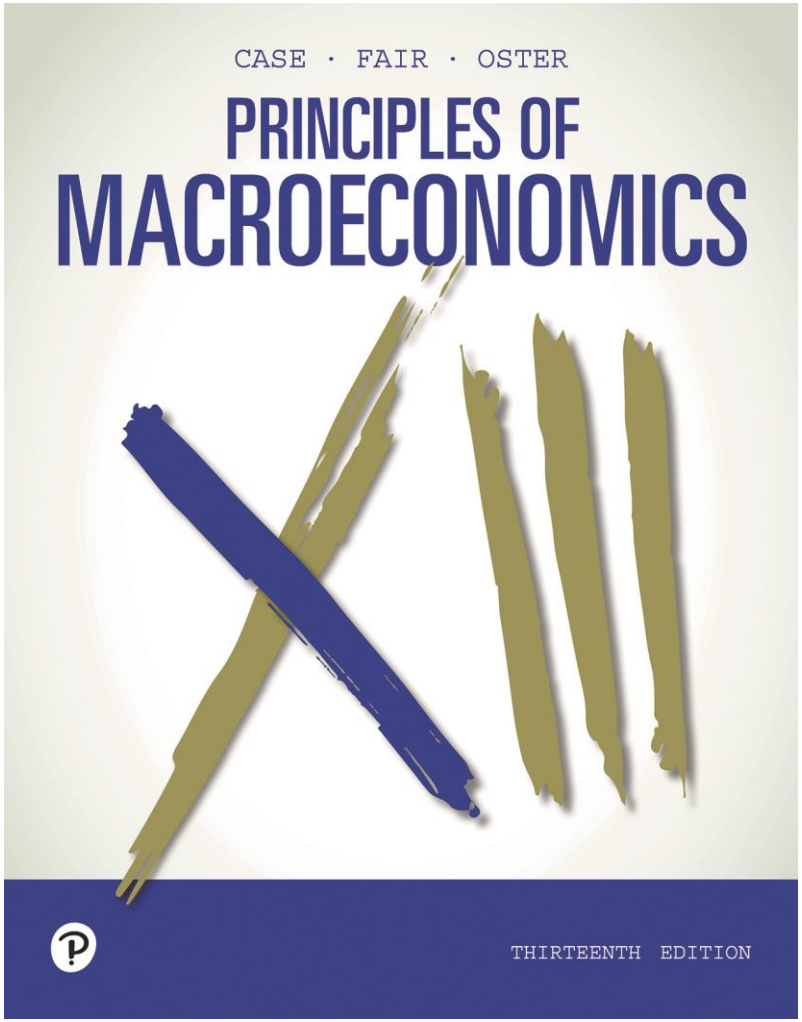
Principles of Macroeconomics

Thirteenth Edition



Chapter 11

The Determination of Aggregate Output, the Price Level, and the Interest Rate

Chapter Outline and Learning Objectives (1 of 2)

11.1 The Aggregate Supply (*AS*) Curve

- Define the aggregate supply curve and discuss shifts in the short-run *AS* curve.

11.2 The Aggregate Demand (*AD*) Curve

- Derive the aggregate demand curve and explain why the *AD* curve is downward sloping.

11.3 The Final Equilibrium

- Explain why the intersection of the *AD* and *AS* curves is an equilibrium point.

Chapter Outline and Learning Objectives (2 of 2)

11.4 Other Reasons for a Downward-Sloping *AD* Curve

- Give two additional reasons why the *AD* curve may slope down.

11.5 The Long-Run *AS* Curve

- Discuss the shape of the long-run aggregate supply curve and explain long-run market adjustment to potential GDP.

Chapter 11 The Determination of Aggregate Output, the Price Level, and the Interest Rate

We are now ready to bring together the three pieces of the economy—output, the price level, and the interest rate.

This chapter and the next one will give you the ability to think about the key issues policy makers face in trying to manage the economy.

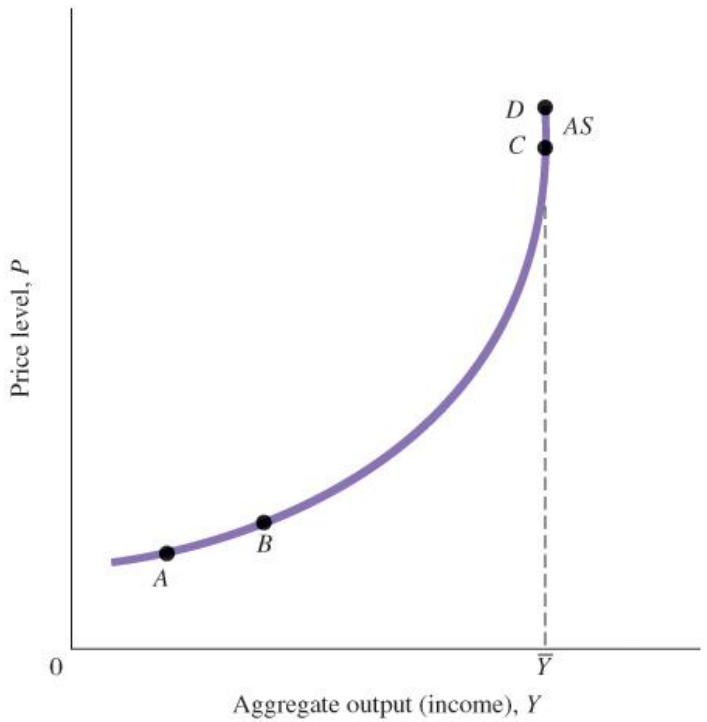
The Aggregate Supply (*AS*) Curve (1 of 3)

- **aggregate supply** The total supply of all goods and services in an economy.
- **aggregate supply (*AS*) curve** A graph that shows the relationship between the aggregate quantity of output supplied by all firms in an economy and the overall price level.
- It is better thought of as a “price/output response” curve: a curve that traces out the price decisions and output decisions of all firms in the economy under different levels of aggregate demand.

Aggregate Supply in the Short Run

Figure 11.1 The Short-Run Aggregate Supply Curve

- In the short run, the aggregate supply curve (the price/output response curve) has a positive slope.
- At low levels of aggregate output, the curve is fairly flat.
- As the economy approaches capacity, the curve becomes nearly vertical.
- At capacity $\bar{Y}$, the curve is vertical.



The Aggregate Supply (*AS*) Curve (2 of 3)

Why an Upward Slope?

- Wages are a large fraction of total costs, and wage changes lag behind price changes. This gives us an upward-sloping short-run *AS* curve.

The Aggregate Supply (*AS*) Curve (3 of 3)

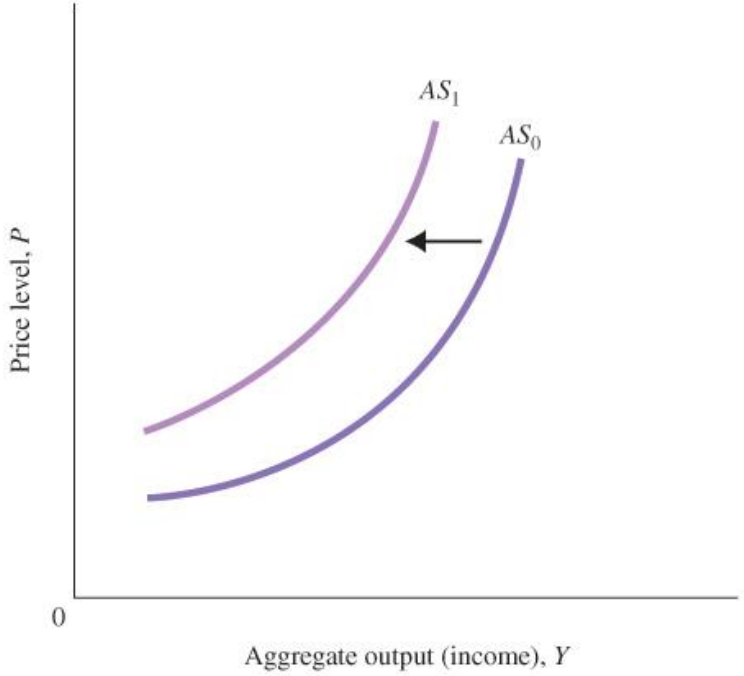
Why the Particular Shape?

- As the overall economy is using all its capital and all the labor that wants to work at the market wage at $\overline{Y}$, increased demand for labor and output can be met only by increased prices.
- At low levels of output, the *AS* curve is flatter. Small price increases may be associated with relatively large output responses.

Shifts of the Short-Run Aggregate Supply Curve

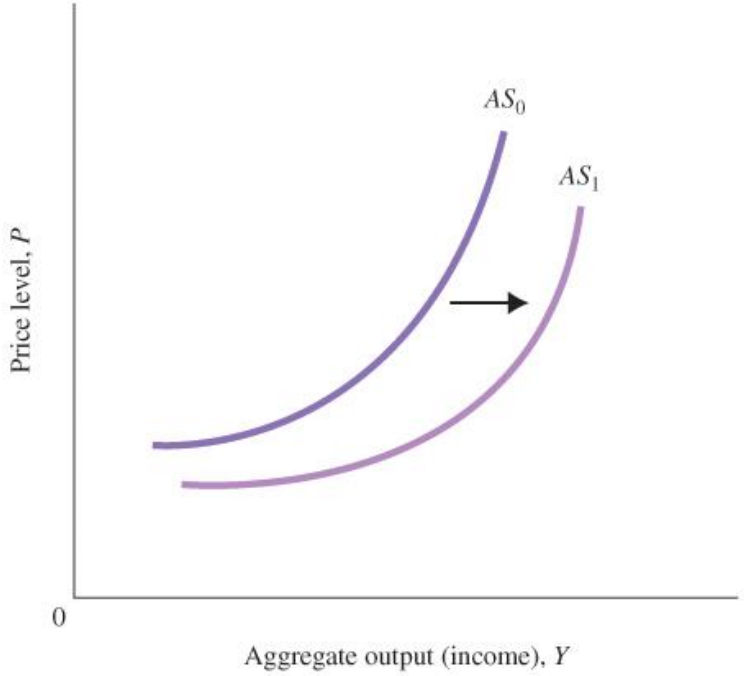
- The vertical part of the short-run *AS* curve represents the economy's maximum (capacity) output, as determined by existing resources.
- New discoveries of oil or problems in the production of energy can shift the *AS* curve through effects on the marginal cost of production.
- **cost shock, or supply shock** A change in costs that shifts the short-run aggregate supply (*AS*) curve.

Figure 11.2 Shifts of the Short-Run Aggregate Supply Curve



a. A decrease in aggregate supply

A leftward shift of the AS curve from AS_0 to AS_1 could be caused by an increase in costs—for example, an increase in wage rates or energy prices.



b. An increase in aggregate supply

A rightward shift of the AS curve from AS_0 to AS_1 could be caused by a decrease in costs—for example, a decrease in wage rates or energy prices or advances in technology.

The Aggregate Demand (*AD*) Curve

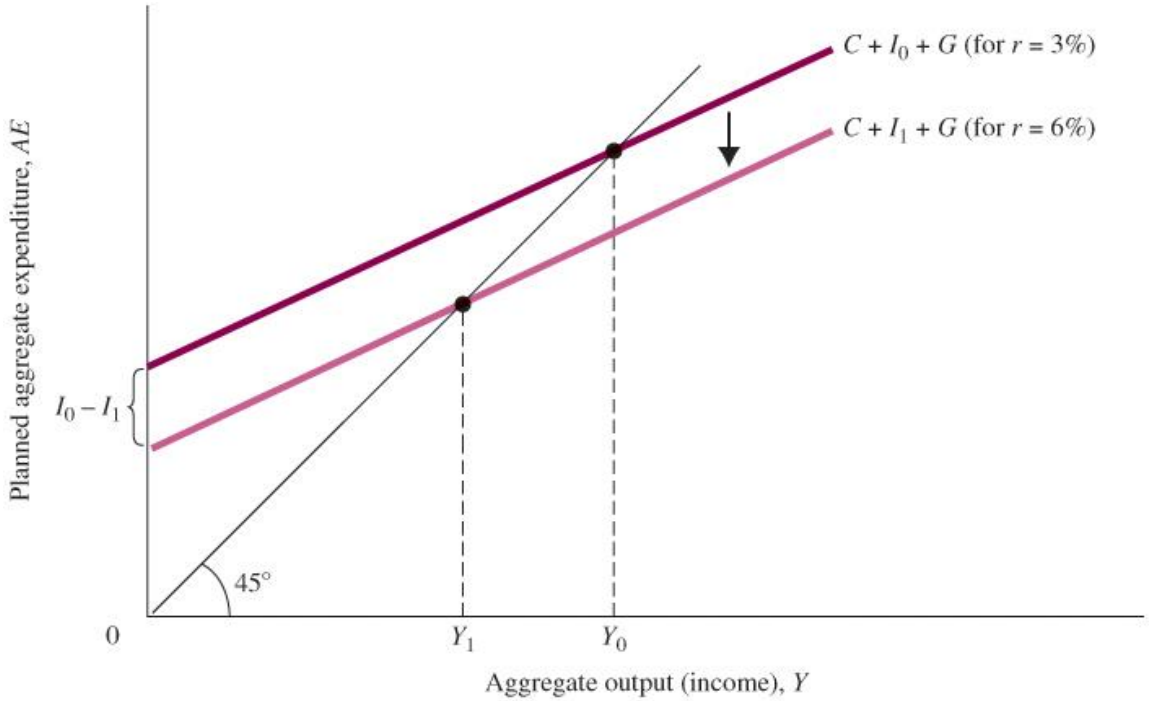
- The *AD* curve is derived from the model of the goods market in Chapters 23 and 24 and from the behavior of the Fed.

Planned Aggregate Expenditure and the Interest Rate

$$AE \equiv C + I + G$$

- As the interest rate rises (falls), *I* falls, thus total planned spending rises (falls) as well.

Figure 11.3 The Effect of an Interest Rate Increase on Planned Aggregate Expenditure and Equilibrium Output



- An increase in the interest rate from 3% to 6% lowers planned aggregate expenditure and thus reduces equilibrium output from Y_0 to Y_1.

Planned Aggregate Expenditure and the Interest Rate (1 of 2)

$$\text{Recall: } AE \equiv C + I + G$$

- The effects of a change in the interest rate:
  - A high interest rate (*r*) discourages planned investment (*I*).
  - Planned aggregate expenditure (*AE*) at every level of income falls.
  - A decrease in *AE* lowers equilibrium output (income) (*Y*) by a multiple of the initial decrease in *I*.

$$r\uparrow \rightarrow I\downarrow \rightarrow AE\downarrow \rightarrow Y\downarrow$$

$$r\downarrow \rightarrow I\uparrow \rightarrow AE\uparrow \rightarrow Y\uparrow$$

Planned Aggregate Expenditure and the Interest Rate (2 of 2)

- ***IS* curve** Relationship between aggregate output and the interest rate in the goods market.
- *With the interest rate fixed,* an increase in government spending (*G*) increases *AE* and thus *Y* in equilibrium.

Figure 11.4 The *IS* Curve

- In the goods market, there is a negative relationship between output and the interest rate because planned investment depends negatively on the interest rate.
- Any point on the *IS* curve is an equilibrium in the goods market for the given interest rate.

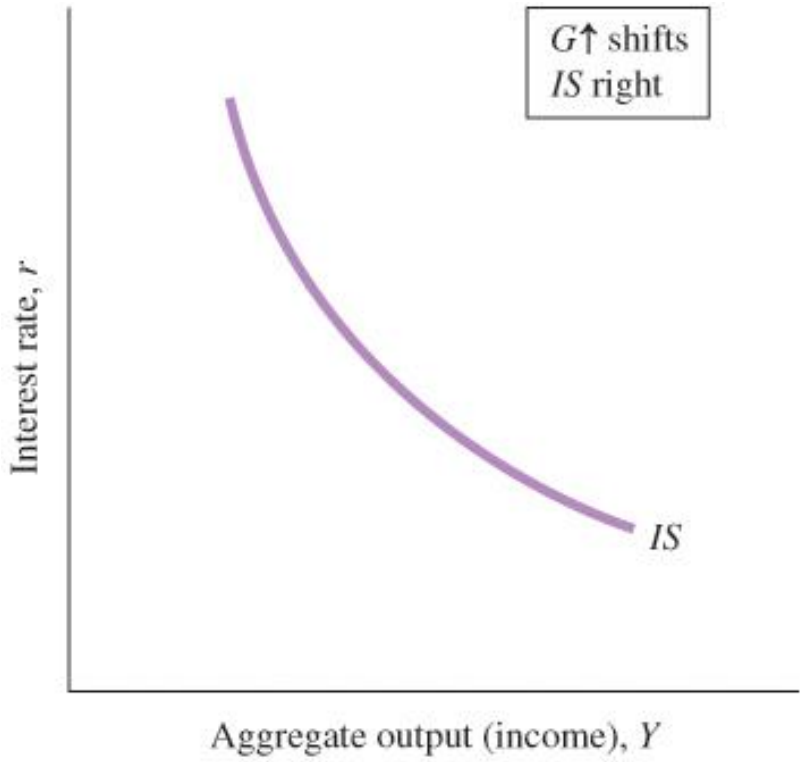
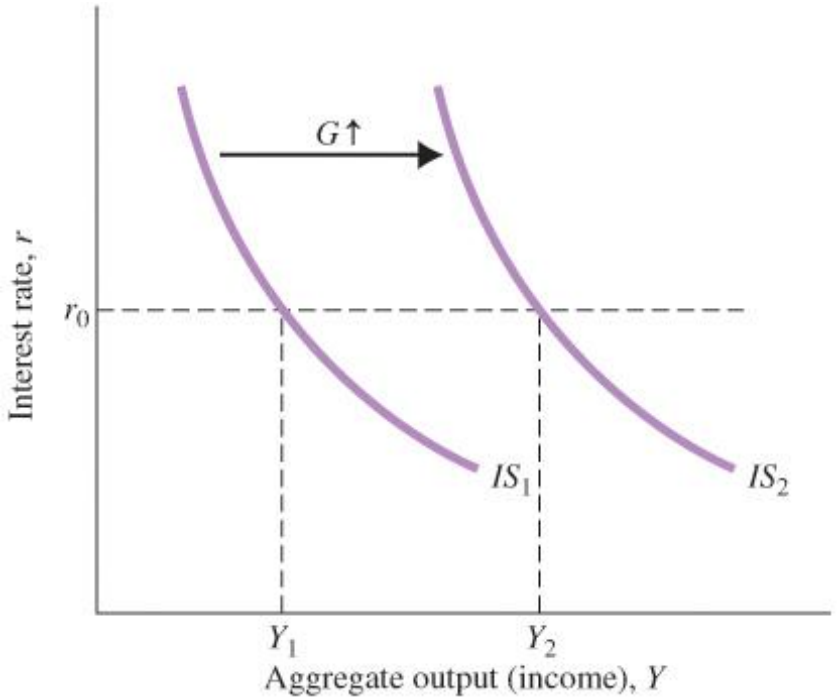


Figure 11.5 Shift of the *IS* Curve

- An increase in government spending (*G*) with the interest rate fixed increases output (*Y*), which is a shift of the *IS* curve to the right.



The Behavior of the Fed

- Output (*Y*) and inflation (*P*) are two main inputs into the Fed's interest rate decision.

- **Fed rule** Equation that shows how the Fed's interest rate decision depends on the state of the economy.

$$r = \alpha Y + \beta P + \gamma Z$$

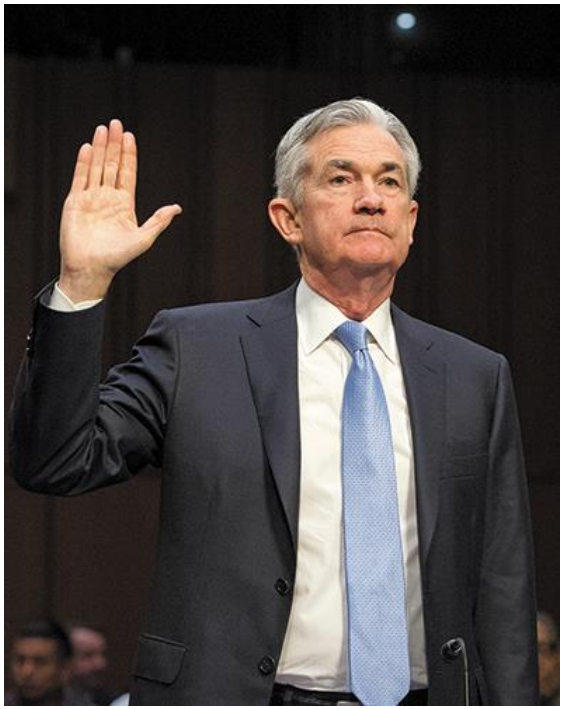
where *Z* includes economic factors (other than *Y* and *P*) that lie outside our model and are likely to vary from period to period in ways that are hard to predict.

Economics In Practice (1 of 3)

The Fed Gets a New Chair, Jerome Powell

In February 2018 President Trump appointed Jerome Powell the sixteenth chair of the Federal Reserve Bank, replacing Janet Yellen.

In his first testimony to Congress, Powell reiterated the goals of monetary policy: “The Congress has assigned us the goals of promoting maximum employment and stable prices.”

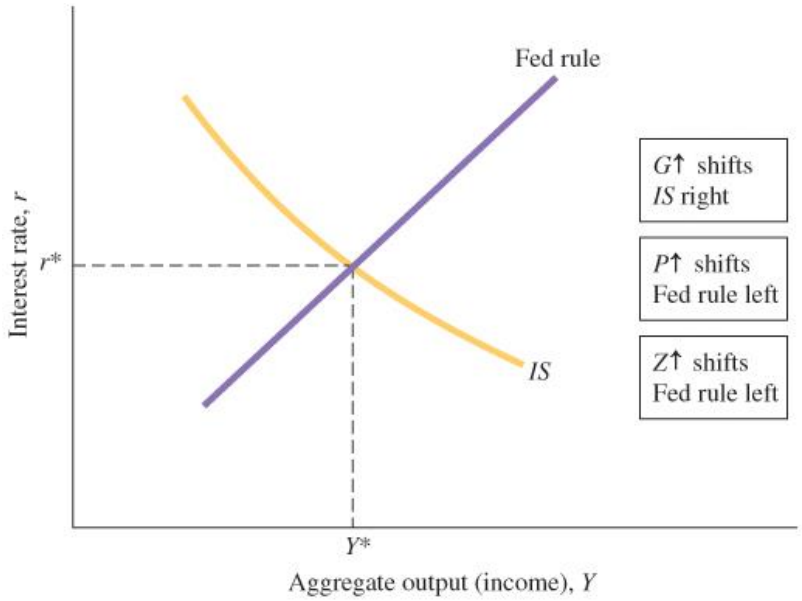


CRITICAL THINKING

1. The Fed Chair is sometimes said to be the second most powerful person in the United States after the president. Why might this be so?

Figure 11.6 Equilibrium Values of the Interest Rate and Output

- In the Fed rule, the Fed raises the interest rate as output increases, other things being equal.
- Along the *IS* curve, output falls as the interest rate increases because planned investment depends negatively on the interest rate.
- The intersection of the two curves gives the equilibrium values of output and the interest rate for given values of government spending (*G*), the price level (*P*), and the factors in *Z*.

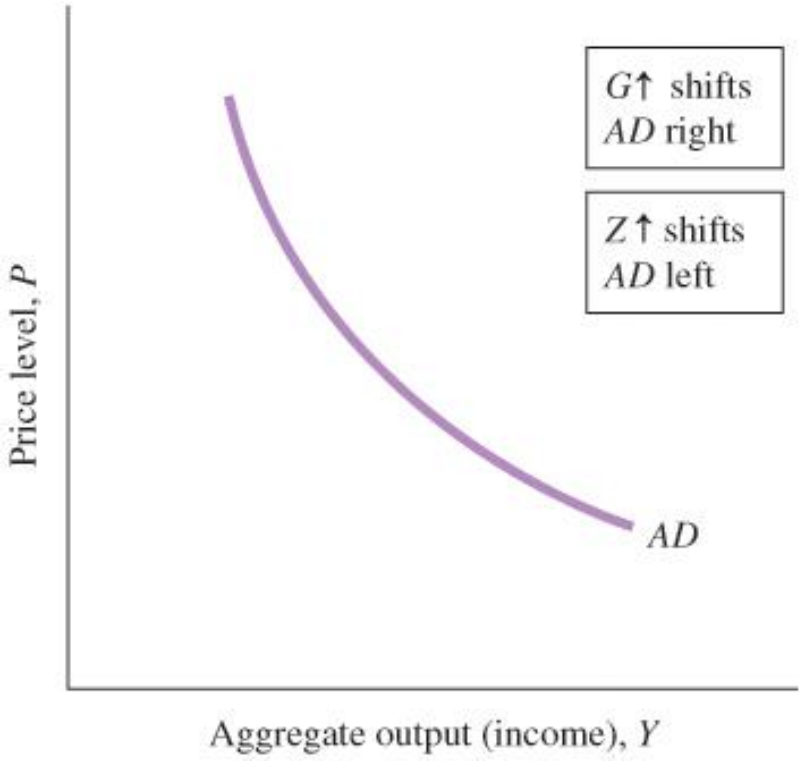


Deriving the *AD* Curve

- The *AD* curve is *not* a market demand curve, and it is not the sum of all market demand curves in the economy.
- Because many prices rise together when the overall price level rises, we cannot use the *ceteris paribus* assumption to draw the *AD* curve.
- *AD* falls when *P* increases because the higher *P* leads the Fed to raise *r*, which decreases *I* and thus *Y*.
- *The higher interest rate causes aggregate output to fall.*

Figure 11.7 The Aggregate Demand (*AD*) Curve

- The *AD* curve is derived from Figure 26.6.
- Each point on the *AD* curve is an equilibrium point in Figure 26.6 for a given value of *P*.
- When *P* increases, the Fed raises the interest rate (the Fed rule in Figure 26.6 shifts to the left), which has a negative effect on planned investment and thus on *Y*.
- The *AD* curve reflects this negative relationship between *P* and *Y*.



Economics In Practice (2 of 3)

How Does the Fed Look at Inflation?

In monetary policy decisions, the Fed pays most attention to a price index called the Core Personal Consumption Expenditures (PCE), which eliminates most food and energy goods due to their volatility.

Some economists have criticized the Fed's use of the Core PCE price index because it includes import prices that the Fed cannot influence.

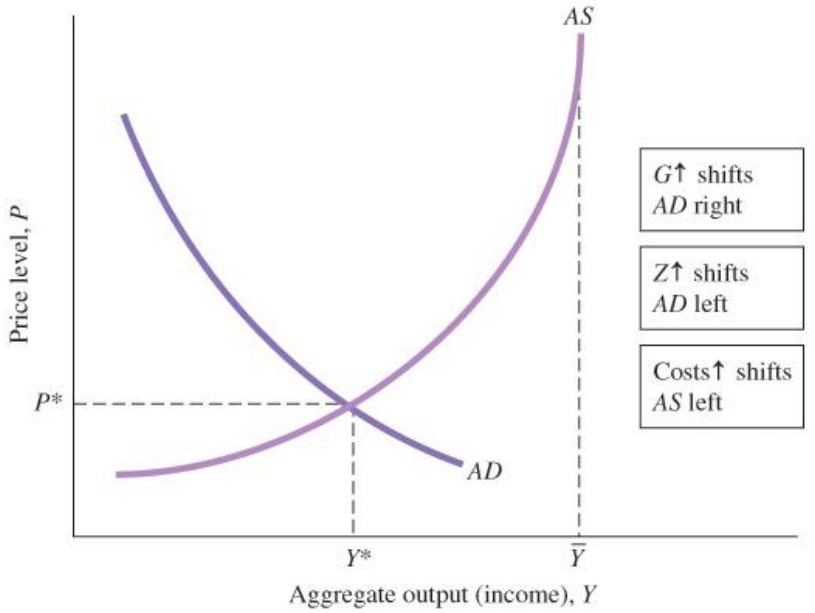
CRITICAL THINKING

1. How do you think Fed policy might change if it included energy and food prices in its measure of the price level?

The Final Equilibrium

Figure 11.8 Equilibrium Output and the Price Level

- Aggregate output and the aggregate price level are determined by the intersection of the *AS* and *AD* curves.
- These two curves embed within them decisions of households, firms, and the government.



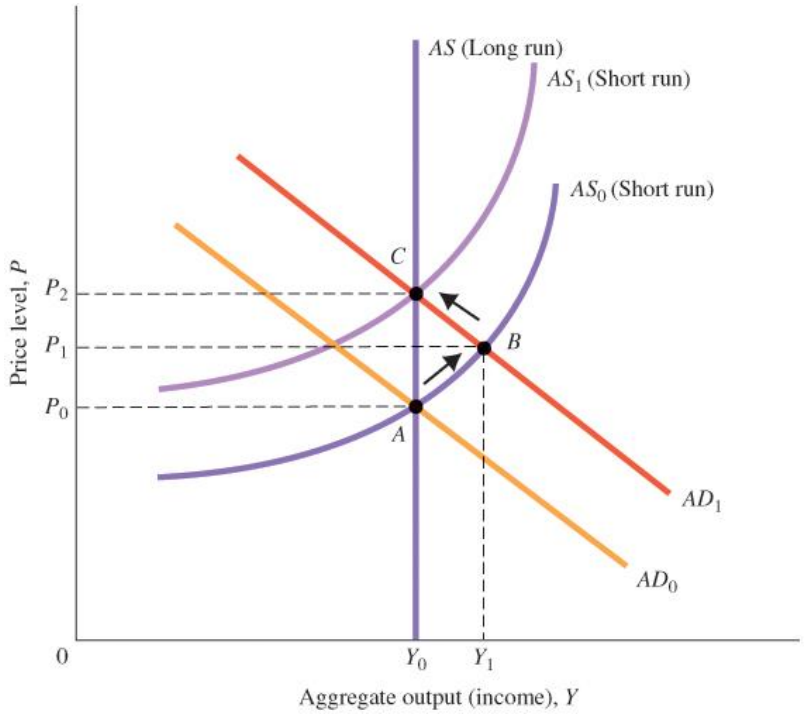
Other Reasons for a Downward-Sloping *AD* Curve

- The *AD* curve slopes down because the Fed raises the interest rate (*r*) when *P* increases and because *I* depends negatively on *r*.
- A real wealth effect on consumption also contributes to a downward-sloping *AD* curve.
- **real wealth effect** The change in consumption brought about by a change in real wealth that results from a change in the price level.

The Long-Run *AS* Curve

Figure 11.9 The Long-Run Aggregate Supply Curve

- When the *AD* curve shifts from AD_0 to AD_1, the equilibrium price level initially rises from P_0 to P_1 and output rises from Y_0 to Y_1.
- Wages respond in the longer run, shifting the *AS* curve from AS_0 to AS_1.
- If wages fully adjust, output will be back to Y_0.
- Y_0 is sometimes called *potential GDP.*



Potential GDP (1 of 2)

- The vertical portion of the short-run *AS* curve exists because there are physical limits to the amount that an economy can produce in any given time period.
- **potential output, *or* potential GDP** The level of aggregate output that can be sustained in the long run without inflation.

Potential GDP (2 of 2)

Short-Run Equilibrium below Potential Output

- Economists have different opinions on how to determine whether an economy is operating at or above potential output.
- Those who believe the *AS* curve is vertical in the long run believe that output will tend to rise when wages fall with high unemployment.

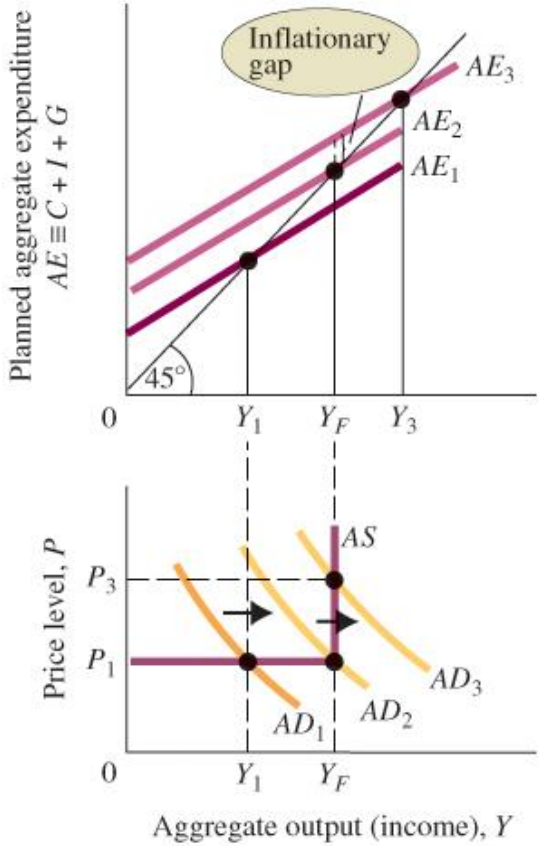
Economics In Practice (3 of 3)

The Simple "Keynesian" Aggregate Supply Curve

With planned aggregate expenditure of AE_1 and aggregate demand of AD_1, equilibrium output is Y_1.

A shift of planned aggregate expenditure to AE_2, corresponding to a shift of the AD curve to AD_2, causes output to rise but the price level to remain at P_1.

If AE and AD exceed Y_F, however, there is an inflationary gap and the price level rises to P_3.



CRITICAL THINKING

1. Why is the distance between AE_3 and AE_2 called an *inflationary gap*?

Review Terms and Concepts

- aggregate supply
- aggregate supply (*AS*) curve
- cost shock, or supply shock
- Fed rule
- *IS* curve
- potential output, or potential GDP
- real wealth effect

Equations:

$$AE \equiv C + I + G$$

$$r = \alpha Y + \beta P + \gamma Z$$

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