THE AGGREGATE DEMAND AND SUPPLY: MACROECONOMIC EQUILIBRIUM

WEEK 8

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1. Recap: the AD & AS Curves

The AD Curve

Recall the AD curve

$$Y = m \cdot \overline{A} - m \cdot \phi \cdot (\overline{r} + \lambda \pi) \tag{1}$$

where:

- $\overline{A} = \overline{C} + \overline{I} - d \cdot \overline{f} + \overline{G} + \overline{NX} - c \cdot \overline{T}$ (Autonomous Aggregate Demand)

- $m = \frac{1}{1-c}$ (multiplier)

- $\phi = b + d + x$ (to simplify notation)

- λ (parameter)

AD: Movements-Along vs Shifts

$$Y = m \cdot \overline{A} - m \cdot \phi \cdot (\overline{r} + \lambda \pi)$$

A movement along the AD curve: π changes, *everything else constant.* For example:

$$\pi \uparrow \;\; \Rightarrow \;\; r \uparrow \;\; \Rightarrow \;\; \{I \downarrow, \, C \downarrow, \, NX \downarrow\} \;\; \Rightarrow \;\; Y \downarrow$$

A shift in the AD curve: π constant, *everything else changes.* For example:

$$\{\overline{A} \uparrow, \, \overline{r} \downarrow\} \;\; \Rightarrow \;\; Y \uparrow$$

The AS curve

Recall the AS curve

$$\pi = \underbrace{\pi^e}_{=\pi_{-1}} + \gamma \left(Y - Y^P \right) + \rho \tag{2}$$

- **Short-run**:

$$Y \neq Y^P \text{ and } \pi \neq \pi^e$$

and the AS has a positive slope given by γ.

- **Long-run**:

$$Y = Y^P \text{ and } \pi = \pi^e$$

and the AS is vertical with $Y = Y^P$.

AD: Movements-Along vs Shifts

$$\pi = \underbrace{\pi^e}_{=\pi_{-1}} + \gamma\left(Y - Y^P\right) + \rho$$

A movement along the AS: Y changes and *everything else constant*:

$$Y \uparrow \; \Rightarrow \; \pi \uparrow$$
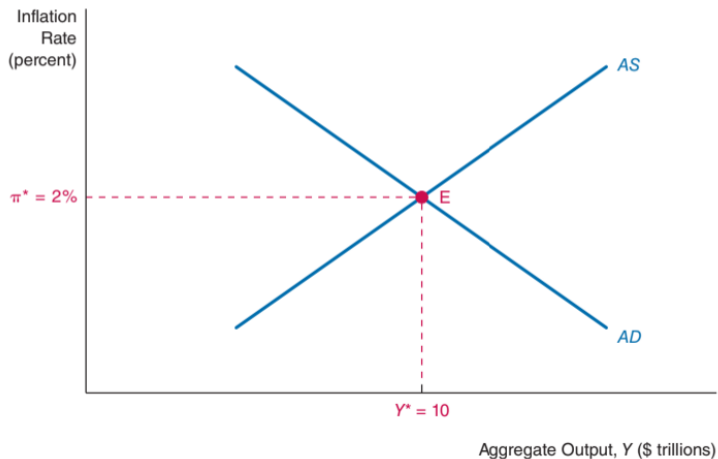$$Y \downarrow \; \Rightarrow \; \pi \downarrow$$

A shift in the AS: Y constant, *everything else changes*. For example:

$$\rho \uparrow \; \Rightarrow \; \pi \uparrow \quad , \quad \pi^e \uparrow \; \Rightarrow \; \pi \uparrow \quad , \quad Y^P \uparrow \; \Rightarrow \; \pi \downarrow$$

2. Macroeconomic Equilibrium: AD=AS
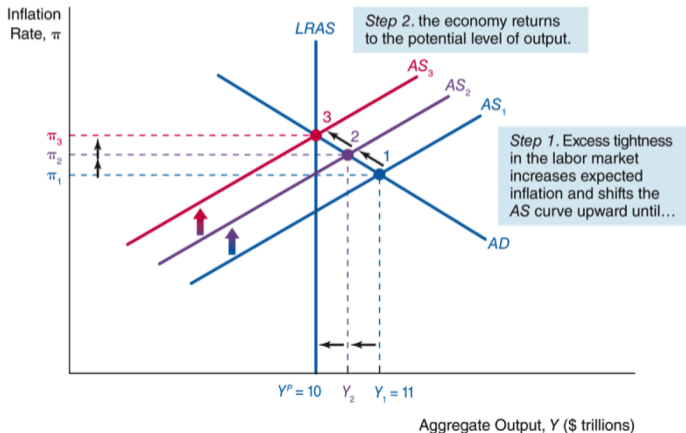
The Short Run Equilibrium

On this equilibrium, we will have: $Y = Y^*$, $\pi = \pi^*$

THE SHORT RUN EQUILIBRIUM ABOVE Y^P

Suppose the economy starts with $Y_1 > Y^P$:

(a) Initial short-run equilibrium above potential output

Inflation Rate, π

LRAS

Step 2. the economy returns to the potential level of output.

AS_3
AS_2
AS_1

π_3
π_2
π_1

Step 1. Excess tightness in the labor market increases expected inflation and shifts the AS curve upward until…

AD

$Y^P = 10$ Y_2 $Y_1 = 11$

Aggregate Output, Y ($ trillions)

Previous Slide's Details: Read at Home

Consider that $Y_1 > Y^P$: point 1.

Unemployment is below the natural unemployment rate: $U < U_n$ and wages increase (Phillips curve).
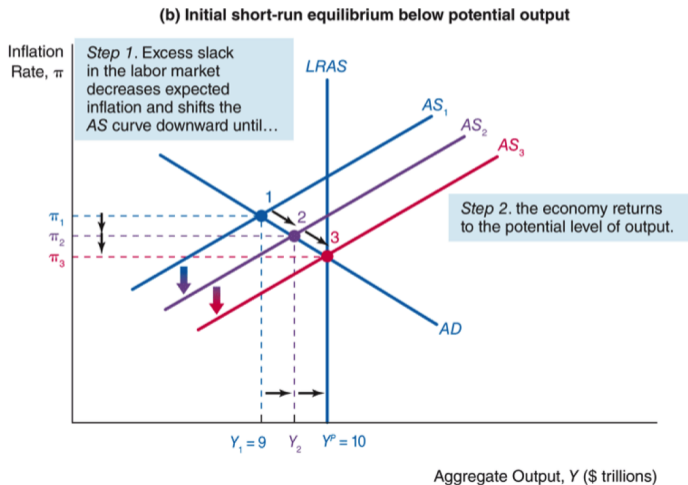
Firms raise their prices.

Inflation rises above its initial level: $\pi > \pi_1$. In the next period, expectations of inflation, π^e, are revised upward due to rising inflation and the short-run AS curve shifts upwards from AS1 to AS2.

As long as $Y > Y^P$ wages and prices will continue to increase, causing the AS curve to shift upward: self-correcting supply mechanism.

The process repeats itself until $Y = Y^P$, i.e., the economy reaches its long-run equilibrium.

The Short Run Equilibrium below Y^P

Suppose the economy starts with $Y_1 < Y^P$:

(b) Initial short-run equilibrium below potential output

Step 1. Excess slack in the labor market decreases expected inflation and shifts the *AS* curve downward until…

Step 2. the economy returns to the potential level of output.

Inflation Rate, π

LRAS

AS_1
AS_2
AS_3

π_1
π_2
π_3

AD

$Y_1 = 9$ Y_2 $Y^P = 10$

Aggregate Output, Y (\$ trillions)

Previous Slide's Details: Read at Home

The short-term equilibrium is below potential GDP: $Y_1 < Y^P$: point 1.

Unemployment is above the natural rate of unemployment: $U > U_n$ and inflation falls below its initial level: $\pi < \pi_1$.

Inflation expectations, π^e, are revised downward due to falling inflation, shifting the short-run AS curve downward from AS1 to AS2.
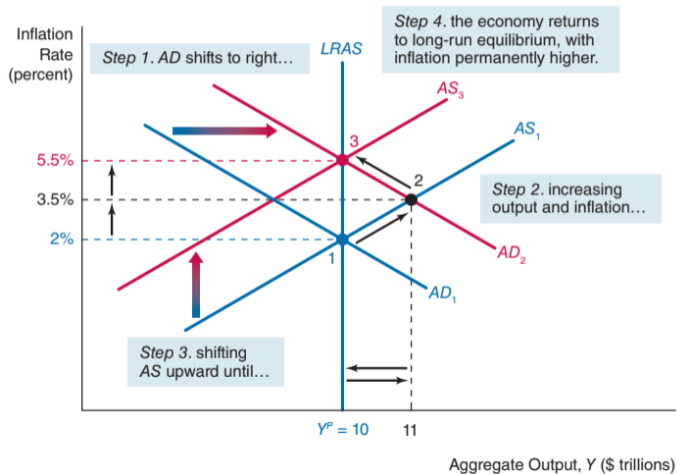
As long as $Y < Y^P$, expected inflation declines, shifting the AS down.

The process repeats until $Y = Y^P$ and the long-run equilibrium is reached.

3. Aggregate Demand Shocks

A Positive Demand Shock

Consider that $\overline{A}$ increases

Previous Slide's Details: Read at Home

We start from the long-run equilibrium at point 1.

The AD curve shifts to the right: we will have point 2.

At this point, $Y > Y^P$ and inflation increases.

The supply self-correction mechanism comes into operation until it passes to AS3 and GDP equals Potential GDP.
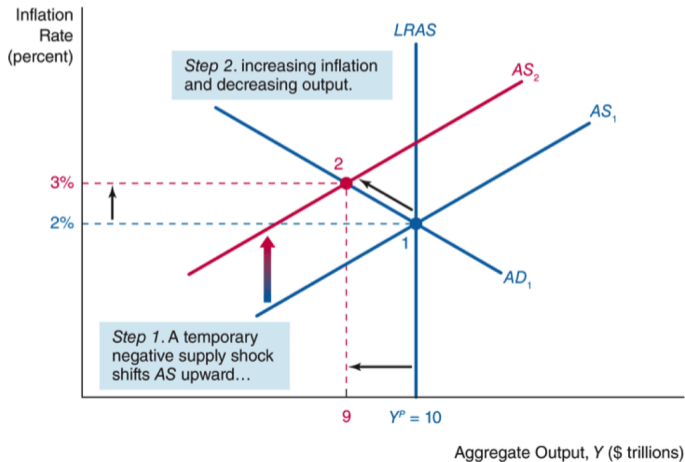
The short-run effect: an economic expansion and an increase in inflation.

The long run effect: inflation rises, but the economy returns to Potential GDP (Y^P).

4. Aggregate Supply Shocks

A Temporary Negative Supply Shock

Suppose that oil prices increase temporarily ($\rho \uparrow$)

Previous Slide's Details: Read at Home

We start from the long-run equilibrium at point 1.

An increase in ρ shifts AS to the left, from AS1 to AS2.

We move to point 2, where $Y < Y^P$ leading to an increase in inflation.

However, the productive capacity of the economy (the LRAS) remains unchanged.

The self-correcting supply mechanism will make the adjustment along AD1, back to the initial equilibrium point.

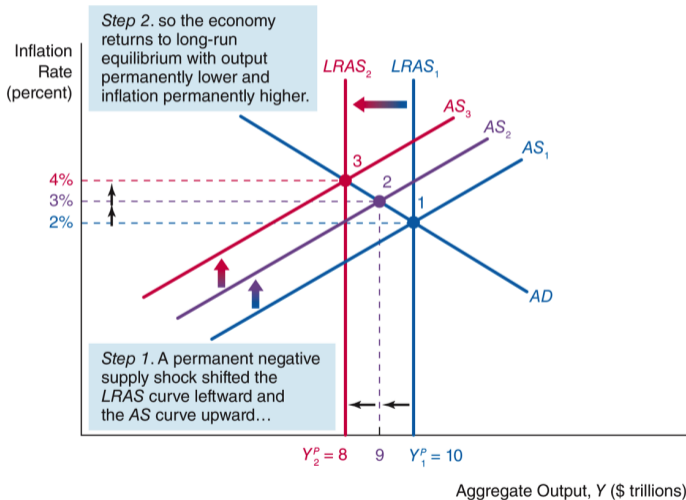The short run effect: an economic recession and an increase in inflation.

In the long run: output and inflation return to their initial equilibrium, Y^P and $\pi = 2\%$.

Permanent Supply Shocks

- A permanent **negative** supply shock: a war that cuts off forever the supply of cheap oil or gas and leads to permanently higher energy costs. A permanent negative supply shock increases inflation and reduces output both in the short and long run.

- Another permanent **negative** supply shock: regulations that cause the economy to be less efficient.

- A permanent **positive** supply shock: the development of new technology that raises productivity or an increase in the supply of labor. A permanent positive supply shock lowers inflation and raises output both in the short and long run.

A PERMANENT NEGATIVE SUPPLY SHOCK

A decrease in potential output from $Y_1^P = \$10$ trillion to $Y_1^P = \$8$ trillion.

Step 2. so the economy returns to long-run equilibrium with output permanently lower and inflation permanently higher.

Step 1. A permanent negative supply shock shifted the LRAS curve leftward and the AS curve upward…

Aggregate Output, Y ($ trillions)

Previous Slide's Details: Read at Home

We start from the long-run equilibrium at point 1.

A permanent (negative) supply shock shifts supply to the left, from LRAS1 to LRAS2.

Inflation increases, shifting short-run supply to the left, from AS1 to AS2, moving to point 2.

At this point we see $Y > Y^P$, which causes inflation to increase again, shifting AS to AS3.

The new long-run equilibrium occurs at point 3.

The short-run effect: a fall in GDP and an increase in inflation.

In the long run: potential GDP falls and inflation rises, both permanently.

5. Readings

Readings

- Read Chapter 12 of the adopted textbook:

  Frederic S. Mishkin (2015). *Macroeconomics: Policy & Practice*, Second Edition, Pearson Editors.