Principles of Macroeconomics: Dynamics

Class 18

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Overview

- Announcements:
  - LC 12, GH 12 due Friday at 11:59pm
- Topics:
  - Recap from Tuesday
  - Short-run equilibrium
  - Long-run equilibrium
- Readings:
  - Chapters 12.3-12.4; chapter 13.1-13.2

Recall

Aggregate Demand: π and Y are inversely related

- The wealth effect: $\uparrow \pi$ decreases real wealth
  - Lower real wealth decreases autonomous consumption, so $\downarrow Y$
- Interest Rates: $\uparrow \pi$ increases demand for money
  - Increased money demand increases r
  - Increased r decreases I, which means that $\downarrow Y$

In terms of equations:

$$GDP = \frac{1}{1 - MPC}\left(A + MPC \times [TR - T] + I(r) + G\right)$$

π enters through A and r

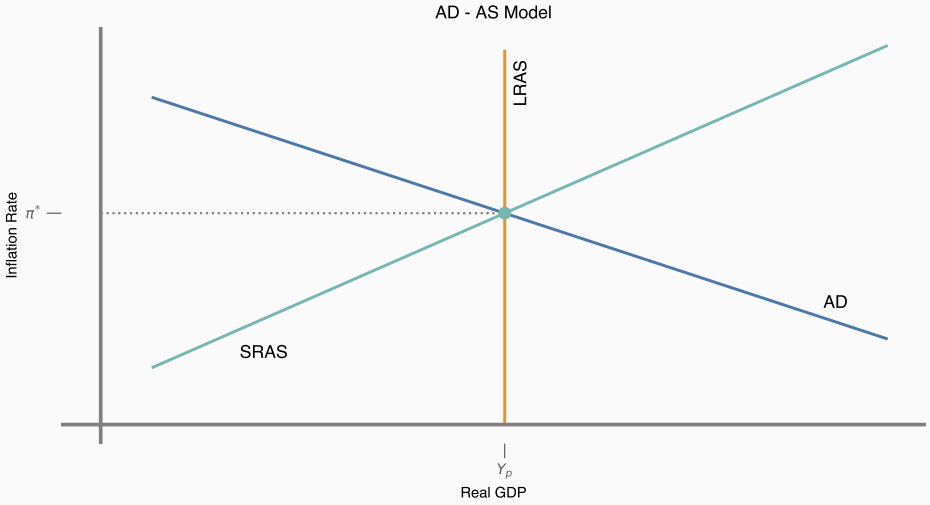
Aggregate Supply: In the short-run, π and Y are positively related

- $\frac{\Pi}{Y} = P - \frac{p^k K - wL}{Y}$
- If wages are "sticky," then wages don't adjust with price changes in the short run
- Then when $\uparrow \pi$, $\uparrow Y$

In the long-run, Y and π are unrelated

- RGDP is only determined by TFP, K, and L
- We call this potential output, or Y_p

The Whole Picture



Practice Problems

(1) Suppose that we are at potential. Then, we observe that output increases. What observable information do you need to know to determine whether LRAS increased or we moved *along* the SRAS?

(2) Suppose that the SRAS curve is given by: $\pi = \mathbb{E}[\pi] + \kappa(Y - Y_p) + u$. Potential is 100, κ is 0.5. u is a supply shock and is equal to zero here. A demand shock moves observed output to 102 and inflation to 3.
   - What is expected inflation?
   - Suppose the demand shock disappears, but expected inflation moves to 2.5. Given that inflation returns to 2, what is Y?

Solutions

(1) What happens with prices? If π increases, demand shifted. If π does not move or falls, then supply shifted. If LRAS shifted, then we would expect Y to remain elevated and prices to remain lower or flatten.

(2) Use the SRAS equation:
- $3 = \mathbb{E}[\pi] + 0.5(102 - 100) + 0 \longrightarrow \mathbb{E}[\pi] = 2$
- $2 = 2.5 + 0.5(Y - 100) \longrightarrow Y = 99$

Dynamics

We want to study what happens when we supply or demand shift

- In the short-run, we only care about AD and SRAS
  - Start with the simple scenario where prices are fixed in the short-run
  - Generalize to when SRAS is upward sloping
- In the long-run, we need to return to potential output
  - Why? How?

Short-run, Flat SRAS

If prices are fixed in the short-run:

- Firms do not adjust prices
- SRAS is horizontal

If this is the case, equilibrium is where AD crosses the flat SRAS

- Only demand matters for equilibrium output – firms will produce any Y given a price
- Then $GDP = AE_{planned}$ and that's all we need

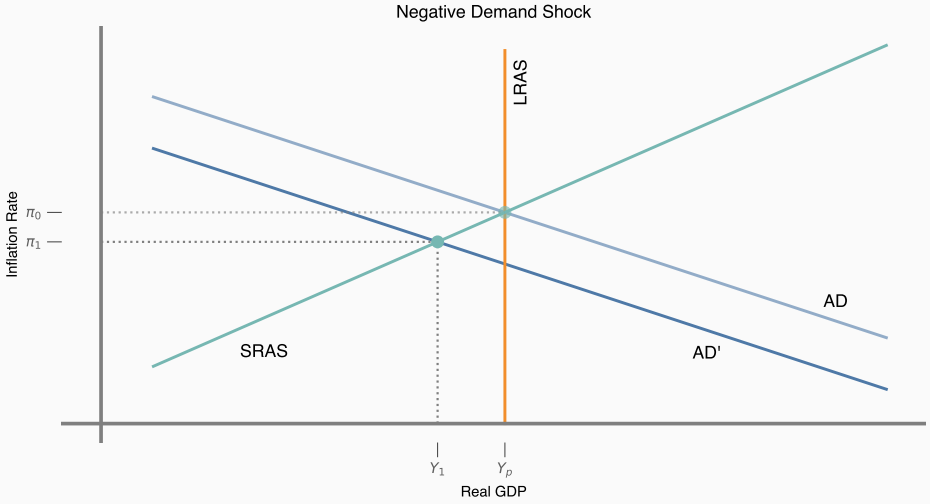
Shifters are the same as last week:

- Shock to consumption
- Shock to investment
- Shock to fiscal policy
- Shock to monetary policy

Now let's impose that SRAS slopes upward

- Suppose that the stock market crashes and consumer wealth plummets
- What happens to *RGDP* and π?
  - AD shifts left because consumer wealth has decreased (A falls). For any given π, consumers will purchase less Y
  - What happens to supply? Well, if at the given inflation rate, firms are selling less, they will lower prices.
  - So *RGDP* falls and π falls
- The output gap is now negative ($Y < Y_p$)

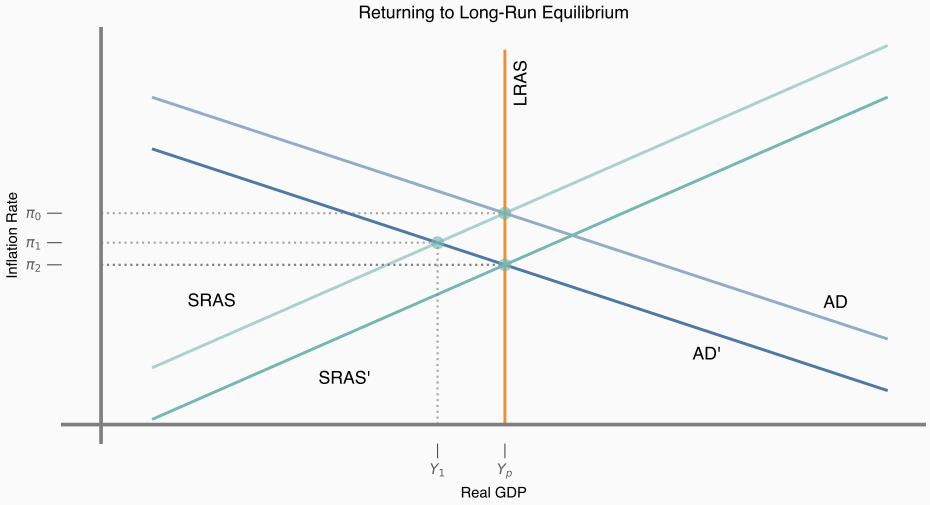
Graphically



Going Long

- In the short-run, output is lower than potential (a recessionary gap) and unemployment rises
- But, will this forever be the case?
  - Consider the case where the shock is very short
    - AD falls today, but then immediately rebounds next period
    - Output and inflation recover, we are back at long-term equilibrium
  - But what about the case where the shock is long-lasting?
    - Then inflation expectations begin to adjust, and workers/firms begin to bargain new wages
    - High unemployment and lower inflation expectations decrease wages bargained
    - Profits begin to recover, output can increase back to long-run equilibrium

Graphically



Supply Shock

- What happens if we have a negative supply shock?
  - Examples: OPEC oil shock of the 1970s, Red Sea Shipping Disruptions (2023)
  - Suppose that these do not permanently change the capital stock, labor hours available, or TFP
- Then SRAS shifts left $\longrightarrow Y \downarrow, \pi \uparrow$
- What happens in the long-run?
  - The negative output gap pushes prices down over time. The SRAS shifts back to long-run equilibrium

Thinking about the Long Run

There's no telling how "long" the long run is.

"In the long run we are all dead."

—John Maynard Keynes

Idea: in the face of shocks – use policy to get back to long-run equilibrium faster

Demand Shocks

- When faced with a negative demand shock, we could wait until inflation expectations adjust and SRAS moves right
- OR we could increase G and use monetary policy now to decrease r
  - These policies will, according to our aggregate demand shifters, move AD to the right and back to long-run equilibrium
- We can avoid the costs of high unemployment and price instability
- Similar intuition holds for a positive demand shock – higher inflation can cause instability, and any short-run gains in output are usually paid back later (i.e. the economy has expanded beyond what it can actually produce right now – borrowing funds this)

Supply Shocks

- What about supply shocks? Here, π and Y move in opposite directions – how can policies that shift demand solve this?
- Suppose the economy is hit with a negative supply shock
  - If policy-makers focus on prices, then we can make the output gap worse
  - If policy-makers focus on output, then we can make the inflation problem worse
- Historically, the US has typically focused on stabilizing prices
  - 1970s OPEC oil crisis: first tried price controls, then the Fed raised rates very high in early 1980s.
  - 2020-2021 COVID pandemic: Fed raised rates cautiously – still focused on prices, but sensitive to output issues

Should We Use Policy?

The theoretical benefits are clear in this model – G will boost AD in a demand driven recession. But reality is more complicated

- Does G always go to places where it is well-used?
  - Is the multiplier the same on all types of G?
- Does G always arrive on time?
- Is the increase in debt worth the increase in G?

More on this next week!

Summary

- Short-run and long-run dynamics
- Macroeconomic policy

- Remember: homework due Friday night
- Read chapter 13.1-13.2