Chapter 13. Aggregate Demand and Aggregate Supply Analysis

Instructor: JINKOOK LEE

Department of Economics / Texas A&M University

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Principles of Macroeconomics
Aggregate Demand and Aggregate Supply

**Aggregate demand and aggregate supply model:** A model that explains short-run fluctuations in real GDP and the price level.

In the short run, real GDP and the price level are determined by the intersection of the aggregate demand curve and the short-run aggregate supply curve.

- The equilibrium real GDP is $14.0 trillion, and the equilibrium price level is 100.
Aggregate Demand and Aggregate Supply

**Aggregate demand (AD) curve**: A curve that shows the relationship between the price level and the quantity of real GDP demanded by households, firms, and the government.

**Short-run aggregate supply (SRAS) curve**: A curve that shows the relationship in the short run between the price level and the quantity of real GDP supplied by firms.

Because we are dealing with the economy as a whole, we need macroeconomic explanations of...

- why the aggregate demand curve is downward sloping,
- why the short-run aggregate supply curve is upward sloping,
- and why the curves shift.
Why Is the Aggregate Demand Curve Downward Sloping?

If we let $Y$ stand for GDP, we have the following relationship:

$$ Y = C + I + G + NX $$

The aggregate demand curve is downward sloping because a fall in the price level increases the quantity of real GDP demanded.

To see why, we next look at how changes in the price level affect each component of aggregate demand, assuming government purchases are not affected, assuming government purchases are not affected.
The Wealth Effect: How a change in the price level affects consumption.

- Some of a household’s wealth, the difference between the value of its assets and the value of its debts, is held in cash or other nominal assets.
- The wealth loses value as the price level rises and gain value as the price level falls.

When the price level falls, the real value of household wealth rises, and so will consumption and the demand for goods and services.
The Interest-Rate Effect: How a change in the price level affects investment.

- A higher price level increases the interest rate and reduces investment spending, thereby reducing the quantity of goods and services demanded.
- A lower price level will decrease the interest rate and increase investment spending, thereby increasing the quantity of goods and services demanded,
The International-Trade Effect: How a Change in the Price Level Affects Net Exports.

- A higher price level in the United States relative to other countries causes net exports to fall, reducing the quantity of goods and services demanded.
- A lower price level in the United States relative to other countries causes net exports to rise, increasing the quantity of goods and services demanded through the international-trade effect.
The aggregate demand curve tells us the relationship between the price level and the quantity of real GDP demanded, holding everything else constant.

If the price level changes but other variables that affect the willingness of households, firms, and the government to spend are unchanged, the economy will move up or down a stationary aggregate demand curve.

If any variable other than the price level changes, the aggregate demand curve will shift.
The Variables That Shift the Aggregate Demand Curve

Changes in Government Policies

**Monetary policy**: The actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy objectives.

- Lower interest rates shift the aggregate demand curve to the right as consumption and investment spending increase.
- Higher interest rates shift the aggregate demand curve to the left as consumption and investment spending decrease.

**Fiscal policy**: Changes in federal taxes and purchases that are intended to achieve macroeconomic policy objectives.

- An increase in government purchases or a decrease in taxes shifts the aggregate demand curve to the right.
- A decrease in government purchases or an increase in taxes shifts the aggregate demand curve to the left.
The Variables That Shift the Aggregate Demand Curve

2 Changes in the Expectations of Households and Firms

- If households become more optimistic about their future incomes and firms become more optimistic about the future profitability of investment spending, the aggregate demand curve will shift to the right.

3 Changes in Foreign Variables

- If firms and households in other countries buy fewer U.S. goods or if firms and households in the United States buy more foreign goods, net exports will fall, and the aggregate demand curve will shift to the left.
- If real GDP in the United States increases faster than real GDP in other countries, net exports will fall.
- Net exports will increase if the value of the dollar falls against other currencies.
- An increase in net exports at every price level will shift the aggregate demand curve to the right.
### The Variables That Shift the Aggregate Demand Curve

<table>
<thead>
<tr>
<th>An increase in...</th>
<th>shifts the aggregate demand curve...</th>
<th>because...</th>
</tr>
</thead>
<tbody>
<tr>
<td>interest rates</td>
<td></td>
<td>higher interest rates raise the cost to firms and households of borrowing, reducing consumption and investment spending.</td>
</tr>
<tr>
<td>government purchases</td>
<td></td>
<td>government purchases are a component of aggregate demand.</td>
</tr>
<tr>
<td>personal income taxes or business taxes</td>
<td></td>
<td>consumption spending falls when personal taxes rise, and investment falls when business taxes rise.</td>
</tr>
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The Variables That Shift the Aggregate Demand Curve

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</thead>
<tbody>
<tr>
<td>households’ expectations of their future incomes</td>
<td>$AD_1$ to $AD_2$</td>
<td>consumption spending increases.</td>
</tr>
<tr>
<td>firms’ expectations of the future profitability of investment spending</td>
<td>$AD_1$ to $AD_2$</td>
<td>investment spending increases.</td>
</tr>
<tr>
<td>the growth rate of domestic GDP relative to the growth rate of foreign GDP</td>
<td>$AD_2$ to $AD_1$</td>
<td>imports will increase faster than exports, reducing net exports.</td>
</tr>
</tbody>
</table>
# The Variables That Shift the Aggregate Demand Curve

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<th>An increase in...</th>
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<tr>
<td>the exchange rate</td>
<td></td>
<td>imports will rise and exports will fall, reducing net exports.</td>
</tr>
<tr>
<td>(the value of the dollar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>relative to foreign currencies</td>
<td></td>
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</tbody>
</table>

![Graph showing the effect of an increase in the exchange rate on the aggregate demand curve](image)
The Long-Run Aggregate Supply Curve

**Long-run aggregate supply (LRAS) curve**: A curve that shows the relationship in the long run between the price level and the quantity of real GDP supplied.

- In the long run, the level of real GDP is determined by the number of workers, the capital stock, and the available technology, none of which are affected by changes in the price level.
- So, in the long run, changes in the price level do not affect the level of real GDP.
- Remember that the level of real GDP in the long run is called potential GDP, or full-employment GDP.
The long-run aggregate supply (LRAS) curve is a vertical line at the potential level of real GDP.

- As the number of workers in the economy increases, more machinery and equipment are accumulated, and technological change occurs, the long-run aggregate supply curve shifts to the right.
The Short-Run Aggregate Supply Curve

As prices of final goods and services rise, prices of inputs - such as the wages of workers or the price of natural resources - rise more slowly.

The reason for this is that some firms and workers fail to accurately predict changes in the price level.
The Short-Run Aggregate Supply Curve

There are three common explanations for an upward-sloping SRAS curve when workers and firms fail to accurately predict the price level:

1. **Contracts Make Some Wages and Prices “Sticky”**
   - Prices or wages are said to be “sticky” when they do not respond quickly to changes in demand or supply.

2. **Firms Are Often Slow to Adjust Wages**
   - If firms are slow to adjust wages, a rise in the price level will increase the profitability of hiring more workers and producing more output.
   - Firms are often slower to cut wages than to increase them.
The Short-Run Aggregate Supply Curve

- **Menu Costs Make Some Prices Sticky**
  - Firms base their prices today partly on what they expect future prices to be, and changing those prices to account for an unexpected increase in the price level can be costly.

  **Menu costs**: The costs to firms of changing prices.
The short-run aggregate supply curve tells us the short-run relationship between the price level and the quantity of goods and services firms are willing to supply, holding constant all other variables.

If the price level changes but other variables are unchanged, the economy will move up or down a stationary aggregate supply curve;
if any variable other than the price level changes, the aggregate supply curve will shift.
Variables That Shift the Short-Run Aggregate Supply Curve

1. Increases in the Labor Force and in the Capital Stock
   - As the labor force and the capital stock grow, firms will supply more output at every price level, and the short-run aggregate supply curve will shift to the right.

2. Technological Change
   - As positive technological change takes place, the productivity of workers and machinery increases, which reduces firms’ costs of production.
   - It allows them to produce more output at every price level, shifting the short-run aggregate supply curve to the right.
Expected Changes in the Future Price Level

- If workers and firms expect the price level to increase by a certain percentage, the SRAS curve will shift by an equivalent amount, holding constant all other variables.
Variables That Shift the Short-Run Aggregate Supply Curve

1. Adjustments of Workers and Firms to Errors in Past Expectations about the Price Level
   - If workers and firms across the economy are adjusting to the price level being higher than expected, the SRAS curve will shift to the left.

2. Unexpected Changes in the Price of an Important Natural Resource
   - Supply shock An unexpected event that causes the short-run aggregate supply curve to shift.
Variables That Shift the Short-Run Aggregate Supply Curve

An increase in...

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<th>Shifts the Short-Run Aggregate Supply Curve...</th>
<th>Because...</th>
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<tr>
<td>the labor force or the capital stock</td>
<td><img src="image1.png" alt="Graph" /></td>
<td>more output can be produced at every price level.</td>
</tr>
<tr>
<td>productivity</td>
<td><img src="image2.png" alt="Graph" /></td>
<td>costs of producing output fall.</td>
</tr>
<tr>
<td>the expected future price level</td>
<td><img src="image3.png" alt="Graph" /></td>
<td>workers and firms increase wages and prices.</td>
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### Variables That Shift the Short-Run Aggregate Supply Curve

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<td>workers and firms adjusting to having previously underestimated the price level</td>
<td>$SRAS_2$ (shift)</td>
<td>workers and firms increase wages and prices.</td>
</tr>
<tr>
<td>the expected price of an important natural resource</td>
<td>$SRAS_2$ (shift)</td>
<td>costs of producing output rise.</td>
</tr>
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In long-run macroeconomic equilibrium, the AD and SRAS curves intersect at a point on the LRAS curve.

In this case, equilibrium occurs at real GDP of $14.0 trillion and a price level of 100.
Because the full analysis of the aggregate demand and aggregate supply model can be complicated, we begin with a simplified case, using two assumptions:

1. The economy has not been experiencing any inflation.
   - The price level is currently 100, and workers and firms expect it to remain at 100 in the future.

2. The economy is not experiencing any long-run growth.
   - Potential real GDP is $14.0 trillion and will remain at that level in the future.
Recession

1. A decline in investment shifts $AD$ to the left, causing a recession.

2. As firms and workers adjust to the price level being lower than they had expected, costs will fall and cause $SRAS$ to shift to the right.

3. Equilibrium moves from point $B$ back to potential GDP at point $C$, with a lower price level.
In the short run,

- A decrease in aggregate demand causes a recession.

In the long run,

- It causes only a decrease in the price level.

Economists refer to the process of adjustment back to potential GDP as an **automatic mechanism** because it occurs without any actions by the government.
1. An increase in investment shifts AD to the right, causing an inflationary expansion.

2. As firms and workers adjust to the price level being higher than they had expected, costs will rise and cause SRAS to shift to the left.

3. Equilibrium moves from point B back to potential GDP at point C, with a higher price level.
In the short run,
- an increase in aggregate demand causes an increase in real GDP.

In the long run,
- it causes only an increase in the price level.

**Stagflation**: A combination of inflation and recession, usually resulting from a supply shock.
Supply Shock

1. An increase in oil prices shifts \( SRAS \) to the left...

2. Equilibrium moves from point \( B \) to potential GDP at the original price level.

(a) A recession with a rising price level—the short-run effect of a supply shock

(b) Adjustment back to potential GDP—the long-run effect of a supply shock
In Panel (a),
- A supply shock, such as a large increase in oil prices, will cause a recession and a higher price level in the short run.
- The recession caused by the supply shock increases unemployment and reduces output.

In panel (b),
- Rising unemployment and falling output result in workers being willing to accept lower wages and firms being willing to accept lower prices.

The short-run aggregate supply curve shifts from $SRAS_2$ to $SRAS_1$. Equilibrium moves from point B back to potential GDP and the original price level at point A.