Elements of Macroeconomics

March 2023

12 AD/AS Model

The AD/AS model helps us to understand market dynamics over the short and long run.

12.1 Aggregate Demand (AD)

The AD curve is our familiar GDP equation and given by:

$$AD = C + I + G + NX \tag{1}$$

Why is the AD downward sloping? First of all, the difference between an individual and aggregate demand curve is that for the AD we do *not* have a substitution across goods. Why? We are looking at all goods together. If people change the composition of their desired basket, we do not care.

What affects the slope is:

1. The Wealth effect
   - Households own *nominal* financial assets.
   - If the price level increases, their *real* value decreases (Fisher equation)
   - This leads to a decrease in consumption.
2. Interest rate effect:
   - If prices increase, consumption gets more expensive
   - Households and firms need to sell assets or withdraw money
   - This increases the interest rate
   - If households and firms need to borrow now, the costs of doing so increased

   → Aggregate demand falls
3. International-Trade Effect:
   - If the domestic price level increases while the international price level is fixed, imports get relatively cheaper and exports get more expensive
   - Therefore, people will consume more imports and the rest of the world will consume less of our exports.

Movement vs Shift If he price level increases, we have a **movement**, when **C, I, G, NX** increase, we have a **shift**.

Let's look at how agents in our model would change their behavior:

1. Consumers
   - **Expected future income increase**: Consumption smoothing $C \uparrow \implies AD \rightarrow$
   - **Tax cut for households**: Higher real disposable income $Y \uparrow \implies C \uparrow \implies AD \rightarrow$
   - **Higher MPC**: Consumers want to consume more: $C \uparrow \implies AD \rightarrow$
   - **Higher wealth of households:** Consumers are richer: $C \uparrow \implies AD \rightarrow$
   - **Lower interest rate:** Easier to borrow: $C \uparrow \implies AD \rightarrow$
2. Firms
   - **Lower interest rate:** Cheaper to borrow money: $I \uparrow \implies AD \rightarrow$
   - **Investment tax subsidy increase:** Cheaper to invest: $I \uparrow \implies AD \rightarrow$
   - **Investment tax cut:** Cheaper to invest: $I \uparrow \implies AD \rightarrow$
3. Government
   - **Increase of spending:** $G \uparrow \implies AD \rightarrow$
   - **Fiscal transfers:** Real disposable income increases: $Y \uparrow \implies C \uparrow \implies AD \rightarrow$
4. Rest of the world:
   - **Weak global economy:** Other countries want less of our goods: $EX \downarrow \implies NX \downarrow \implies AD \leftarrow$
   - **Exchange rate appreciation:** Dollar gets relatively more valuable: $EX \downarrow$ AND $IM \uparrow \implies NX \downarrow \implies AD \leftarrow$

12.2 Short Run Aggregate Supply (SRAS)

In the short run, wages and prices are not completely flexible (but not completely fixed either).

Movement vs Shift A change in the price level leads to a movement. Everything which affects production costs shifts the SRAS curve.

- Labor costs
  - **Increase in minimum wage:** Wages $\uparrow \implies$ Labor costs $\uparrow \implies SRAS \leftarrow$
  - **Workers increase bargaining power** Wages $\uparrow \implies$ Labor costs $\uparrow \implies SRAS \leftarrow$
- Intermediary good prices
  - **Oil prices increase:** Production costs $\uparrow \implies SRAS \leftarrow$
- Productivity
  - **Machines produce more:** Production costs $\downarrow \implies SRAS \rightarrow$
- Expected future price level $\implies$ wages $\uparrow \implies$ Labor costs $\uparrow \implies SRAS \leftarrow$
- Labor Force or Capital $\implies$ we can produce more $\implies SRAS \rightarrow$

12.3 Long Run Aggregate Supply (LRAS)

In the long run, wages and prices are completely flexible. Therefore, they are set such that we reach full-employment or potential output (Y^*). This also means economy is at natural rate of unemployment (U^*).

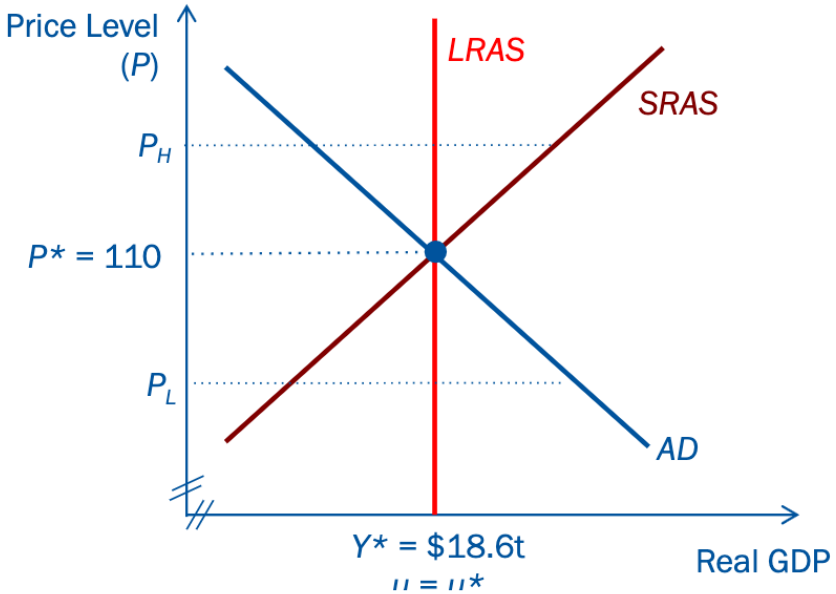
Movement vs shift A change in the price level leads to a movement. Everything which affects **long term** production, leads to a shift in the LRAS curve.

Recall the formula:

$$\%\Delta Y = \%\Delta LF + \%\Delta LP$$

12.4 Equilibrium

Equilibrium means that nothing is moving, we are in a *steady state*. This occurs when all curves intersect at the same point: $AD = LRAS = SRAS$.



12.5 Shocks

1. Is the shock temporary or permanent? If not clear, make assumptions!
2. Which curve is shifting where?
3. Do we have a new long term equilibrium?
4. Are we already there?
   - If yes: We are done
   - If not: Which curve is shifting towards the new equilibrium?

12.6 Exercises

For each of the following events, explain the short-run and long-run effects on output and the price level, assuming policymakers take no action.

1. Temporary supply shock: increase in oil prices
2. Permanent suppy shock: increase in oil prices
3. Temporary demand shock: increase in MPC
4. Permanent demand shock: increase in MPC
5. Government increases spending on infrastructure (one time)
6. Firms invest permanently more in R&D
7. The stock market declines sharply, reducing consumers' wealth
8. The federal government increases spending on national defense
9. A technological improvement raises productivity.
10. A recession overseas causes foreigners to buy fewer U.S. goods.

12.7 Questions for yourself

Q 1.4 Briefly explain how each of the following events would affect the aggregate demand curve.

(a) An increase in the price level

(b) An increase in government purchases

(c) Higher state personal income taxes

(d) Higher interest rates

(e) Faster income growth in other countries

(f) A higher exchange rate between the dollar and foreign currencies

Q 4.4 Draw a dynamic aggregate demand and aggregate supply graph showing the economy moving from potential GDP in 2019 to potential GDP in 2020, with no inflation. Your graph should contain the AD, SRAS, and LRAS curves for both 2019 and 2020 and should indicate the short-run macroeconomic equilibrium for each year and the directions in which the curves have shifted. Identify what must happen for the economy to experience growth during 2020 without inflation.