1 Review

- Two typical goals of optimal monetary policy:
  - Re-establish the flexible price equilibrium:
    - **Outcome:** Maintain output at the medium-run equilibrium level (i.e., potential output)
    - **Graph:** Use the 5-graph analysis, especially the IS-LM and AD-AS models
    - **How:** Adjust the money supply
  - Price stability (also known as inflation targeting):
    - **Outcome:** Maintain stable prices (low and predictable inflation)
    - **Graph:** Effective AD curve(flat), upward-sloping AS curve, IS curve
    - **How:** Adjust the real rate
- Trade-off between the two targets: consider a price shock—an increase in the exogenous component of $\bar{P}$
  - **Cost of targeting the flexible price equilibrium:** The price level rises
  - **Cost of targeting price stability:** Output declines

2 Fiscal Policy

2.1 Natural rate of interest

Definition: Natural rate of interest is the real interest rate that sets output equal to full employment output.

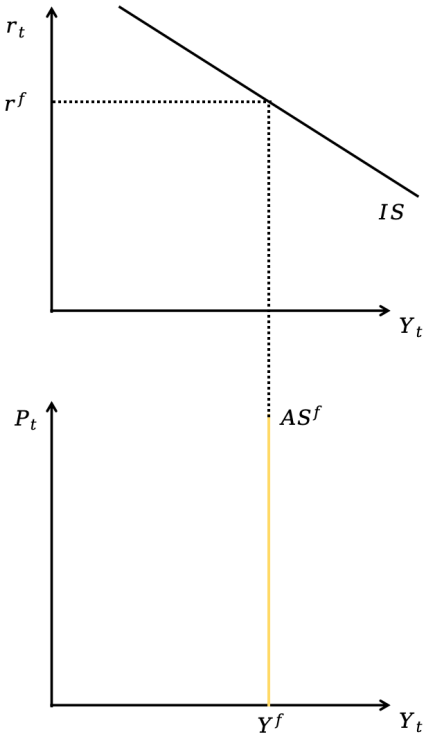
- The natural rate of output is

$$Y_t^f = C(Y_t^f - G_t, Y_{t+1}^f - G_{t+1}, r_t^f) + I^d(r_t^f, A_{t+1}, K_t) + G_t$$

  so r_t^f is affected by IS shocks.

2.2 Fiscal policy

- **Goal:** Maintain output at its potential (full-employment) level
- **How:** Adjust government spending G_t to shift the IS curve. $G_t \uparrow \rightarrow$ IS curve shifts right; $G_t \downarrow \rightarrow$ IS curve shifts left
- **Graph:**



3 Monetary Policy & Fiscal Policy

Monetary Policy & Fiscal Policy

- **Common Goal:**
  - Achieve the flexible price equilibrium.
- **Key Differences:**
  - **Monetary Policy:** Targets full employment equilibrium by selecting M_t. Specifically, it adjusts M^s to shift all LM curves, and then shifts the AD curve.

$$\frac{M_t}{P_t} = M^d(r_t^f + \pi_{t+1}^e, Y_t^f)$$

  - **Fiscal Policy:** Targets full employment equilibrium by selecting r_t^f. Specifically, it adjusts G_t to shift the IS curve, and then shifts the AD curve.

$$\frac{M_t}{P_t} = M^d(r_t^f + \pi_{t+1}^e, Y_t^f)$$

Case: IS shock

- The IS curve shifts right, causing the AD curve to shift right as well. Then both the price level and output level increase, while the LM curve shifts slightly to the left.
- The new IS curve implies a different natural rate.

Different policies:

- **Monetary Policy:**
  - A decrease in M^s causes all LM curves to shift left, which shifts the AD curve back.
  - **Result:** Output remains at the flexible price equilibrium level, but the equilibrium real interest rate **increases**, aligning with the real rate implied by the new IS curve.
- **Fiscal Policy:**
  - A decrease in G_t shifts the IS curve back, which shifts the AD curve back.
  - **Result:**Output remains at the flexible price equilibrium level, but the equilibrium real interest rate **remains unchanged**. The real rate differs from that under monetary policy, suggesting a different composition of output.
- **Composition of Output:** The output after both monetary and fiscal policies reach the potential output level. However, fiscal policy involves a reduction in government spending, leading to a different composition of output: $G\downarrow, C+I\uparrow$. In contrast, after monetary policy, the composition of output remains unchanged, with the shares of $C+I$ and G staying the same as before.

Figure 28.2: Optimal Monetary Response to Positive IS Shock

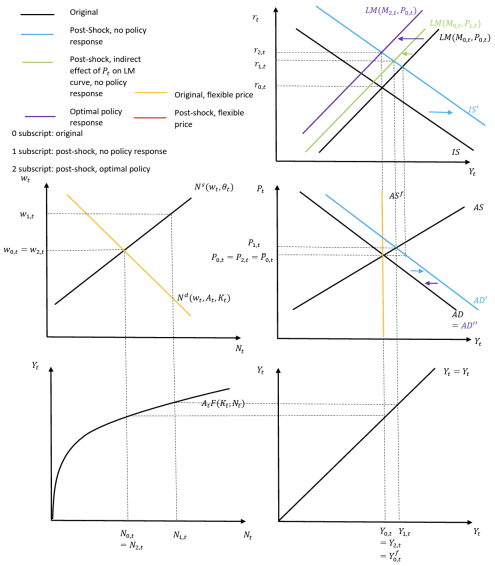
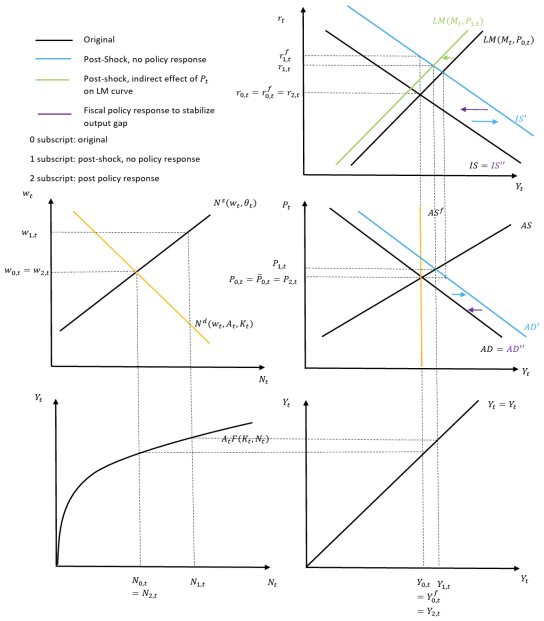


Figure 28.12: Using Fiscal Policy to Combat an IS Shock



4 AD-AS-IS-MP

4.1 Why MP curve

Why introduce MP curve? **Endogenous monetary policy!**
The main change here is that MP is endogenous, and in the background. It reacts automatically to shocks.

4.2 AD-AS-IS-MP

MP curve is given by:

$$r_t = \bar{r}_t + (\phi_\pi - 1)\pi_t$$

- $\phi_\pi > 1$: MP curve is upward-sloping
- $\bar{r}_t$: The intercept is greater than 0(normally)

Demand side:

- IS curve:

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t)$$
$$I_t = I^d(r_t, A_{t+1}, K_t)$$
$$Y_t = C_t + I_t + G_t$$

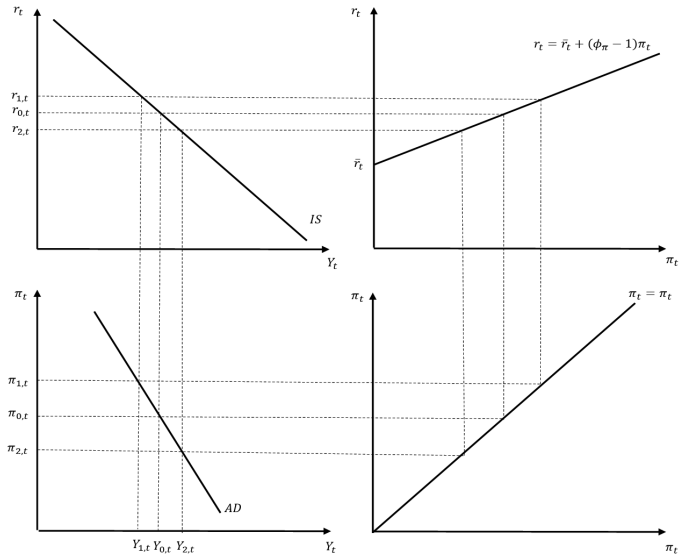
- MP curve:

$$r_t = \bar{r}_t + (\phi_\pi - 1)\pi_t$$

  where $\bar{r}_t \equiv r^* + (1 - \varphi_\pi)\pi^* + e_t$

- IS & MP $\Rightarrow$ AD curve.

Figure E.2: The AD Curve with the MP Curve: Derivation



Summary:

- A rightward shift in the IS curve causes the AD curve to shift right.
- A rightward shift in the MP curve leads to a corresponding rightward shift in the AD curve.
- An increase in ϕ_π causes the MP curve to rotate left, which in turn results in the AD curve rotating left.

Supply side: AS curve

- Phillips curve: AS curve and AS^f curve intersect at π_t^e

$$\pi_t = \pi_t^e + \gamma(Y_t - Y_t^f)$$

- Labor market:

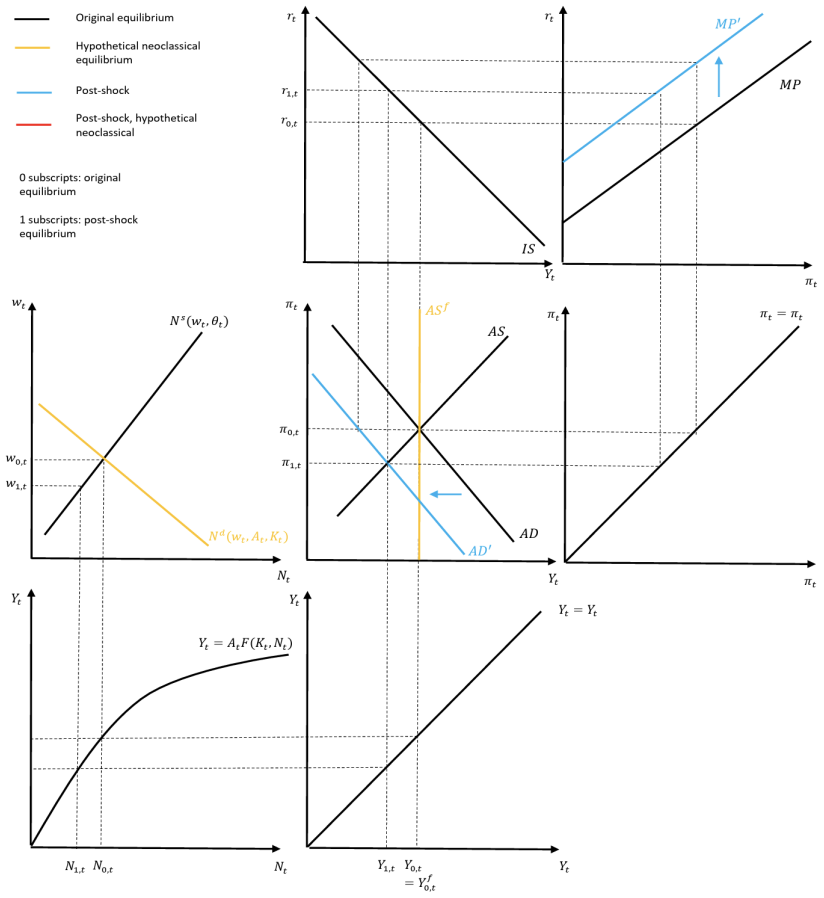
$$N_t = N^s(w_t, \theta_t)$$

- Production function:

$$Y_t = A_t F(K_t, N_t)$$

4.3 Case: Increase in $\bar{r}_t$

Figure E.9: Increase in $\bar{r}_t$



- An increase in $\bar{r}_t$ (the natural real interest rate) causes the MP curve to shift up: the same level of inflation will now result in a higher real rate.
- According to the IS curve, the same level of inflation will result in a higher real rate, which implies a lower output level.
- Thus, for the same level of inflation, a lower output level is observed, and the AD curve shifts left.