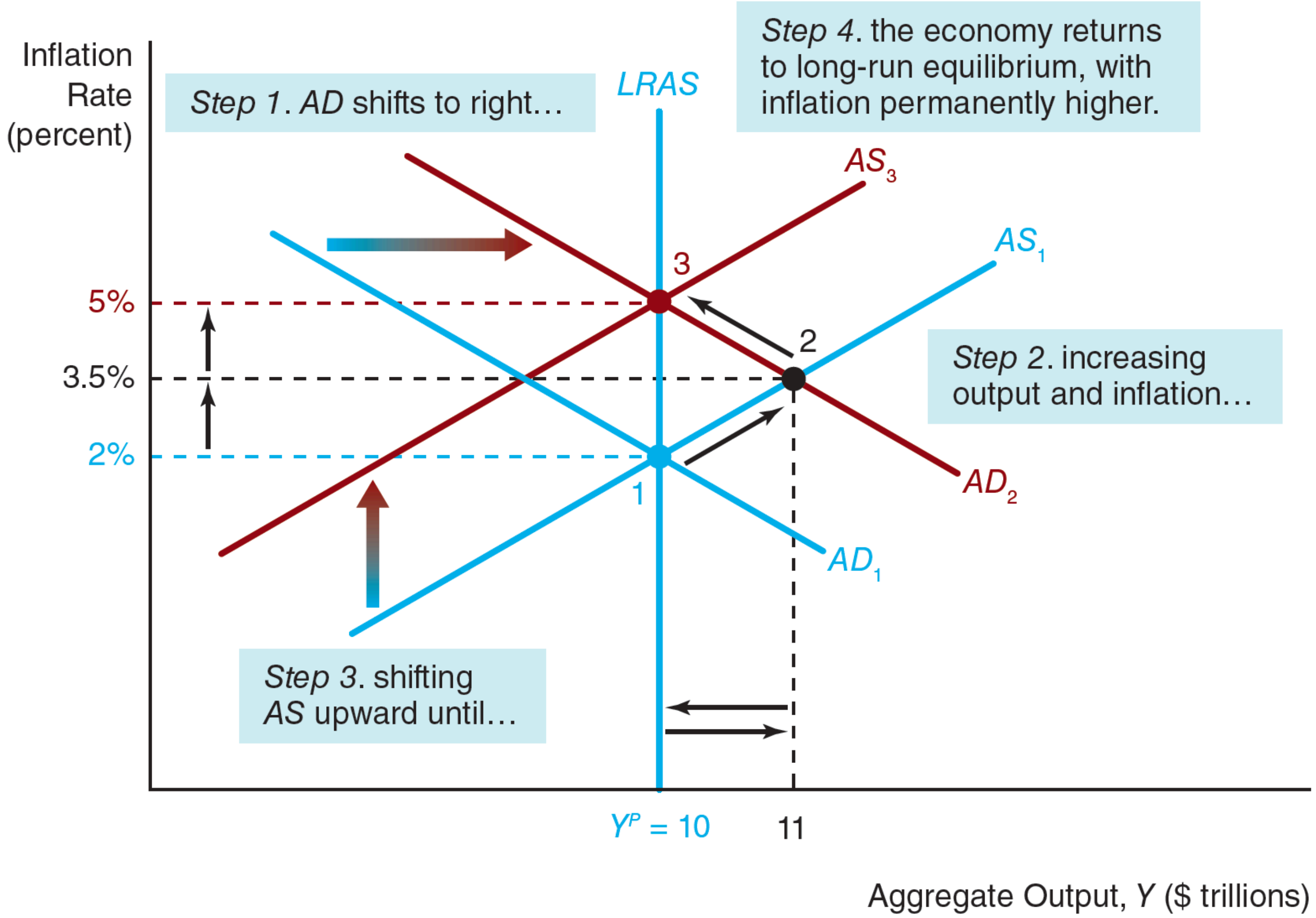
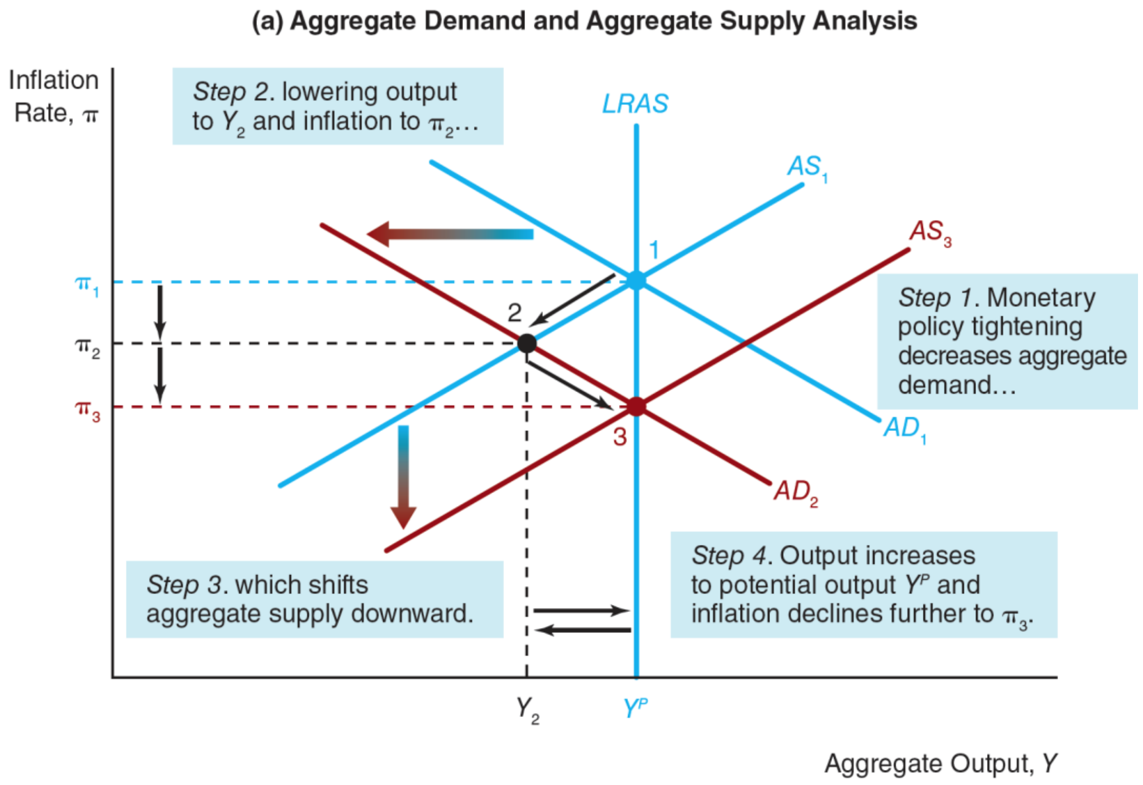


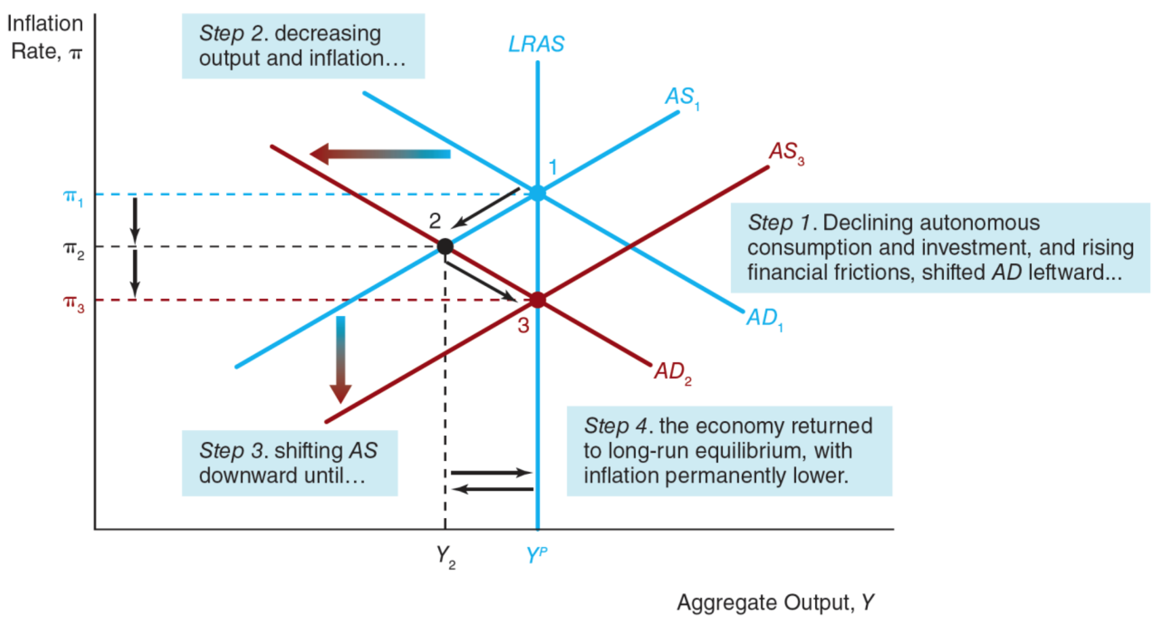
Figure 10 The Volcker Disinflation



(b) Unemployment and Inflation, 1980–1986

Year	Unemployment Rate (%)	Inflation (Year to Year) (%)
1980	7.1	13.5
1981	7.6	10.3
1982	9.7	6.2
1983	9.6	3.2
1984	7.5	4.3
1985	7.2	3.6
1986	7.0	1.9

Figure 11 Negative Demand Shocks, 2000–2004



(b) Unemployment and Inflation, 2000–2004

Year	Unemployment Rate (%)	Inflation (Year to Year) (%)
2000	4.0	3.4
2001	4.7	2.8
2002	5.8	1.6
2003	6.0	2.3
2004	5.5	2.7

Changes in Equilibrium: Aggregate Supply (Price) Shocks

- The aggregate supply curve can shift from temporary supply (price) shocks in which the long-run aggregate supply curve does not shift, or from permanent supply shocks in which the long-run aggregate supply curve does shift.

Changes in Equilibrium: Aggregate Supply (Price) Shocks

- **Temporary Supply Shocks**:
  - When the temporary shock involves a restriction in supply, we refer to this type of supply shock as a negative (or unfavorable) supply shock, and it results in a rise in commodity prices.
  - A temporary positive supply shock shifts the short-run aggregate supply curve downward and to the right, leading initially to a fall in inflation and a rise in output. In the long run, however, output and inflation will be unchanged (holding the aggregate demand curve constant).

Figure 12 Temporary Negative Supply Shock

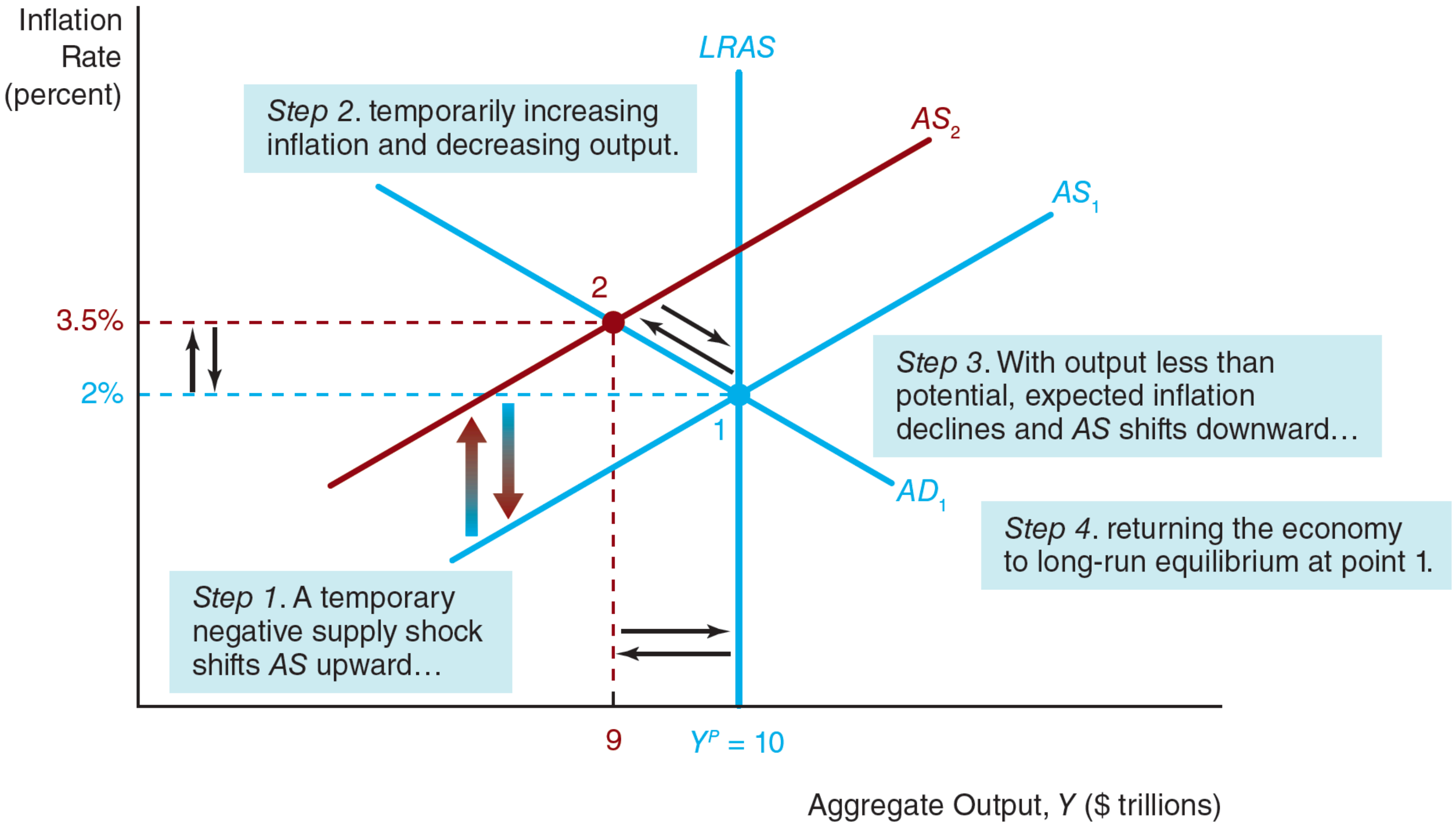
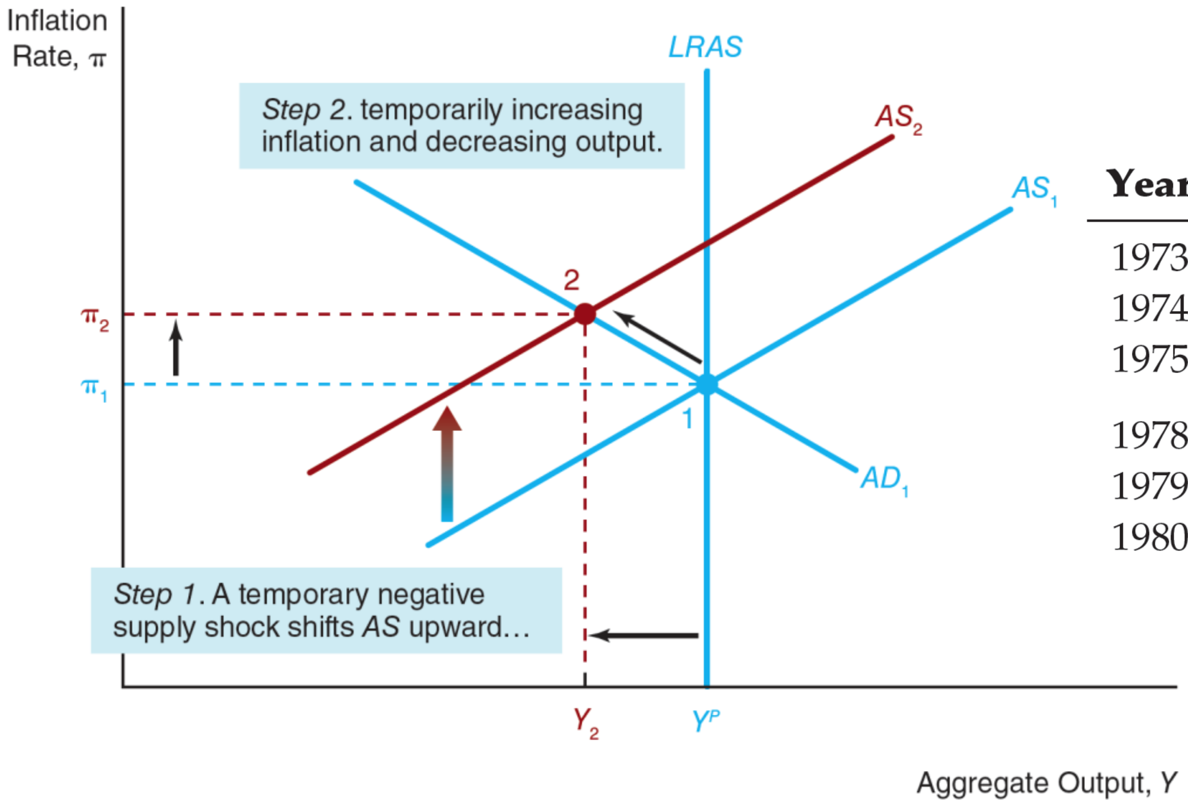


Figure 13 Negative Supply Shocks, 1973–1975 and 1978–1980

(a) Aggregate Demand and Aggregate Supply Analysis



(b) Unemployment and Inflation, 1973–1975 and 1978–1980

Year	Unemployment Rate (%)	Inflation (Year to Year) (%)
1973	4.8	6.2
1974	5.5	11.0
1975	8.3	9.1
1978	6.0	7.6
1979	5.8	11.3
1980	7.1	13.5

Permanent Supply Shocks and Real Business Cycle Theory

- A permanent negative supply shock—such as an increase in ill-advised regulations that causes the economy to be less efficient, thereby reducing supply—would decrease potential output and shift the long-run aggregate supply curve to the left.
- Because the permanent supply shock will result in higher prices, there will be an immediate rise in inflation and so the short-run aggregate supply curve will shift up and to the left.

Permanent Supply Shocks and Real Business Cycle Theory

- One group of economists, led by Edward Prescott of Arizona State University, believe that business cycle fluctuations result from permanent supply shocks alone and their theory of aggregate economic fluctuations is called **real business cycle theory.**

Figure 14 Permanent Negative Supply Shock

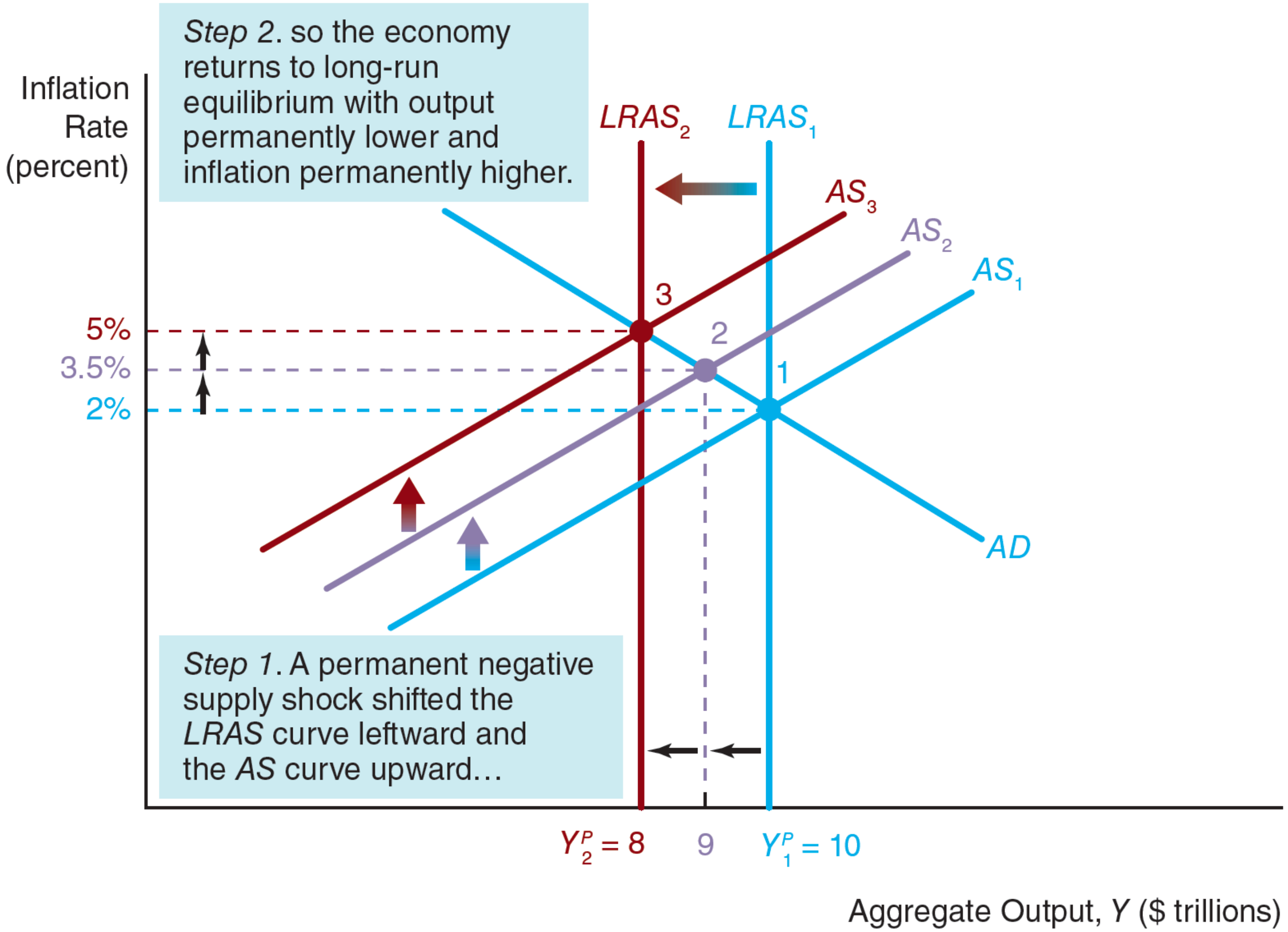
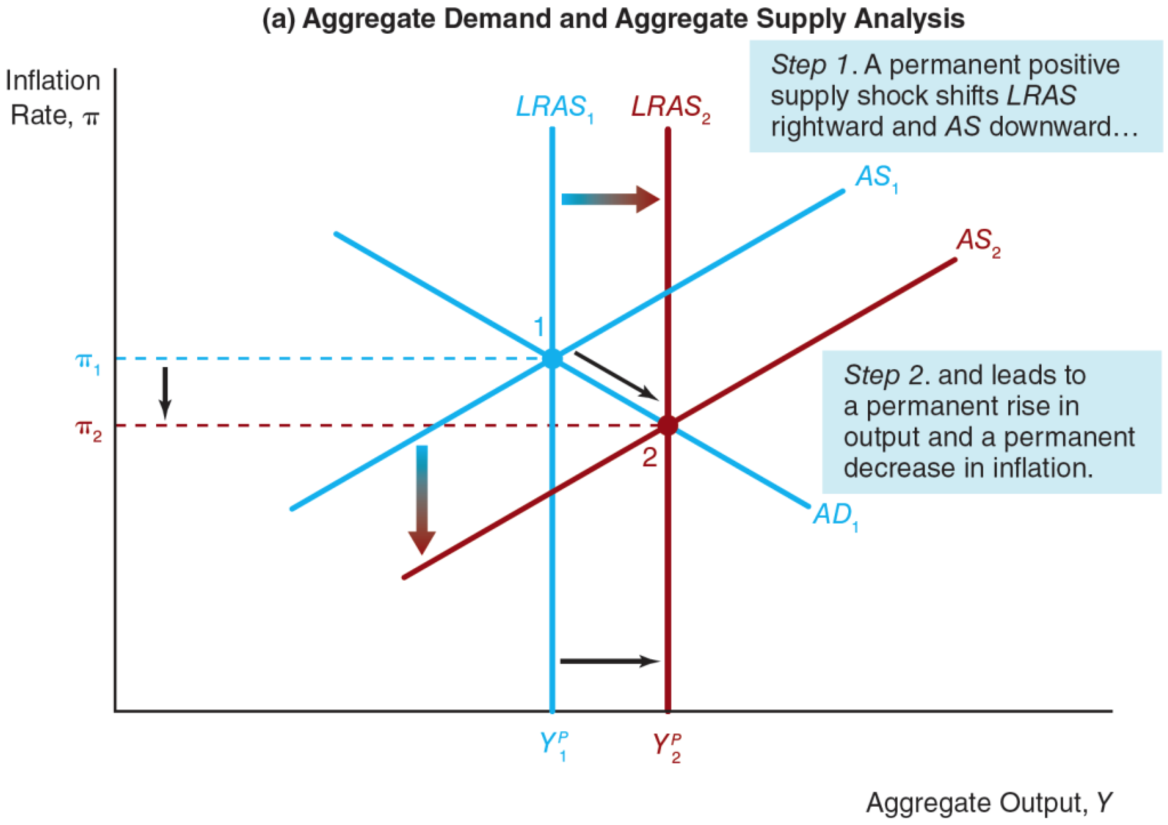


Figure 15 Positive Supply Shocks, 1995–1999



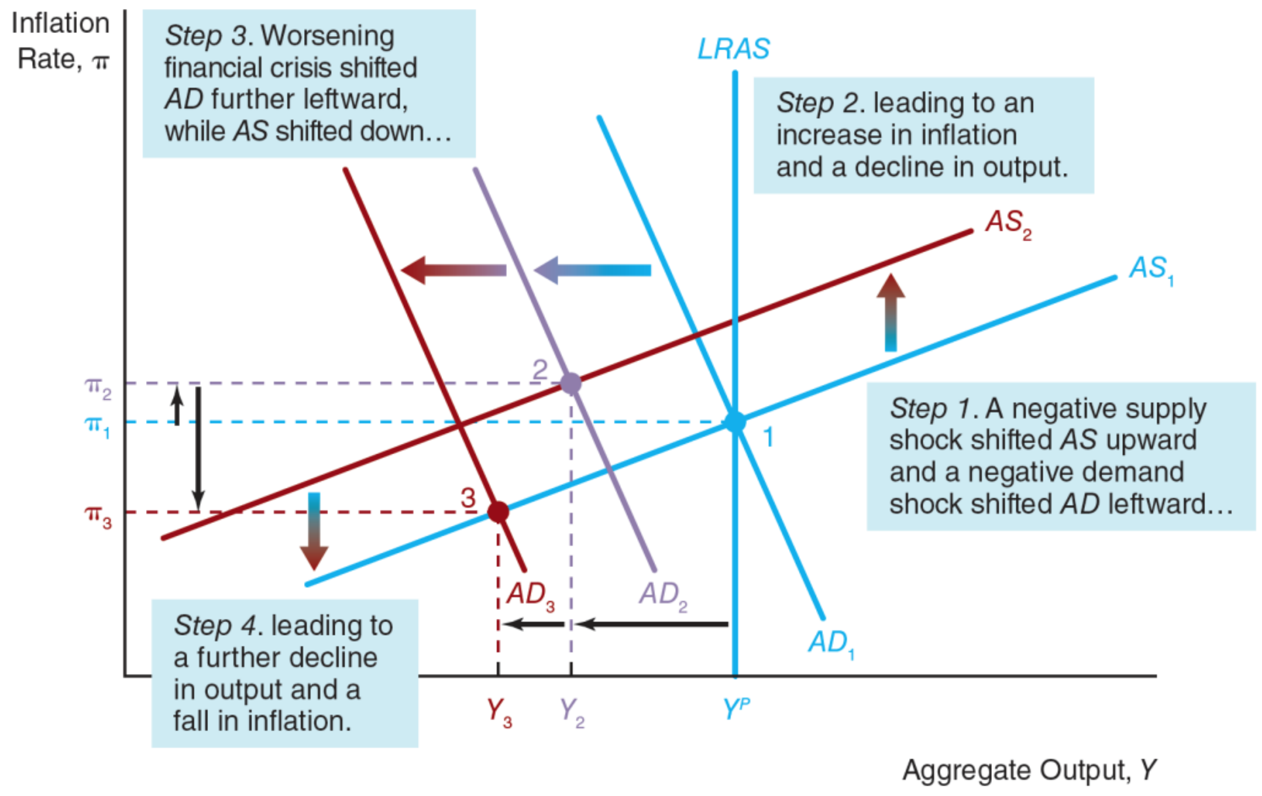
(b) Unemployment and Inflation, 1995–1999

Year	Unemployment Rate (%)	Inflation (Year to Year) (%)
1995	5.6	2.8
1996	5.4	3.0
1997	4.9	2.3
1998	4.5	1.6
1999	4.2	2.2

Conclusions

- Aggregate demand and supply analysis yields the following conclusions:
  1. A shift in the aggregate demand curve affects output only in the short run and has no effect in the long run.
  2. A temporary supply shock affects output and inflation only in the short run and has no effect in the long run (holding the aggregate demand curve constant).
  3. A permanent supply shock affects output and inflation both in the short and the long run.
  4. The economy has a self-correcting mechanism that returns it to potential output and the natural rate of unemployment over time.

Figure 16 Negative Supply and Demand Shocks and the 2007–2009 Crisis



(b) Unemployment and Inflation During the Perfect Storm of 2007–2009

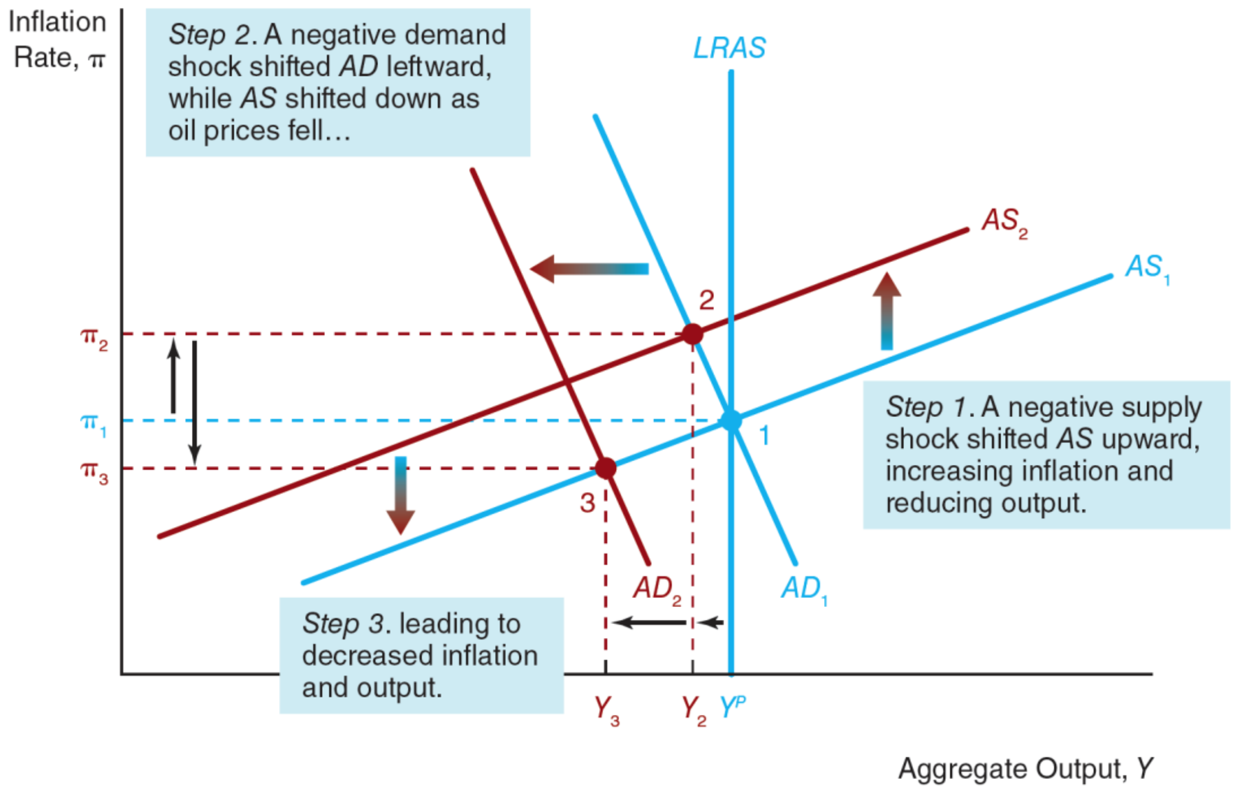
Year	Unemployment Rate (%)	Inflation (Year to Year) (%)
2006	4.6	2.5
2007	4.6	4.1
2008, June	5.5	5.0
2008, Dec.	7.2	0.1
2009, June	9.5	–1.2
2009, Dec.	10.0	2.8

AD/AS Analysis of Foreign Business Cycle Episodes

- Our aggregate demand and supply analysis also can help us understand business cycle episodes in foreign countries.
  - Figure 17 shows the UK Financial Crisis, 2007–2009
  - Figure 18 shows China and the Financial Crisis, 2007–2009

Figure 17 U.K. Financial Crisis, 2007–2009

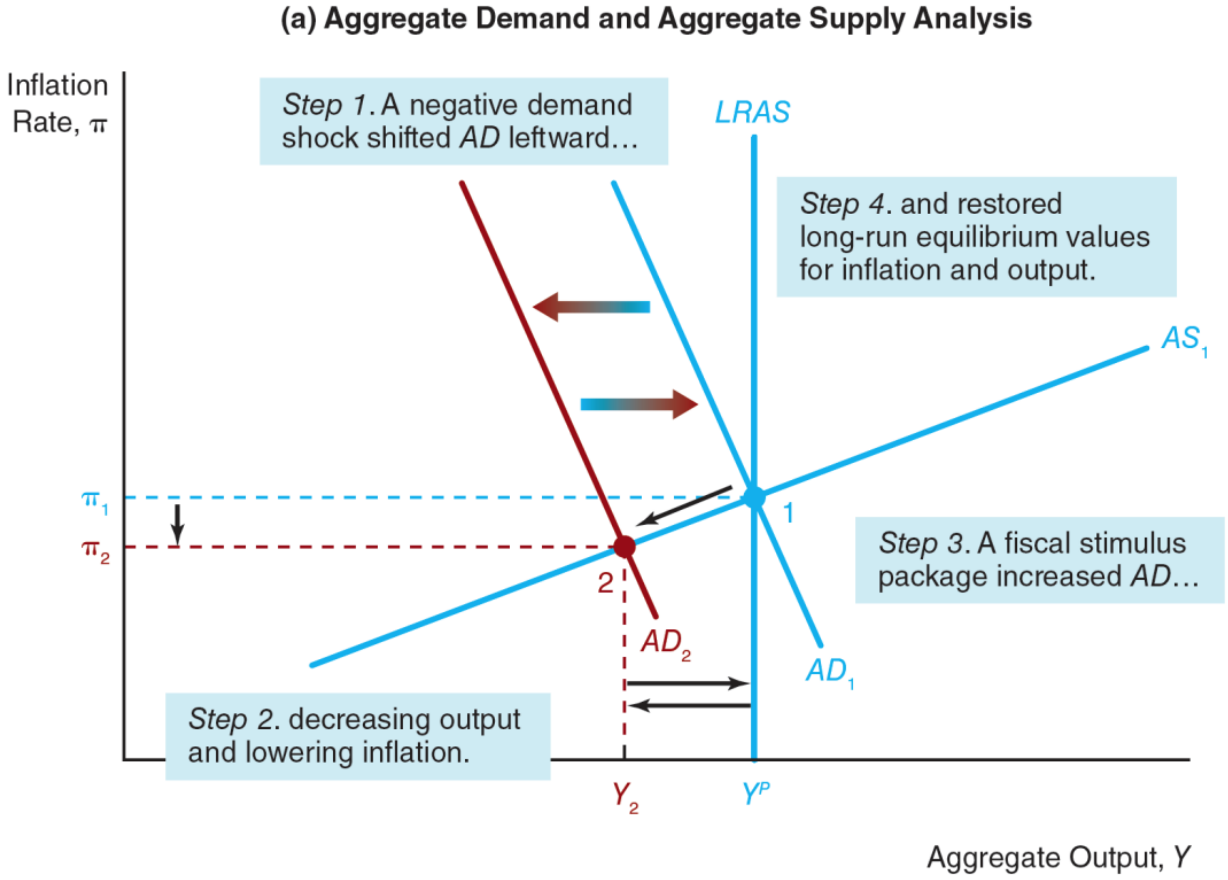
(a) Aggregate Demand and Aggregate Supply Analysis



(b) Unemployment and Inflation, 2006–2009

Year	Unemployment Rate (%)	Inflation (Year to Year) (%)
2006	5.4	2.3
2007	5.3	2.3
2008, June	5.3	3.4
2008, Dec.	6.4	3.9
2009, June	7.8	2.1
2009, Dec.	7.8	2.1

Figure 18 China and the Financial Crisis, 2007–2009



(b) Chinese Output Growth and Inflation, 2006–2009

Year	Output Growth (%)	Inflation (Year to Year) (%)
2006	11.8	1.5
2007	12.4	4.8
2008, June	11.2	7.9
2008, Dec.	4.4	3.9
2009, June	11.1	–1.1
2009, Dec.	10.4	–0.3

Appendix to Chapter 22: The Phillips Curve and the Short-Run Aggregate Supply Curve

- **The Phillips Curve**: the negative relationship between unemployment and inflation.
- The idea behind the Phillips curve is intuitive: When labor markets are *tight*—that is, the unemployment rate is *low*—firms may have difficulty hiring qualified workers and may even have a hard time keeping their present employees. Because of the shortage of workers in the labor market, firms will raise wages to attract needed workers and raise their prices at a more rapid rate.

Figure 1 Inflation and Unemployment in the United States, 1950–1969 and 1970–2014

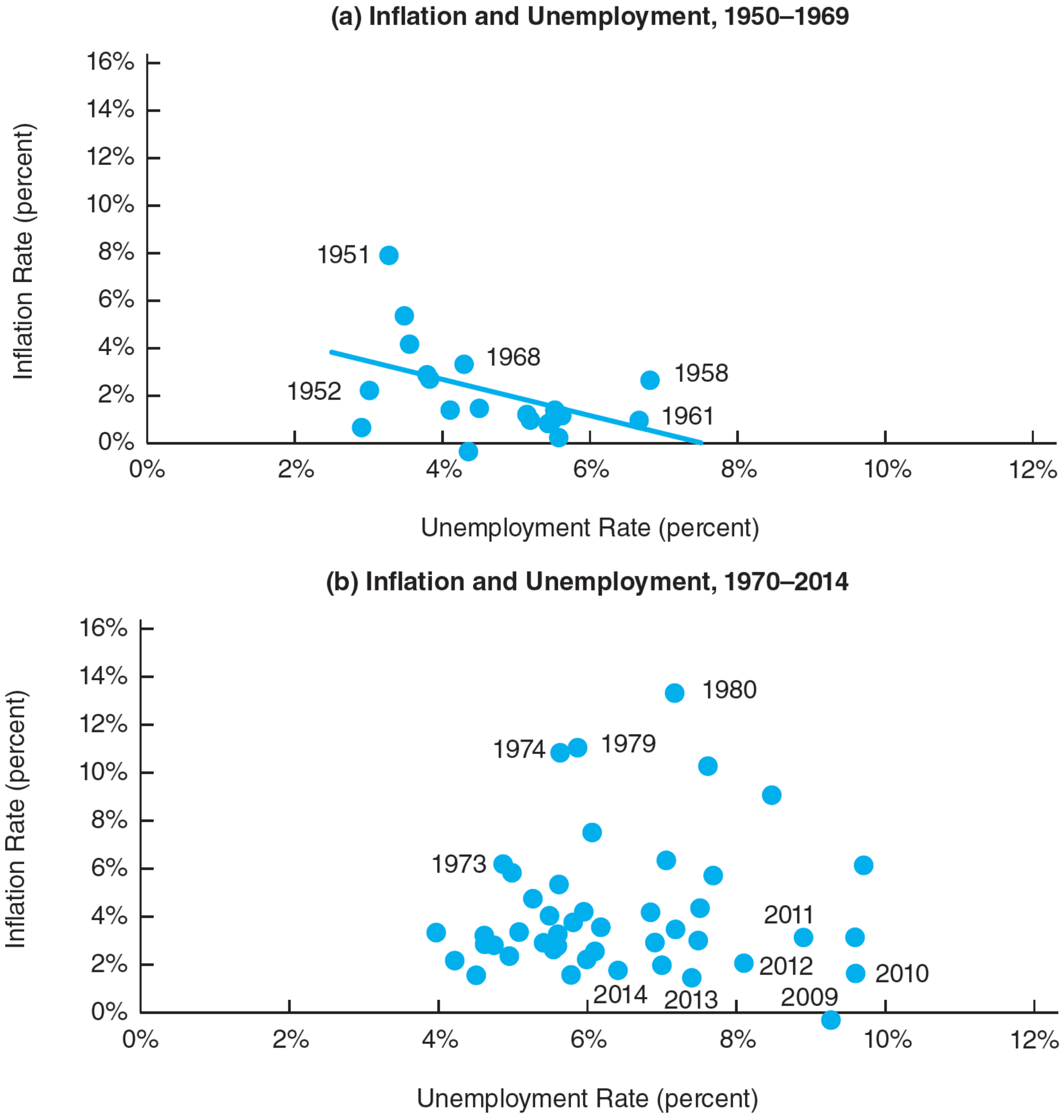
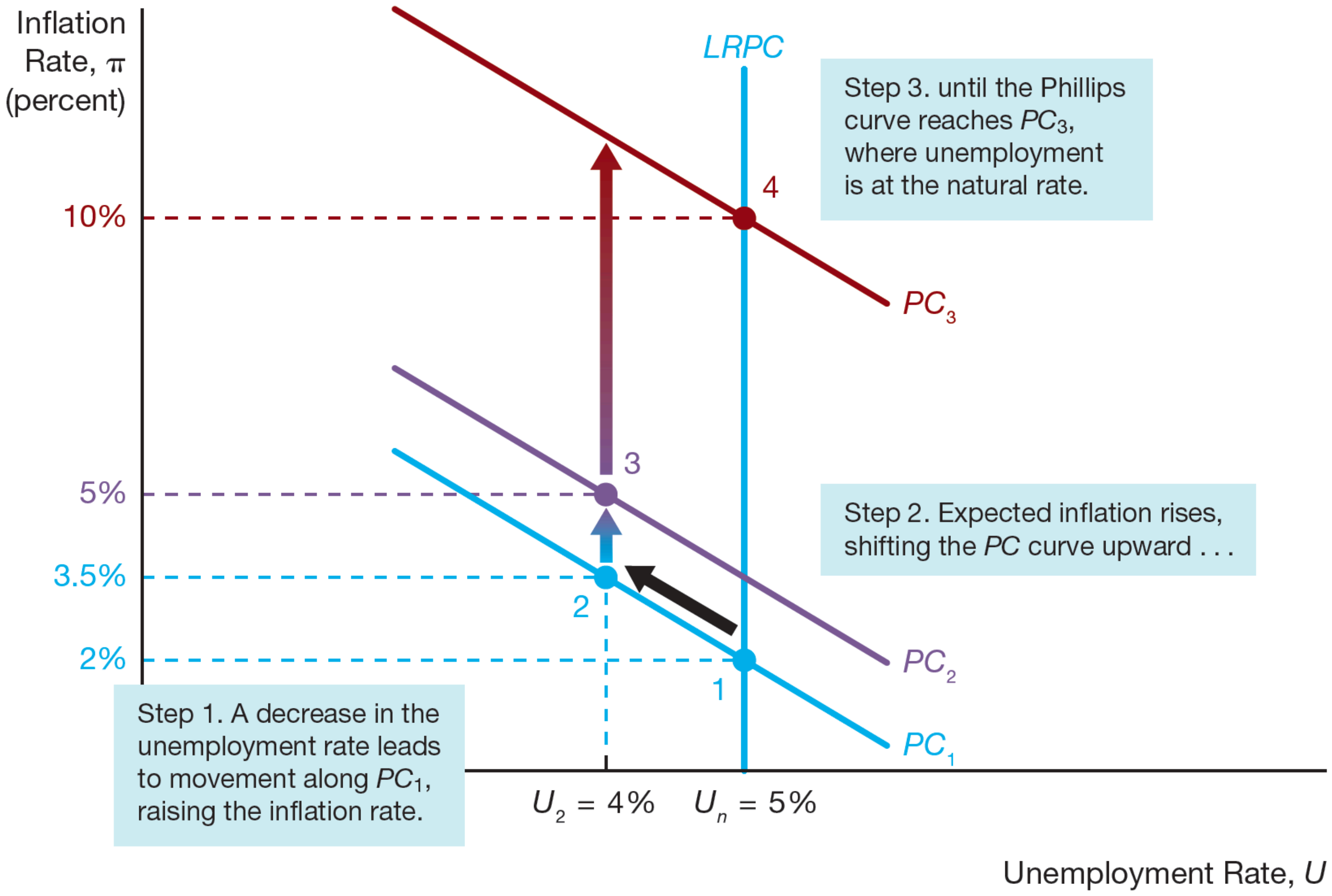


Figure 2 The Short- and Long-Run Phillips Curve



Three Important Conclusions

- There is no long-run trade-off between unemployment and inflation.
- There is a short-run trade-off between unemployment and inflation.
- There are two types of Phillips curves, long run and short run.

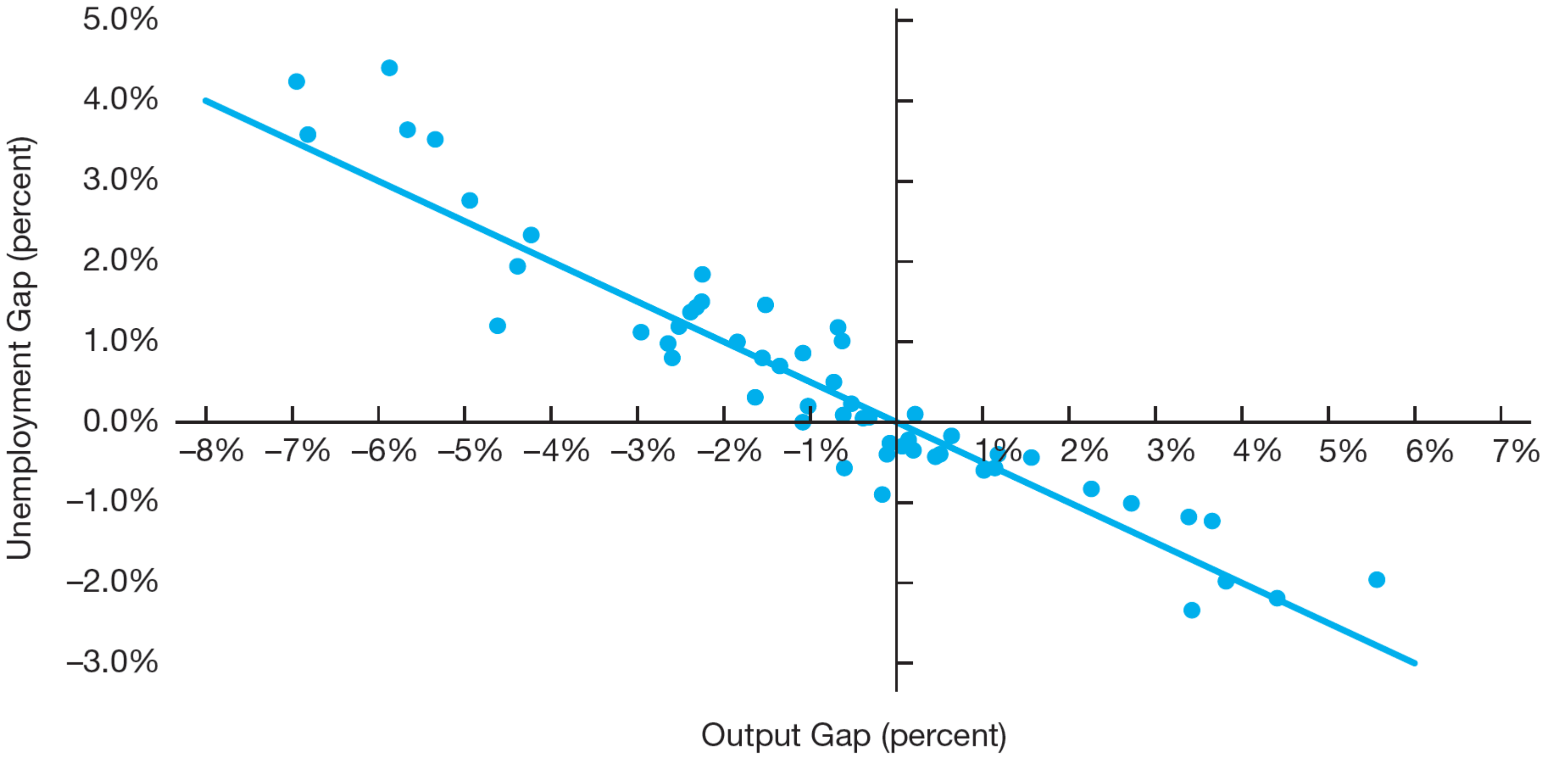
The Short-Run Aggregate Supply Curve

- To complete our aggregate demand and supply model, we need to use our analysis of the Phillips curve to derive a short-run aggregate supply curve, which represents the relationship between the total quantity of output that firms are willing to produce and the inflation rate.
- We can translate the modern Phillips curve into a short-run aggregate supply curve by replacing the unemployment gap ($U - U_n$) with the *output gap*, the difference between output and potential output ($Y - Y_P$).

Okun’ s Law

- **Okun’s law** describes the negative relationship between the unemployment gap and the output gap.
- Okun’s law states that for each percentage point that output is above potential, the unemployment rate is one-half of a percentage point below the natural rate of unemployment. Alternatively, for every percentage point that unemployment is above its natural rate, output is two percentage points below potential output.

Figure Okun's Law, 1960–2014



Source: Federal Reserve Bank of St. Louis, FRED database: http://research.stlouisfed.org/fred2/.