Aggregate Demand and Aggregate Supply

A review
**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 (both inside and outside of the country).
It is determined by real GDP. Real GDP ($Y$) has four components:

- Consumption ($C$)
- Investment ($I$)
- Government purchases ($G$)
- Net exports ($NX$)

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

Most of the variables ($C$, $I$, & $NX$) are determined by the price level; government purchases ($G$) is an exception and normally determined by the decisions of policymakers.
Aggregate Demand

There are several channels that prices can use to affect real GDP and aggregate demand (AD). They are:

- The Wealth Effect
- The Interest-rate Effect
- The International-trade Effect
The Wealth Effect

The way a change in the price level affects consumption ($C$)

– While income affects household consumption the most, but wealth does as well.
– Some household wealth is held in nominal assets, so as price levels rise, the real value of household wealth declines. This results in less consumption. (Example: Price of oranges goes up; you cannot buy as many oranges as before assuming your wealth has not changed.)
– Implication: higher price level leads to lower consumption.
The Interest-rate Effect

The way a change in the price level affects investment (I)

- As prices rise, households & firms need more money to finance their buying and selling.
- Households & firms can borrow & withdraw funds from banks and/or they can sell financial assets such as bonds. They do this to have more funds available.
- With this though, there is an increase in the demand for money. This causes the interest rate (the price/cost of holding money) to increase and this discourages firm investment.
- Implication: higher price level leads to lower investment.
The International-trade Effect

The way a change in the price level affects net exports (NX)

– When domestic price levels increase, domestic exports become more expensive and imports become relatively cheaper.

– Fewer exports and more imports means net exports falls.

– Implication: higher price level leads to lower net exports.
All three effects show that higher price levels lead to lower values of consumption, investment, and net exports (three of the four components of real GDP). This means that the aggregate demand curve slopes downward.
Shifts of the Aggregate Demand Curve vs. Movements along It

The aggregate demand curve shows the relationship between the price level and real GDP demanded, *holding everything else constant*.

- A movement along the $AD$ curve will occur when the price level changes and the change in prices is *not* caused by a component of real GDP changing.
- A shift of the $AD$ curve will occur when some component (C, I, G, & NX) of real GDP changes; for example, a change in government purchases.
Variables That Shift the Aggregate Demand Curve

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

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

3. **Households’ or Firms’ attitudes about the economy**: Their optimism (or pessimism) about the future increases (or decreases) consumption and/or investment.

4. **Foreign incomes**: If theirs rise more slowly than ours, their imports of our goods fall; if ours rise more slowly, our imports fall. If our *exchange rate* (the value of the $US) rises, our exports become more expensive, so foreigners buy less of them (and we buy more imports, also) and vice versa.
### Variables That Shift the Aggregate Demand Curve: Monetary Policy

| An increase in ... | shifts the aggregate demand curve ... | because ...
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![Graph showing the effect of an increase in interest rates on aggregate demand.](image1)

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![Graph showing the effect of a decrease in interest rates on aggregate demand.](image2)
Variables That Shift the Aggregate Demand Curve:
Fiscal Policy - Government Purchases

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Variables That Shift the Aggregate Demand Curve: Fiscal Policy - Personal Income Taxes

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![Diagram showing the shift in the aggregate demand curve with an increase in personal income taxes.]

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![Diagram showing the shift in the aggregate demand curve with a decrease in personal income taxes.]

**NOTE:** The government can also alter its *level of government purchases*. It could also alter *business taxes*, affecting the level of investment spending.
Variables That Shift the Aggregate Demand Curve: Fiscal Policy – Attitudes of Households and Firms

- Households expect their future incomes to rise and/or firms expect their future profitability of investment spending to rise, leading to an increase in consumption spending and the residential investment component of investment spending increase and/or overall investment spending increases.

- Households expect their future incomes to fall and/or firms expect their future profitability of investment spending to fall, leading to a decrease in consumption spending and the residential investment component of investment spending decreases and/or overall investment spending decreases.
**Variables That Shift the Aggregate Demand Curve:**

**Foreign Incomes**

<table>
<thead>
<tr>
<th>Description</th>
<th>Graph</th>
<th>Economic Outcome</th>
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</table>
| The growth rate of domestic GDP 
relative to the growth rate of foreign GDP decreases and/or the exchange rate (the value of the dollar) relative to foreign currencies decreases | ![Graph](image1) | Exports will increase faster than imports, increasing net exports. |
| The growth rate of domestic GDP 
relative to the growth rate of foreign GDP increases and/or the exchange rate (the value of the dollar) relative to foreign currencies increases | ![Graph](image2) | Imports will increase faster than exports, reducing net exports. |
Aggregate Supply

Aggregate supply refers to the quantity of goods and services that firms are willing and able to supply.

The relationship between this quantity and the price level is different in the long and short run. So we will have two curves:

- **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.
- **Short-run aggregate supply (SRAS) curve:** A curve that shows the relationship between the price level and the quantity of goods and services firms are willing to supply, holding constant all other variables that affect the willingness of firms to supply goods and services.
Aggregate Supply

Long-run Aggregate Supply Curve

Short-run Aggregate Supply Curve
In the long run, the level of real GDP is determined by the number of workers, the level of technology, and the capital stock (factories, machinery, etc.).

None of these elements are affected by the price level, so LRAS does not depend on the price level; it is a vertical line.

LRAS occurs at the level of potential or full-employment GDP, which typically advances each year.

NOTE: In theory it could decrease, but this would be highly unusual for a developed economy.
Short-run Aggregate Supply

The SRAS is upward-sloping. Why?

– 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.

– A secondary reason is that some firms are slow to adjust their prices when the price level rises or falls.

Economists tend to believe that some firms and workers fail to accurately predict changes in the price level. This gives three potential explanations for why the SRAS curve is upward-sloping:

– Contracts make some wages and prices “sticky”.

– Firms are often slow to adjust wages.

– Menu costs make some prices sticky.
Short-run Aggregate Supply: Contracts

- Contracts make some wages and prices “sticky.” Prices and wages are said to be “sticky” when they do not respond quickly to changes in demand or supply.
- Some firms and workers fail to predict price level changes, and hence do not correctly build them into long-term contracts.
Short-run Aggregate Supply: Wage Adjustment

- Firms are often slow to adjust wages
- Salary reviews typically only happen annually.
- Also, firms dislike cutting wages—it’s bad for morale.
Short-run Aggregate Supply: Menu Costs

– Firms have **menu costs**: the costs to firms of changing prices.

– A small “optimal” change in price may not be worth the hassle for a firm to perform.
The short-run aggregate supply curve describes the relationship between the price level and the quantity of goods and services firms are willing to supply, holding constant all other variables that affect the willingness of firms to supply goods and services.

- A change in the price level not caused by factors that would otherwise affect short-run aggregate supply results in a movement along a stationary SRAS curve.

- But some factors (labor force, capital stock, productivity, expected future price level, workers & firms adjusting to incorrect estimations of price level, & supply shocks) cause the SRAS curve to shift.
### Variables That Shift the SRAS Curve: Labor force or Capital Stock

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<td>the labor force or the capital stock</td>
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<td>more output can be produced at every price level.</td>
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![Graph showing SRAS curve shift due to an increase in labor force or capital stock](image1.png)

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![Graph showing SRAS curve shift due to a decrease in labor force or capital stock](image2.png)
Variables That Shift the SRAS Curve: Productivity

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![Diagram showing the effect of an increase in productivity on SRAS curve]

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![Diagram showing the effect of a decrease in productivity on SRAS curve]
Variables That Shift the SRAS Curve: Expected Future Price Level

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<td>because workers and firms increase wages and prices.</td>
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![Graph showing SRAS curve shift due to increase in expected future price level](image1)

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![Graph showing SRAS curve shift due to decrease in expected future price level](image2)
Variables That Shift the SRAS Curve:

Workers & Firms adjusting to incorrect estimation of price level

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![Graph showing SRAS curve shift](image)

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![Graph showing SRAS curve shift](image)
### Variables That Shift the SRAS Curve: Supply shocks

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![Graph showing shift in SRAS curve due to increase in price](image1)

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![Graph showing shift in SRAS curve due to decrease in price](image2)
Short-run Equilibrium

Price level (GDP deflator, 2009 = 100)

Real GDP (trillions of 2009 dollars)
Long-run Equilibrium

- Long-run Aggregate Supply (LRAS)
- Short-run Aggregate Supply (SRAS)
- Aggregate Demand (AD)

Price level (GDP deflator, 2009 = 100)

Real GDP (trillions of 2009 dollars)
Short-Run Effects of a Decrease in Aggregate Demand

1. A decline in investment shifts AD to the left, causing a recession.
Short-Run and Long-Run Effects of a Decrease in Aggregate Demand

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.
Short-Run Effects of a Increase in Aggregate Demand

1. An increase in investment shifts AD to the right, causing an inflationary expansion.
Short-Run and Long-Run Effects of a Increase in Aggregate Demand

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.
Short-Run Effects of a Negative Supply Shock
(stagflation)

2. . . . moving short-run equilibrium to point $B$, with lower real GDP and a higher price level.

1. An increase in oil prices shifts $SRAS$ to the left . . .

Price level
(GDP deflator, 2009 = 100)

Real GDP
(trillions of 2009 dollars)

\( LRAS \)

\( SRAS_1 \)

\( SRAS_2 \)

\( AD \)

$16.7$

$17.0$

110

112
Short-run and Long-run Effects of a Negative Supply Shock (stagflation)

**Short-run Effect**

2. ... moving short-run equilibrium to point B, with lower real GDP and a higher price level.

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

**Long-run Effect**

1. The recession caused by the supply shock eventually leads to falling wages and prices, shifting SRAS back to its original position.

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