chapter: 12

Aggregate Demand and Aggregate Supply

Krugman/Wells
WHAT YOU WILL LEARN IN THIS CHAPTER

- How the **aggregate demand curve** illustrates the relationship between the aggregate price level and the quantity of aggregate output demanded in the economy
- How the **aggregate supply curve** illustrates the relationship between the aggregate price level and the quantity of aggregate output supplied in the economy
- Why the aggregate supply curve in the short run is different from the aggregate supply curve in the long run
WHAT YOU WILL LEARN IN THIS CHAPTER

- How the AS–AD model is used to analyze economic fluctuations
- How monetary policy and fiscal policy can stabilize the economy
Aggregate Demand

- The **aggregate demand curve** shows the relationship between the aggregate price level and the quantity of aggregate output demanded by households, businesses, the government and the rest of the world.
A movement down the AD curve leads to a lower aggregate price level and higher aggregate output.

The Aggregate Demand Curve
It is downward-sloping for two reasons:

- The first is the **wealth effect of a change in the aggregate price level**—a higher aggregate price level reduces the purchasing power of households’ wealth and reduces consumer spending.

- The second is the **interest rate effect of a change in aggregate the price level**—a higher aggregate price level reduces the purchasing power of households’ money holdings, leading to a rise in interest rates and a fall in investment spending and consumer spending.
The Aggregate Demand Curve and the Income-Expenditure Model

- Planned aggregate spending

AE_{Planned}

AE_{Planned_2}

AE_{Planned_1}

45-degree line

E_1

E_2

Y_1

Y_2

Real GDP
The Aggregate Demand Curve and the Income-Expenditure Model

(a) Change in Income–Expenditure Equilibrium

(b) Aggregate Demand
Shifts of the Aggregate Demand Curve

- The aggregate demand curve shifts because of:
  - changes in expectations
  - wealth
  - the stock of physical capital
  - government policies
    - fiscal policy
    - monetary policy
Shifts of the Aggregate Demand Curve

(a) Rightward Shift

Increase in aggregate demand

(b) Leftward Shift

Decrease in aggregate demand
Factors that Shifts the Aggregate Demand Curve

Changes in expectations
If consumers and firms become more optimistic, aggregate demand increases.
If consumers and firms become more pessimistic, aggregate demand decreases.

Changes in wealth
If the real value of household assets rises, aggregate demand increases.
If the real value of household assets falls, aggregate demand decreases.

Size of the existing stock of physical capital
If the existing stock of physical capital is relatively small, aggregate demand increases.
If the existing stock of physical capital is relatively large, aggregate demand decreases.

Fiscal policy
If the government increases spending or cuts taxes, aggregate demand increases.
If the government reduces spending or raises taxes, aggregate demand decreases.

Monetary policy
If the central bank increases the quantity of money, aggregate demand increases.
If the central bank reduces the quantity of money, aggregate demand decreases.
A movement along versus a shift of the aggregate demand curve

- In the last section we explained that one reason the $AD$ curve is downward sloping is due to the wealth effect of a change in the aggregate price level: a higher aggregate price level reduces the purchasing power of households’ assets and leads to a fall in consumer spending, $C$.
- But in this section we’ve just explained that changes in wealth lead to a shift of the $AD$ curve.
- Aren’t those two explanations contradictory? Which one is it?
A movement along versus a shift of the aggregate demand curve

- The answer is both: it depends on the source of the change in wealth.
- A movement along the $AD$ curve occurs when a change in the aggregate price level changes the purchasing power of consumers’ existing wealth (the real value of their assets).
- This is the *wealth effect of a change in the aggregate price level*—a change in the aggregate price level is the source of the change in wealth.
Moving Along the Aggregate Demand Curve

- Faced with a sharp increase in the aggregate price level—the rate of consumer price inflation reached 14.8% in March of 1980—the Federal Reserve stuck to a policy of increasing the quantity of money slowly.

- The aggregate price level was rising steeply, but the quantity of money circulating in the economy was growing slowly.

- The net result was that the purchasing power of the quantity of money in circulation fell.

- This led to an increase in the demand for borrowing and a surge in interest rates.
Moving Along the Aggregate Demand Curve

- The *prime rate* climbed above 20%. High interest rates, in turn, caused both consumer spending and investment spending to fall: in 1980 purchases of durable consumer goods like cars fell by 5.3% and real investment spending fell by 8.9%.

- In other words, in 1979–1980 the economy responded just as we’d expect if it were moving upward along the aggregate demand curve from right to left.

- Due to the wealth effect and the interest rate effect of a change in the aggregate price level, the quantity of aggregate output demanded fell as the aggregate price level rose.
The **aggregate supply curve** shows the relationship between the aggregate price level and the quantity of aggregate output in the economy.
The Short-Run Aggregate Supply Curve

- The **short-run aggregate supply curve** is upward-sloping because nominal wages are sticky in the short run:
  - a higher aggregate price level leads to higher profits and increased aggregate output in the short run.

- The **nominal wage** is the dollar amount of the wage paid.

- **Sticky wages** are nominal wages that are slow to fall even in the face of high unemployment and slow to rise even in the face of labor shortages.
The Short-Run Aggregate Supply Curve

A movement down the SRAS curve leads to deflation and lower aggregate output.
What’s Truly Flexible, What’s Truly Sticky

- Empirical data on wages and prices don’t wholly support a sharp distinction between flexible prices of final goods and services and sticky nominal wages.
- On one side, some nominal wages are in fact flexible even in the short run because some workers are not covered by a contract or informal agreement with their employers.
- Since some nominal wages are sticky but others are flexible, we observe that the average nominal wage—the nominal wage averaged over all workers in the economy—falls when there is a steep rise in unemployment.
What’s Truly Flexible, What’s Truly Sticky

- On the other side, some prices of final goods and services are sticky rather than flexible. For example, some firms, particularly the makers of luxury or name-brand goods, are reluctant to cut prices even when demand falls. Instead they prefer to cut output even if their profit per unit hasn’t declined.

- These complications don’t change the basic picture, though.

- In the end, the short-run aggregate supply curve is still upward sloping.
Shifts of the Short-Run Aggregate Supply Curve

(a) Leftward Shift

- Decrease in short-run aggregate supply
- Real GDP

(b) Rightward Shift

- Increase in short-run aggregate supply
- Real GDP
Shifts of the Short-Run Aggregate Supply Curve

- Changes in
  - commodity prices
  - nominal wages
  - productivity
- lead to changes in producers’ profits and shift the short-run aggregate supply curve.
Factors that Shift Short-Run Aggregate Supply

Changes in commodity prices
If commodity prices fall, . . . . . . short-run aggregate supply increases.
If commodity prices rise, . . . . . . short-run aggregate supply decreases.

Changes in nominal wages
If nominal wages fall, . . . . . . short-run aggregate supply increases.
If nominal wages rise, . . . . . . short-run aggregate supply decreases.

Changes in productivity
If workers become more productive, . . . short-run aggregate supply increases.
If workers become less productive, . . . short-run aggregate supply decreases.
The **long-run aggregate supply curve** shows the relationship between the aggregate price level and the quantity of aggregate output supplied that would exist if all prices, including nominal wages, were fully flexible.
A fall in the aggregate price level…

Long-run aggregate supply curve, LRAS

...leaves the quantity of aggregate output supplied unchanged in the long run.
Actual and Potential Output from 1989 to 2007

Potential output exceeds actual aggregate output.

Actual aggregate output roughly equals potential output.

Actual aggregate output exceeds potential output.
(a) Leftward Shift of the Short-Run Aggregate Supply Curve

A rise in nominal wages shifts SRAS leftward.

(b) Rightward Shift of the Short-Run Aggregate Supply Curve

A fall in nominal wages shifts SRAS rightward.
PITFALLS

Are we there yet? what the long run really means

- We’ve used the term long run in two different contexts. In an earlier chapter we focused on long-run economic growth: growth that takes place over decades. In this chapter we introduced the long-run aggregate supply curve, which depicts the economy’s potential output: the level of aggregate output that the economy would produce if all prices, including nominal wages, were fully flexible. It might seem that we’re using the same term, long run, for two different concepts. But we aren’t: these two concepts are really the same thing.

- Because the economy always tends to return to potential output in the long run, actual aggregate output fluctuates around potential output, rarely getting too far from it. As a result, the economy’s rate of growth over long periods of time—say, decades—is very close to the rate of growth of potential output. And potential output growth is determined by the factors we analyzed in the chapter on long-run economic growth. So that means that the “long run” of long-run growth and the “long run” of the long-run aggregate supply curve coincide.
Prices and Output During the Great Depression

Aggregate price level (GDP deflator, 2000 = 100)

Real GDP (billions of 2000 dollars)
The **AS–AD Model**

- The **AS-AD model** uses the aggregate supply curve and the aggregate demand curve together to analyze economic fluctuations.
Short-Run Macroeconomic Equilibrium

- The economy is in **short-run macroeconomic equilibrium** when the quantity of aggregate output supplied is equal to the quantity demanded.

- The **short-run equilibrium aggregate price level** is the aggregate price level in the short-run macroeconomic equilibrium.

- **Short-run equilibrium aggregate output** is the quantity of aggregate output produced in the short-run macroeconomic equilibrium.
The AS–AD Model

The AS–AD Model represents the short-run macroeconomic equilibrium. It shows the relationship between the aggregate price level and real GDP. The SRAS (Short-Run Aggregate Supply) and AD (Aggregate Demand) curves intersect at the equilibrium point E_{SR}, which corresponds to the equilibrium real GDP Y_E and the equilibrium aggregate price level P_E.
Shifts of Aggregate Demand: Short-Run Effects

(a) A Negative Demand Shock

A negative demand shock...

...leads to a lower aggregate price level and lower aggregate output.

(b) A Positive Demand Shock

A positive demand shock...

...leads to a higher aggregate price level and higher aggregate output.

Shifts of Aggregate Demand: Short-Run Effects

Aggregate price level

Real GDP

Real GDP

A negative demand shock...

...leads to a lower aggregate price level and lower aggregate output.

A positive demand shock...

...leads to a higher aggregate price level and higher aggregate output.
(a) A Negative Supply Shock

A negative supply shock...
...leads to a lower aggregate output and a higher aggregate price level.

(a) A Positive Supply Shock

A positive supply shock...
...leads to a higher aggregate output and lower aggregate price level.
The Supply Shock of 2007-2008

Inflation rate

- United States
- Germany
- United Kingdom
- Japan
- France

Month and year
Long-Run Macroeconomic Equilibrium

- The economy is in **long-run macroeconomic equilibrium** when the point of short-run macroeconomic equilibrium is on the long-run aggregate supply curve.
Long-Run Macroeconomic Equilibrium

Aggregate price level

Real GDP

LRAS

SRAS

AD

PE

ELR

YP

Long-run macroeconomic equilibrium

Potential output

Potential output
1. An initial negative demand shock...

2. ...reduces the aggregate price level and aggregate output and leads to higher unemployment in the short run...

3. ...until an eventual fall in nominal wages in the long run increases short-run aggregate supply and moves the economy back to potential output.
1. An initial positive demand shock...

2. ...increases the aggregate price level and aggregate output and reduces unemployment in the short run...

3. ...until an eventual rise in nominal wages in the long run reduces short-run aggregate supply and moves the economy back to potential output.

Short-Run Versus Long-Run Effects of a Positive Demand Shock
Gap Recap

- There is a **recessionary gap** when aggregate output is below potential output.
- There is an **inflationary gap** when aggregate output is above potential output.
- The **output gap** is the percentage difference between actual aggregate output and potential output.

\[
\text{Output gap} = \frac{\text{Actual aggregate output} - \text{Potential output}}{\text{Potential output}} \times 100
\]
Gap Recap

- The economy is **self-correcting** when shocks to aggregate demand affect aggregate output in the short run, but not the long run.
Where’s the Deflation?

- The $AD-AS$ model says that either a negative demand shock or a positive supply shock should lead to a fall in the aggregate price level—that is, deflation. In fact, however, the United States hasn’t experienced an actual fall in the aggregate price level since 1949.

- What happened to the deflation? The basic answer is that since World War II economic fluctuations have taken place around a long-run inflationary trend. Before the war, it was common for prices to fall during recessions, but since then negative demand shocks have been reflected in a decline in the rate of inflation rather than an actual fall in prices.

- A very severe negative demand shock could still bring deflation, which is what happened in Japan.
Negative supply shocks pose a policy dilemma: a policy that stabilizes aggregate output by increasing aggregate demand will lead to inflation, but a policy that stabilizes prices by reducing aggregate demand will deepen the output slump.
Negative Supply Shocks

![Graph showing unemployment rate from 1948 to 2008 with annotations for 1973 Arab–Israeli war and 1979 Iranian revolution.]
Supply Shocks versus Demand Shocks in Practice

- Recessions are mainly caused by demand shocks. But when a negative supply shock does happen, the resulting recession tends to be particularly severe.

- There’s a reason the aftermath of a supply shock tends to be particularly severe for the economy: macroeconomic policy has a much harder time dealing with supply shocks than with demand shocks.

- The reason the Federal Reserve was having a hard time in 2008, as described in the opening story, was the fact that in early 2008 the U.S. economy was in a recession partially caused by a supply shock (although it was also facing a demand shock).
Macroeconomic Policy

- Economy is self-correcting in the long run.
- Most economists think it takes a decade or longer!!!
- John Maynard Keynes: “In the long run we are all dead.”
- **Stabilization policy** is the use of government policy to reduce the severity of recessions and rein in excessively strong expansions.
Keynes and the Long Run

- The British economist Sir John Maynard Keynes (1883–1946), probably more than any other single economist, created the modern field of macroeconomics.

- In 1923 Keynes published *A Tract on Monetary Reform*, a small book on the economic problems of Europe after World War I.

- In it he decried the tendency of many of his colleagues to focus on how things work out in the long run:

  “This *long run* is a misleading guide to current affairs. *In the long run* we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the sea is flat again.”
Macroeconomic Policy

- The high cost — in terms of unemployment — of a recessionary gap and the future adverse consequences of an inflationary gap → **Active stabilization policy**, using fiscal or monetary policy to offset shocks.
Policy in the face of supply shocks:

- There are no easy policies to shift the short-run aggregate supply curve.
- **Policy dilemma**: a policy that counteracts the fall in aggregate output by increasing aggregate demand will lead to higher inflation, but a policy that counteracts inflation by reducing aggregate demand will deepen the output slump.
Is Stabilization Policy Stabilizing?

- Has the economy actually become more stable since the government began trying to stabilize it?
  - **Yes.** Data from the pre–World War II era are less reliable than more modern data, but there still seems to be a clear reduction in the size of economic fluctuations.
- It’s possible that the greater stability of the economy reflects good luck rather than policy.
- But on the face of it, the evidence suggests that stabilization policy is indeed stabilizing.
1. The **aggregate demand curve** shows the relationship between the aggregate price level and the quantity of aggregate output demanded.

2. The aggregate demand curve is downward sloping for two reasons. The first is the **wealth effect of a change in the aggregate price level**—a higher aggregate price level reduces the purchasing power of households’ wealth and reduces consumer spending. The second is the **interest rate effect of a change in the aggregate price level**—a higher aggregate price level reduces the purchasing power of households’ and firms’ money holdings, leading to a rise in interest rates and a fall in investment spending and consumer spending.
3. The aggregate demand curve shifts because of changes in expectations, changes in wealth not due to changes in the aggregate price level, and the effect of the size of the existing stock of physical capital. Policy makers can use fiscal policy and monetary policy to shift the aggregate demand curve.

4. The **aggregate supply curve** shows the relationship between the aggregate price level and the quantity of aggregate output supplied.
5. The **short-run aggregate supply curve** is upward sloping because **nominal wages** are **sticky** in the short run: a higher aggregate price level leads to higher profit per unit of output and increased aggregate output in the short run.

6. Changes in commodity prices, nominal wages, and productivity lead to changes in producers’ profits and shift the short-run aggregate supply curve.

7. In the long run, all prices are flexible and the economy produces at its **potential output**. If actual aggregate output exceeds potential output, nominal wages will eventually rise in response to low unemployment and aggregate output will fall. If potential output exceeds actual aggregate output, nominal wages will eventually fall in response to high unemployment and aggregate output will rise. So the **long-run aggregate supply curve** is vertical at potential output.
8. In the *AD–AS model*, the intersection of the short-run aggregate supply curve and the aggregate demand curve is the point of **short-run macroeconomic equilibrium**. It determines the **short-run equilibrium aggregate price level** and the level of **short-run equilibrium aggregate output**.

9. Economic fluctuations occur because of a shift of the aggregate demand curve (a *demand shock*) or the short-run aggregate supply curve (a *supply shock*). A *demand shock* causes the aggregate price level and aggregate output to move in the same direction as the economy moves along the short-run aggregate supply curve. A *supply shock* causes them to move in opposite directions as the economy moves along the aggregate demand curve. A particularly nasty occurrence is **stagflation**—inflation and falling aggregate output—which is caused by a negative supply shock.
10. Demand shocks have only short-run effects on aggregate output because the economy is **self-correcting** in the long run. In a **recessionary gap**, an eventual fall in nominal wages moves the economy to **long-run macroeconomic equilibrium**, where aggregate output is equal to potential output. In an **inflationary gap**, an eventual rise in nominal wages moves the economy to long-run macroeconomic equilibrium. We can use the **output gap**, the percentage difference between actual aggregate output and potential output, to summarize how the economy responds to recessionary and inflationary gaps. Because the economy tends to be self-correcting in the long run, the output gap always tends toward zero.
11. The high cost—in terms of unemployment—of a recessionary gap and the future adverse consequences of an inflationary gap lead many economists to advocate active **stabilization policy**: using fiscal or monetary policy to offset demand shocks. There can be drawbacks, however, because such policies may contribute to a long-term rise in the budget deficit and crowding out of private investment, leading to lower long-run growth. Also, poorly timed policies can increase economic instability.

12. Negative supply shocks pose a policy dilemma: a policy that counteracts the fall in aggregate output by increasing aggregate demand will lead to higher inflation, but a policy that counteracts inflation by reducing aggregate demand will deepen the output slump.
The End of Chapter 12

coming attraction:

Chapter 13: Fiscal Policy