

Elements of Macroeconomics

March 2023

15 Phillips Curve

15.1 From AS-AD To Phillips Curve

We can derive the Phillips Curve from the AS-AD model. By now, we know that monetary policy changes the real interest rate on the T-Bill, T-Bond, and corporate bond market. This shifts the AD curve in the AS-AD model.

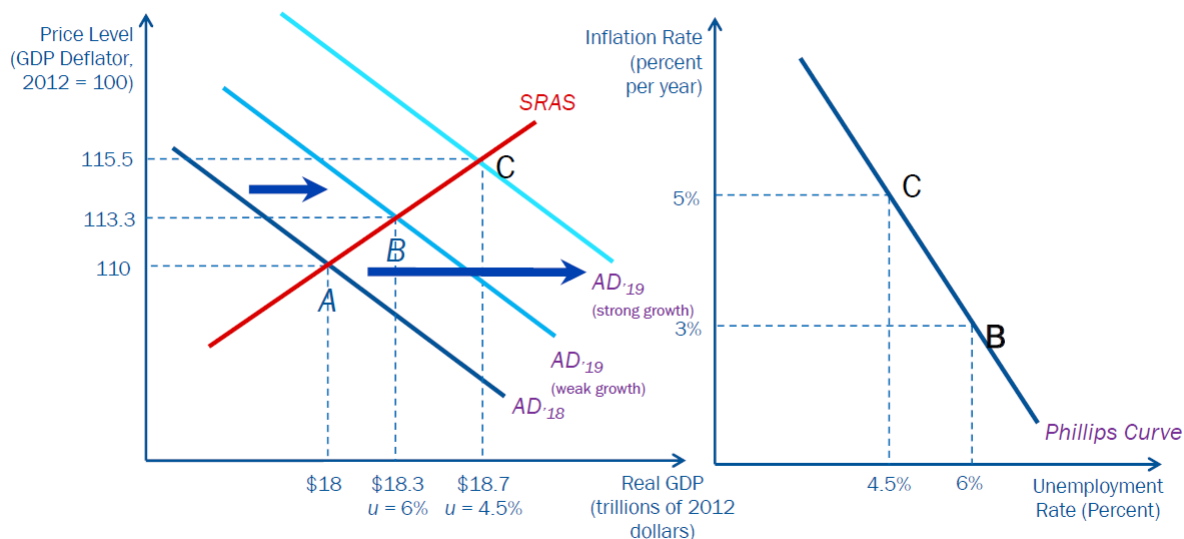


Figure 1: From AS-AD to Phillips Curve

Things to remember:

- We start from point A. The Phillips curve reflects the deviation from this point.
- In the AS-AD model, we have output on the x-axis, in the Phillips curve we have u . Remember: when y increases, u decreases!
- The short run Phillips curve is downward sloping. Why? Because of sticky prices and wages!

15.2 Inflation Expectations and the Phillips Curve

The impact of monetary policy depends on the formation process of inflation expectations. Two helpful ways to think about it:

1. **adaptive expectations:** You expect inflation rate today to be similar to last periods.
2. **rational expectations (perfect foresight):** You know exactly what the inflation rate will be

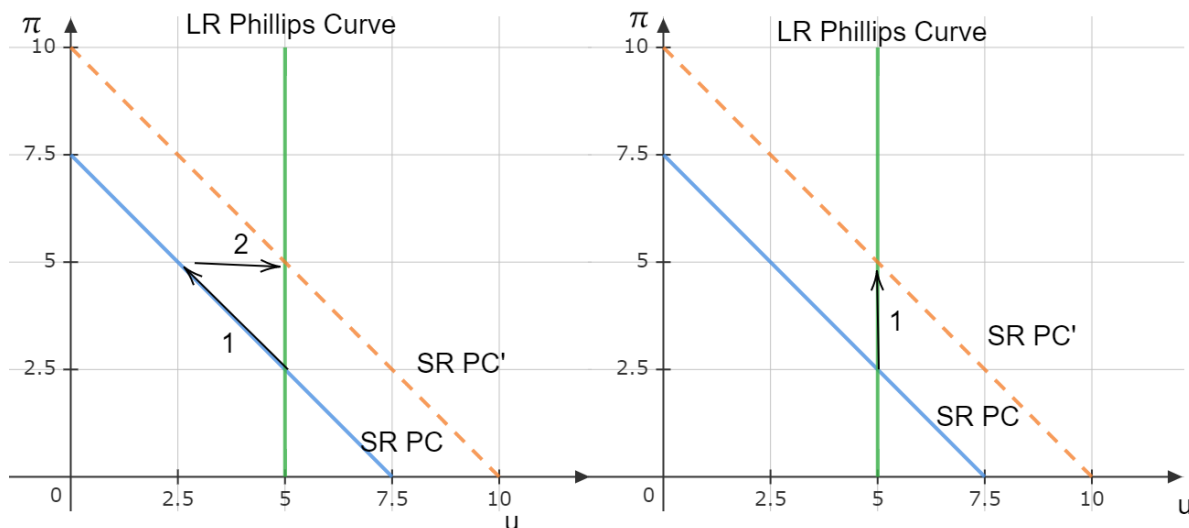


Figure 2: Phillips Curve and Expectations. Adaptive (left) and rational (right)

Bottom Line: Monetary policy does only work in the short run and when households/firms get surprised.

15.3 Exercises

Q1: The Phillips Curve can be written as:

$$\pi_t = \pi_e + \alpha(U_t - U^*)$$

Note that in the lecture notes it is written as $\alpha(U^* - U_t)$. To make the graphs look more familiar, we use this form.

1. Explain each part.
2. What is $U_t - U^*$?
3. Draw the short run Phillips Curve for $\pi_e = 2\%$ and $\alpha = -0.5$ in an $U_t - U^* / \pi_t$ graph.
4. Assume NAIRU and unemployment are at 3.5%. Draw the long run Phillips Curve
5. The FED reduces interest rates which increases inflation rate to 3%. Assuming adaptive expectations, what happens to $U_t - U^*$ and U_t in the short run? What happens in the long run?
6. Assuming rational expectations, what happens to $U_t - U^*$ and U_t in the short run? What happens in the long run?

Q2: 2.3 Use the following information to draw a graph showing the short-run and long-run Phillips curves:

- Natural rate of unemployment = 4.5 percent
- Current rate of unemployment = 4.0 percent
- Expected inflation rate = 2.0 percent
- Current inflation rate = 3.0 percent

Be sure your graph shows the point where the short-run and long-run Phillips curves intersect.

Q3: Assume $\pi^* = 2\%$, $U^* = 5\%$, $\alpha = 0.5$ in the Phillips Curve Equation. Further, assume adaptive inflationary expectations.

year	π	U
2021	2%	5%
2022	3%	3%
2023	?	3%

- Use an equation to predict the inflation rate for 2023.
- Suppose the Fed wants to get back to 2% inflation in 2024. What will the unemployment rate have to be?

16 Fiscal Policy

Fiscal policy means that the government can change taxes (T) or government spending (G) to influence macroeconomic outcomes

Note:

- Discretionary spending/outlays: e.g. infrastructure, government worker wages, defense spending \implies This is fiscal policy!
- Mandatory outlays (not altered by budget): e.g. Social Security, Medicare, unemployment insurance \implies Automatic stabilizers, not fiscal policy!

16.1 Expansionary and Contractionary Fiscal Policy in a dynamic model

Let's review the impact of fiscal policy in a static setting:

- In the left picture we are in a recession.
- Fiscal policy can shift the AD curve to the right.
- Now, we do not have a recession anymore.

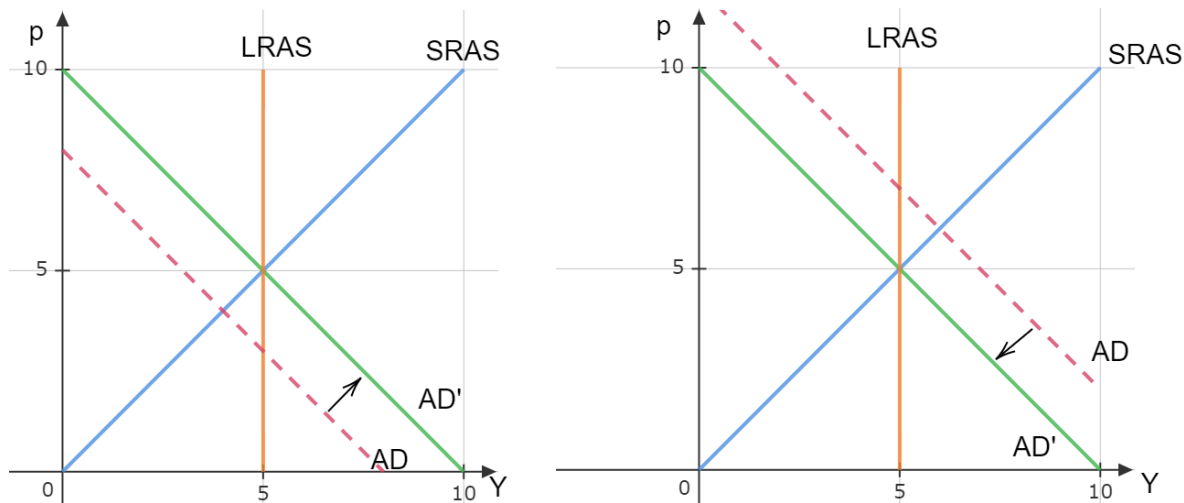


Figure 3: Expansionary (left) and Contractionary (right) Fiscal policy Phillips Curve.

Fiscal policy in a dynamic setting

- Y^* increases over time due to an increase in labor force or labor productivity (remember $\% \Delta Y = \% \Delta LF + \% \Delta LP$) \implies LRAS shifts to the right
- The SRAS also experiences productivity gains \implies SRAS shifts to the right
- Higher overall output means higher income for households \implies AD shifts to the right
- When aggregate demand does not adjust in the same way, fiscal policy can help to stabilize!
Tipp: shift all curves without fiscal policy then see how much fiscal policy is needed.
- In this model we can also see how the price level and real GDP increases over time.

16.2 The multiplier effect

Please review the multiplier effect from the aggregate expenditure model!

We can rewrite the government spending and tax multiplier:

$$\text{Government spending multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in government spending}} = \frac{\Delta Y}{\Delta G} \implies \frac{1}{1 - MPC}$$

$$\text{Tax multiplier} = \frac{\text{Change in equilibrium real GDP}}{\text{Change in Taxes}} = \frac{\Delta Y}{\Delta T} \implies \frac{-MPC}{1 - MPC}$$

If we know the multipliers and the output gap; eg how much we need to increase real GDP to be back in equilibrium, we can calculate the amount of spending or the reduction in taxes we need to implement.

Example Question: Assume MPC is 0.6. Due to a recession the output gap rose to \$2 billion. How large does G increase or T decrease to close the output gap?