Monetary Policy and the Phillips Curve

— Week 9 —

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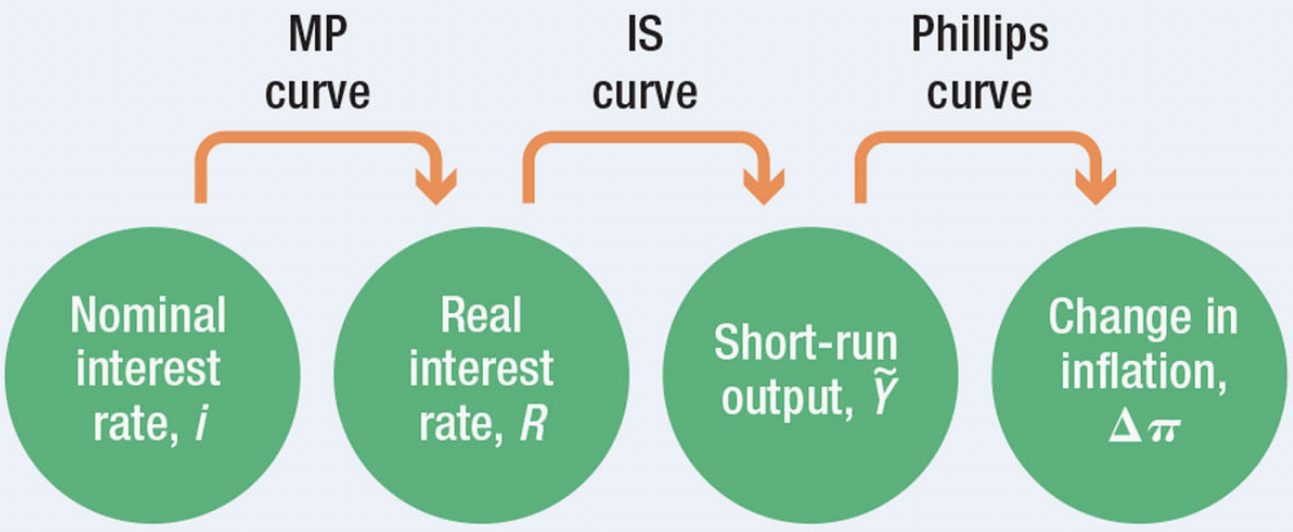
Summary

I – The MP Curve: Monetary Policy and Interest Rates

In this chapter: the crucial steps

FIGURE 12.1

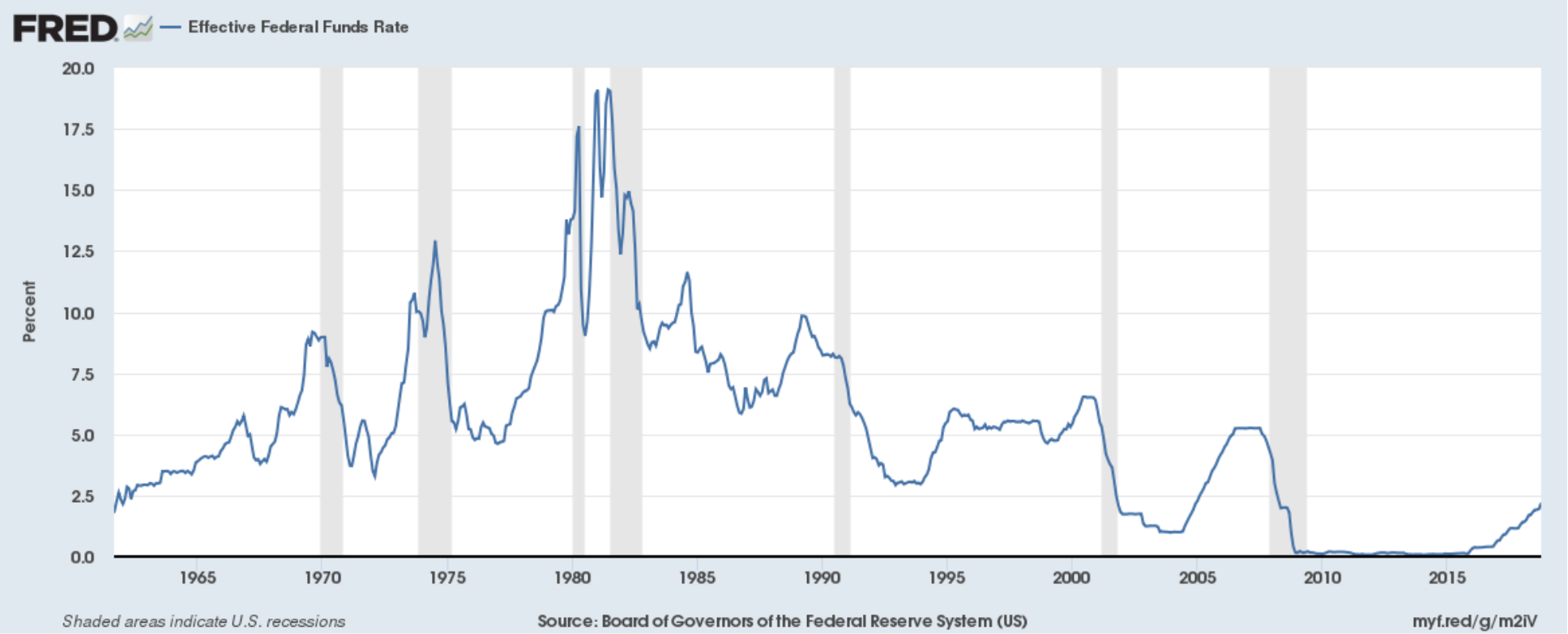
The Structure of the Short-Run Model



Central Banks set the nominal interest

1. Large banks and financial institutions borrow from each other.
2. Central banks set the nominal interest rate by stating what they are willing to lend or borrow at the specified rate.
3. Banks cannot charge a higher rate: everyone would use the central bank.
4. Banks cannot charge a lower rate: they would borrow at the lower rate and lend it back to the central bank at a higher rate.
5. **Thus, banks must exactly match the rate the central bank is willing to lend at**

The fed funds rate since 1960



Remember: from Nominal to Real Interest Rates

1. The relationship between the interest rates is given by the **Fisher equation**.

$$i_t = R_t + \pi_t$$

Nominal interest rate

Real interest rate

Rate of inflation

$$R_t = i_t - \pi_t$$

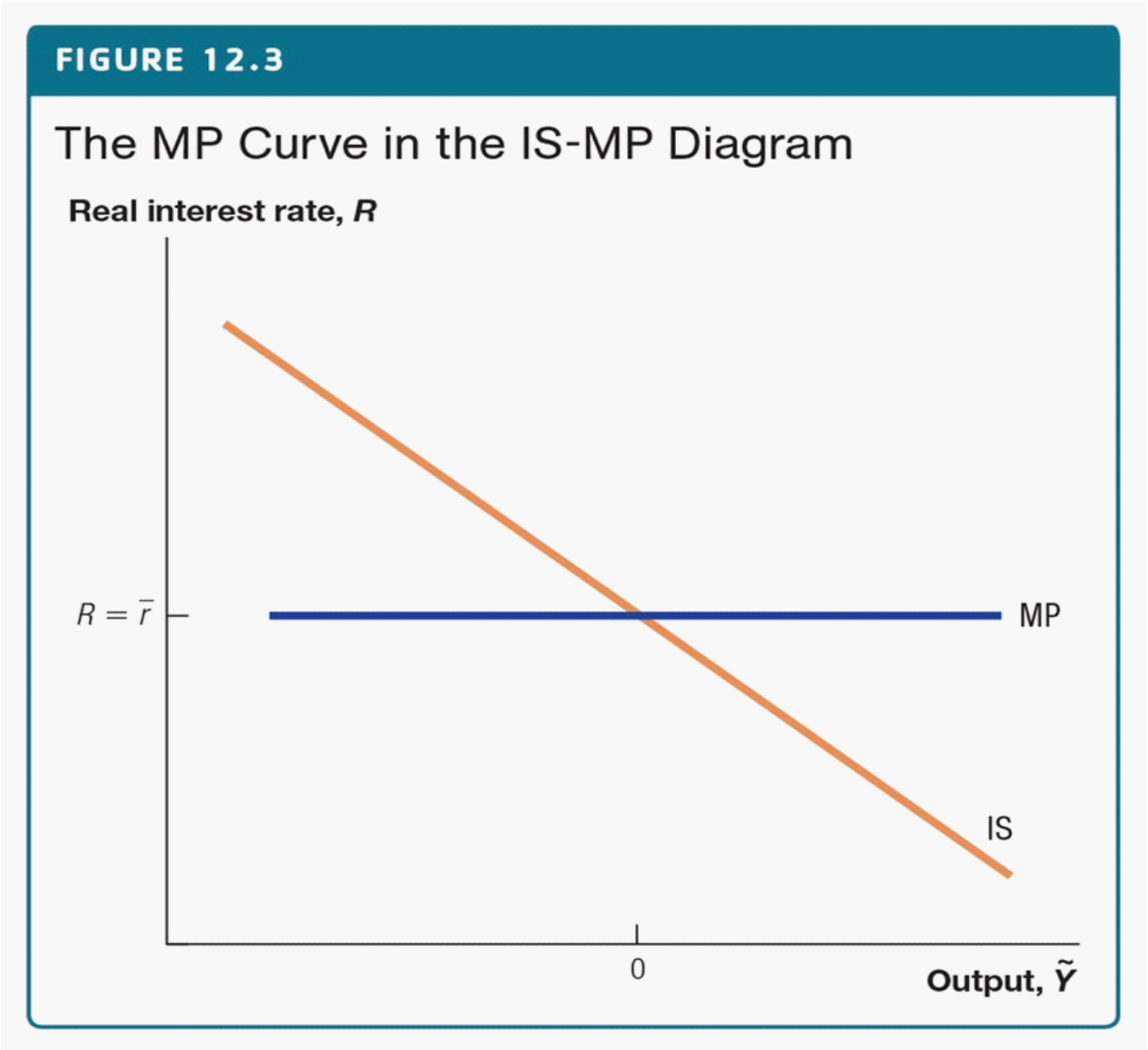
The sticky inflation assumption

1. The rate of inflation displays **inertia, or stickiness**, so that it adjusts slowly over time.
2. In the very short run the rate of inflation does not respond directly to monetary policy.
3. Central banks have the ability to set the real interest rate in the short run.

The IS-MP Diagram

1. The MP curve: shows the central bank's ability to set the real interest rate
2. Central banks set the real interest rate at a particular value: the MP curve is a horizontal line.
3. See next figure
4. The economy is at potential when:
    1. The real interest rate equals the MPK.
    2. There are no aggregate demand shocks.
    3. Short-run output $= 0$.

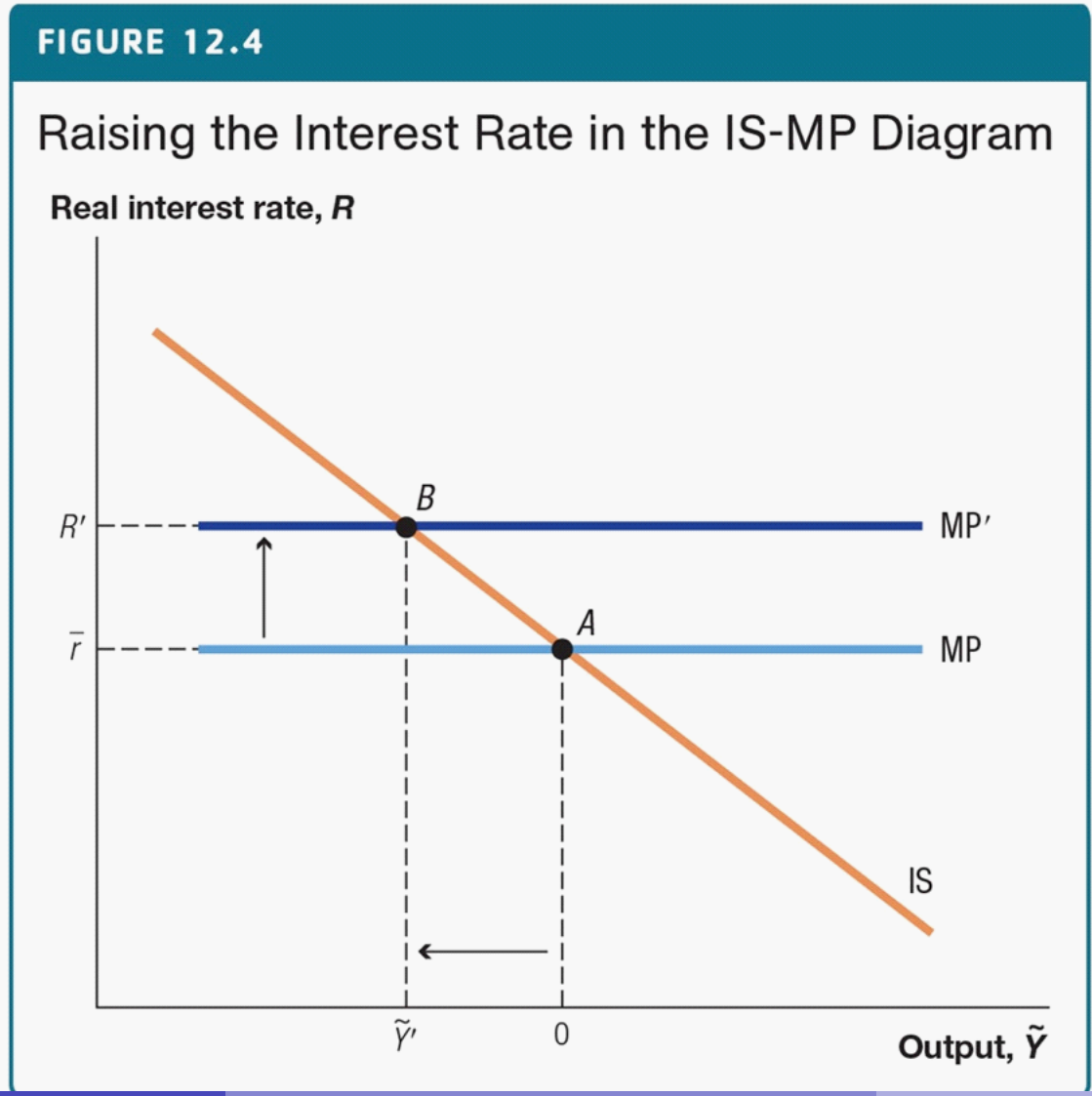
The IS-MP diagram



What happens if the central bank decides to raise the interest rate?

1. If the central bank raises the interest rate above the MPK
2. Inflation is slow to adjust.
3. The real interest rate rises.
4. Investment falls.
5. See next figure

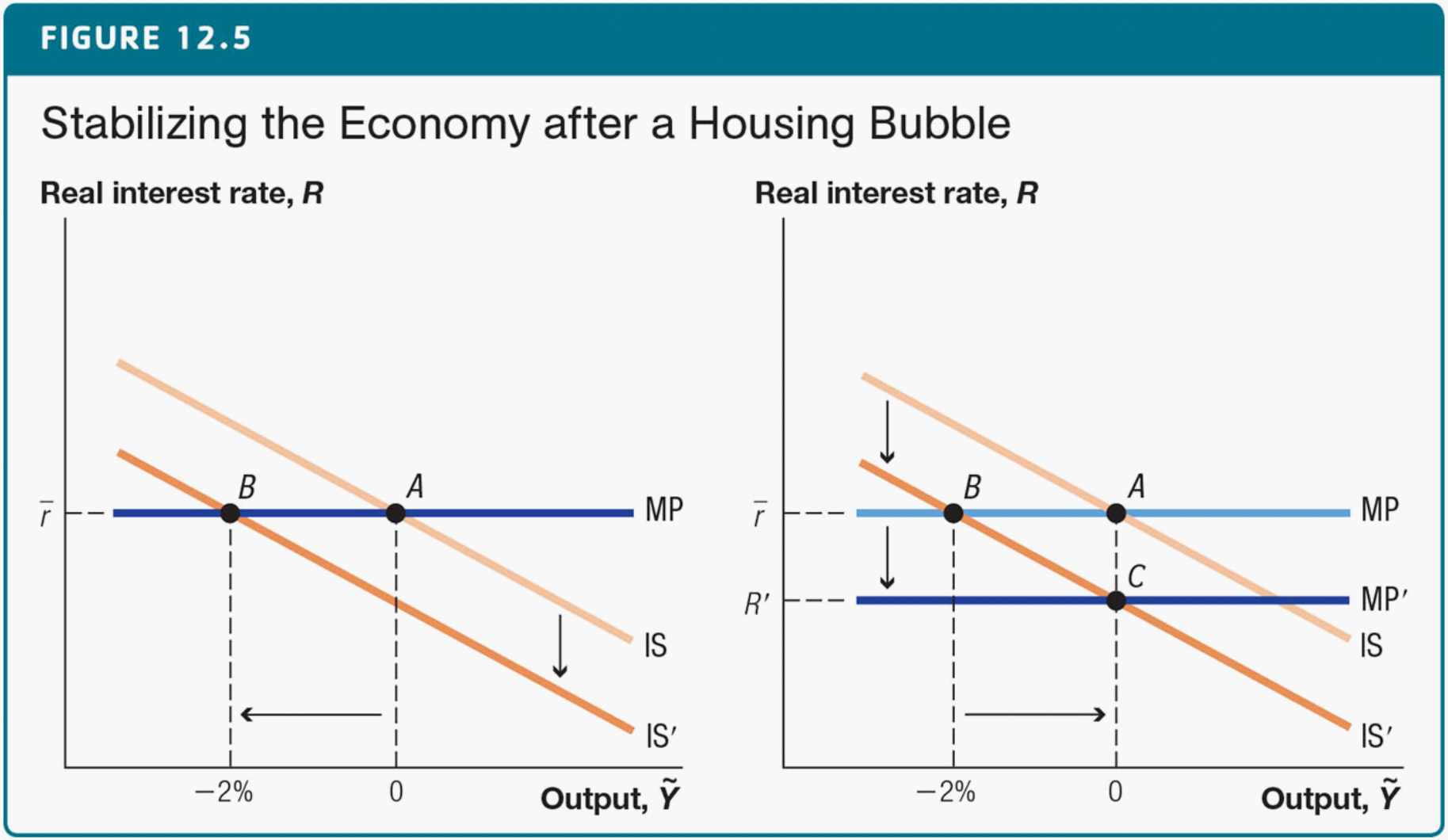
What happens if the central bank raises the interest rate?



Example: The End of a Housing Bubble

1. Suppose housing prices had been rising, but then they fall sharply.
   1. The aggregate demand parameter declines $(a \searrow)$
   2. The IS curve shifts left.
2. If the central bank lowers the nominal interest rate in response:
   1. The real interest rate falls as well because inflation is sticky.
   2. The economy will not have a decline in output.

Example: The End of a Housing Bubble



II – The Phillips Curve

The behavior of inflation

- Recall the inflation rate is the percent change in the overall price level.

$$\pi_t \equiv (P_{t+1} - P_t)/P_t$$

- Firms set their prices on the basis of
  - Their expectations of the economy-wide inflation rate
  - The state of demand for their product.

$$\pi_t = \underbrace{\pi_t^e}_{\text{expected inflation}} + \underbrace{\overline{v}\tilde{Y}_t}_{\text{demand conditions}}.$$

Adaptive expectations

Under adaptive expectations firms adjust their forecasts of inflation slowly.Firms expect next year's inflation rate to be the same as this year's inflation rate.

1. $$\pi_t^e = \pi_{t-1}$$

- Expected inflation embodies the sticky inflation assumption.

The Phillips curve

- Describes how inflation evolves over time as a function of short-run output

$$\pi_t = \pi_{t-1} + \overline{v}\tilde{Y}_t$$

This year's inflation

Last year's inflation

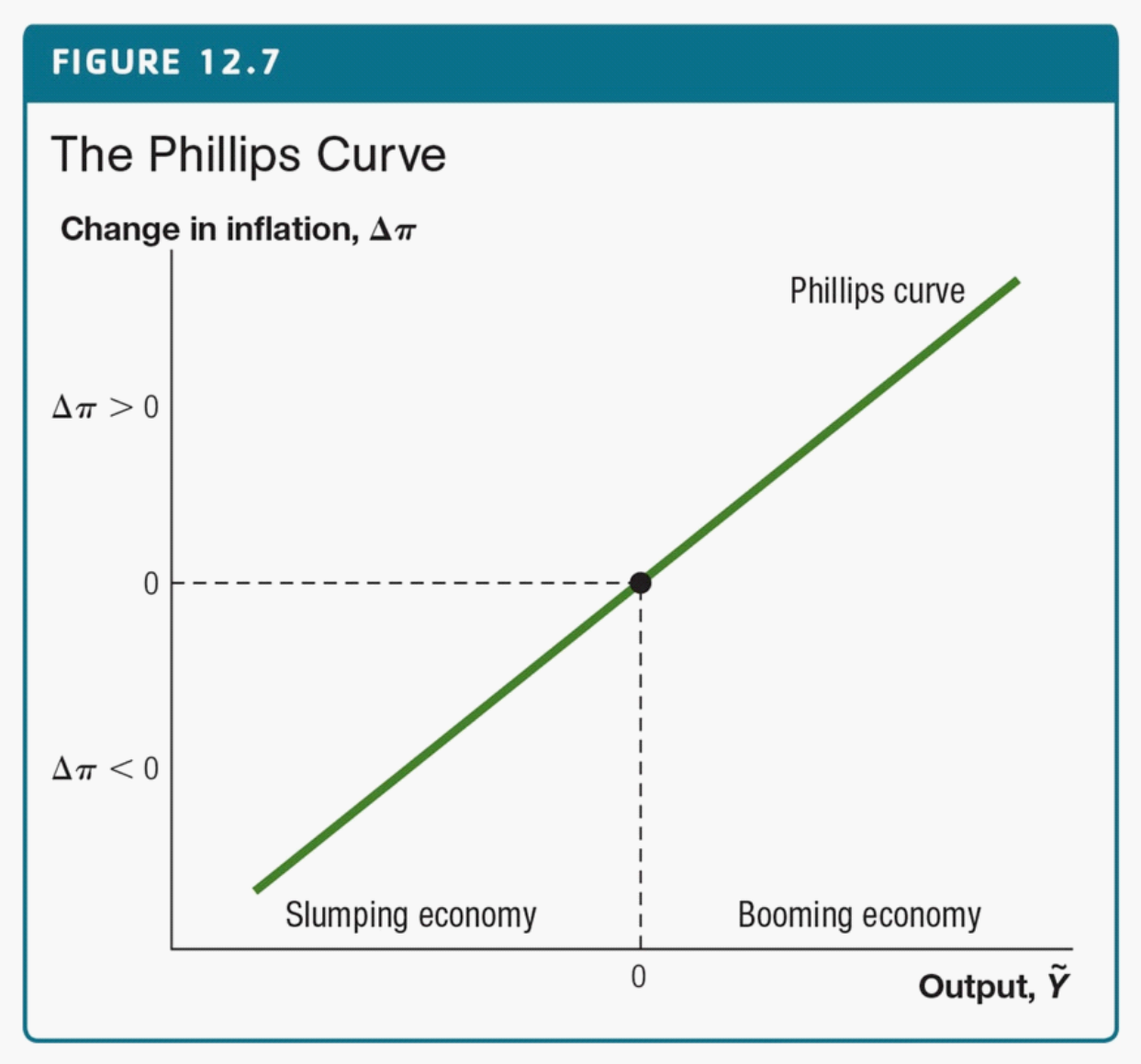
Short run output

- If output is below potential: prices rise more slowly than usual
- If output is above potential: prices rise more rapidly than usual
- Notice that

$$\Delta\pi_t = \overline{v}\tilde{Y}_t$$

This parameter measures how sensitive inflation is to demand conditions.

The Phillips curve



Price Shocks and the Phillips Curve

1. We can add shocks to the Phillips curve to account for temporary increases in the price of inflation
2. The actual rate of inflation now depends on three things:

$$\pi_t = \pi_{t-1} + \bar{v}\tilde{Y}_t + \bar{o}$$

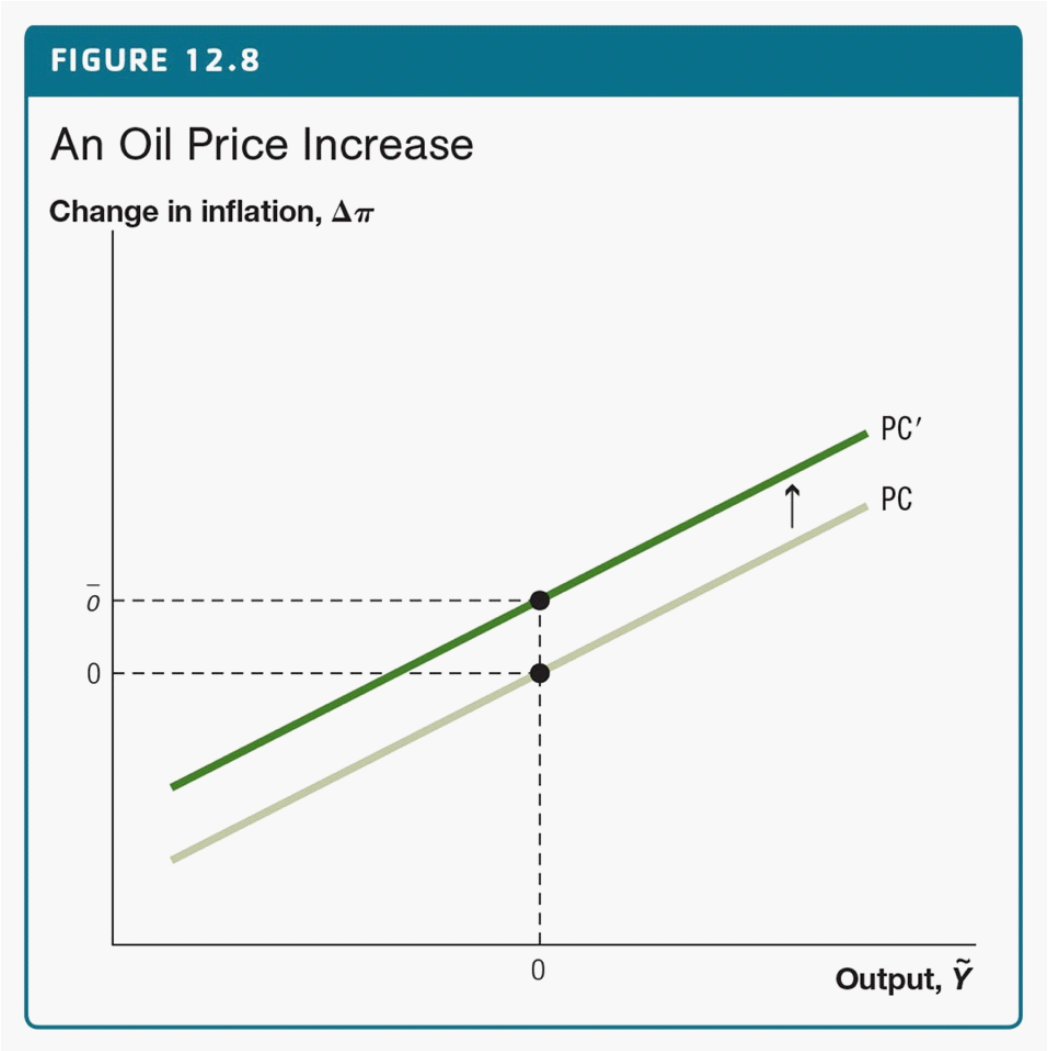
Expected rate of inflation

Adjustment factor for state of economy

Shock to inflation

$$\Delta\pi_t = \bar{v}\tilde{Y}_t + \bar{o}$$

The price of oil rises

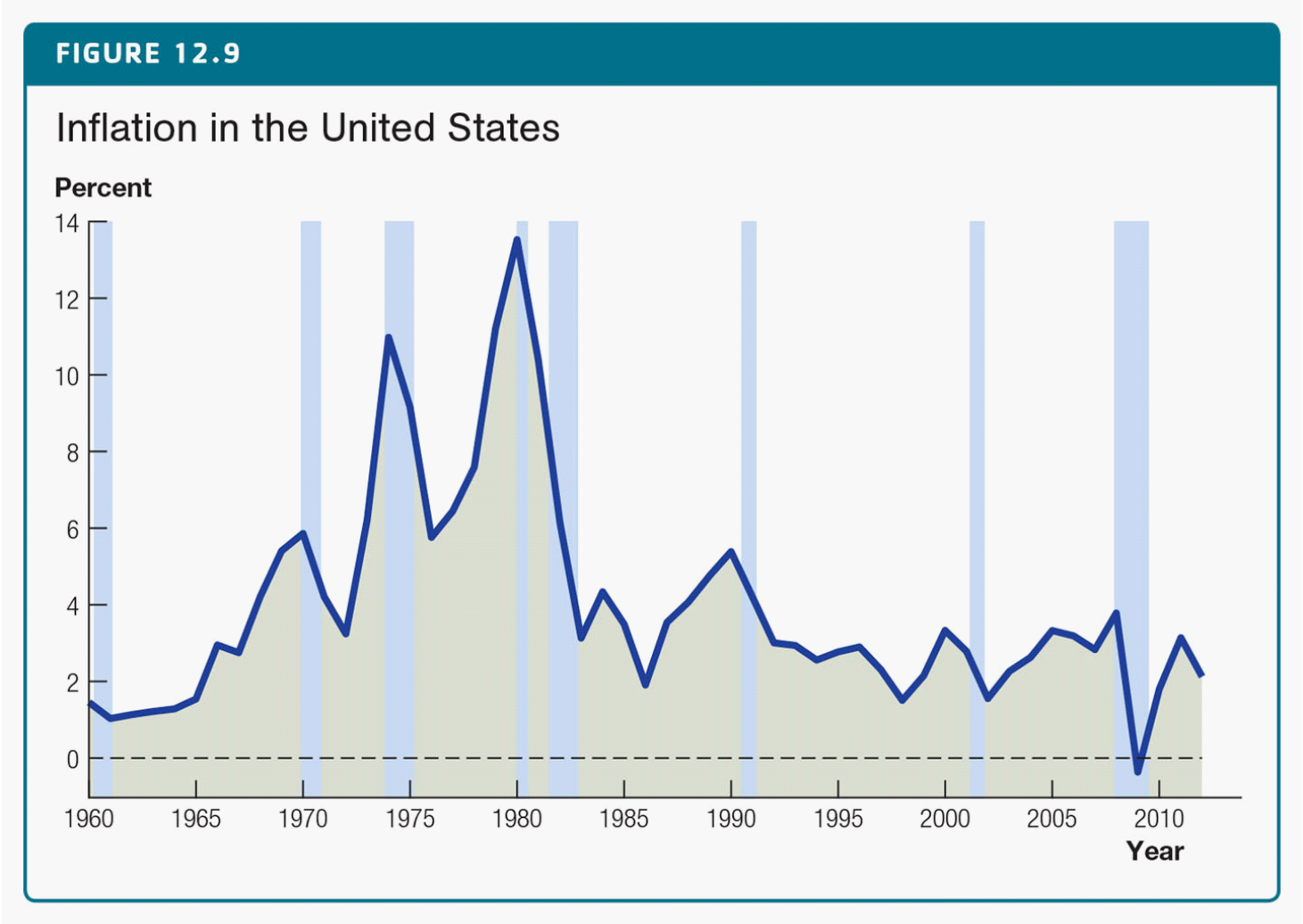


III – Using the Short-Run Model

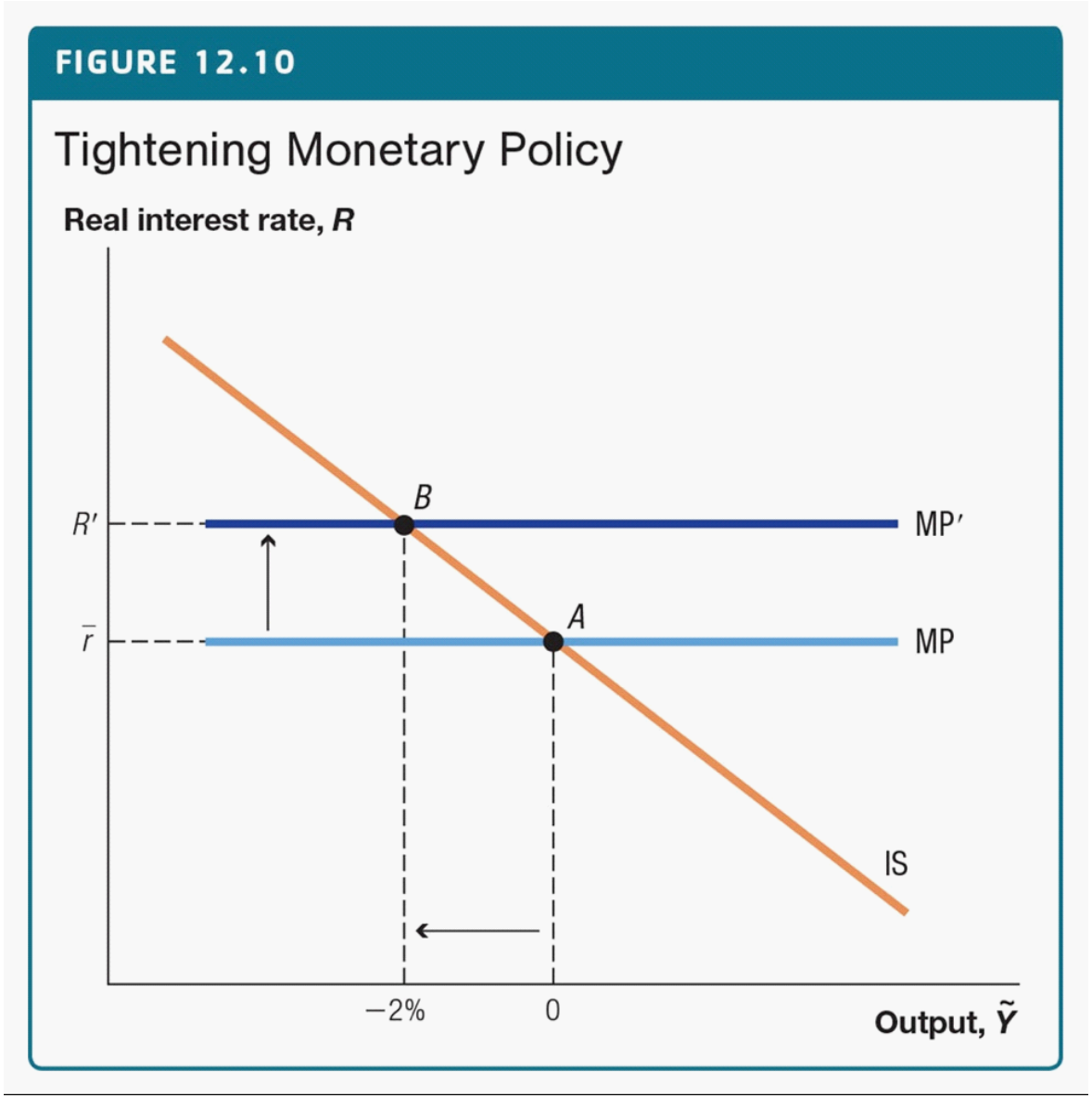
The Great Inflation of the 1970s and the Volcker Disinflation

1. Misinterpreting the productivity slowdown contributed to rising inflation.
2. Disinflation: sustained reduction of inflation to a stable lower rate
3. The Volcker Disinflation
    1. The real interest rate must increase to induce a recession to reduce inflation
    2. Reducing the level of inflation requires a sharp reduction in the rate of money growth–a tight monetary policy.
4. The FED: lower money growth led to higher interest rates

The Great Inflation of the 1970s and the Volcker Disinflation

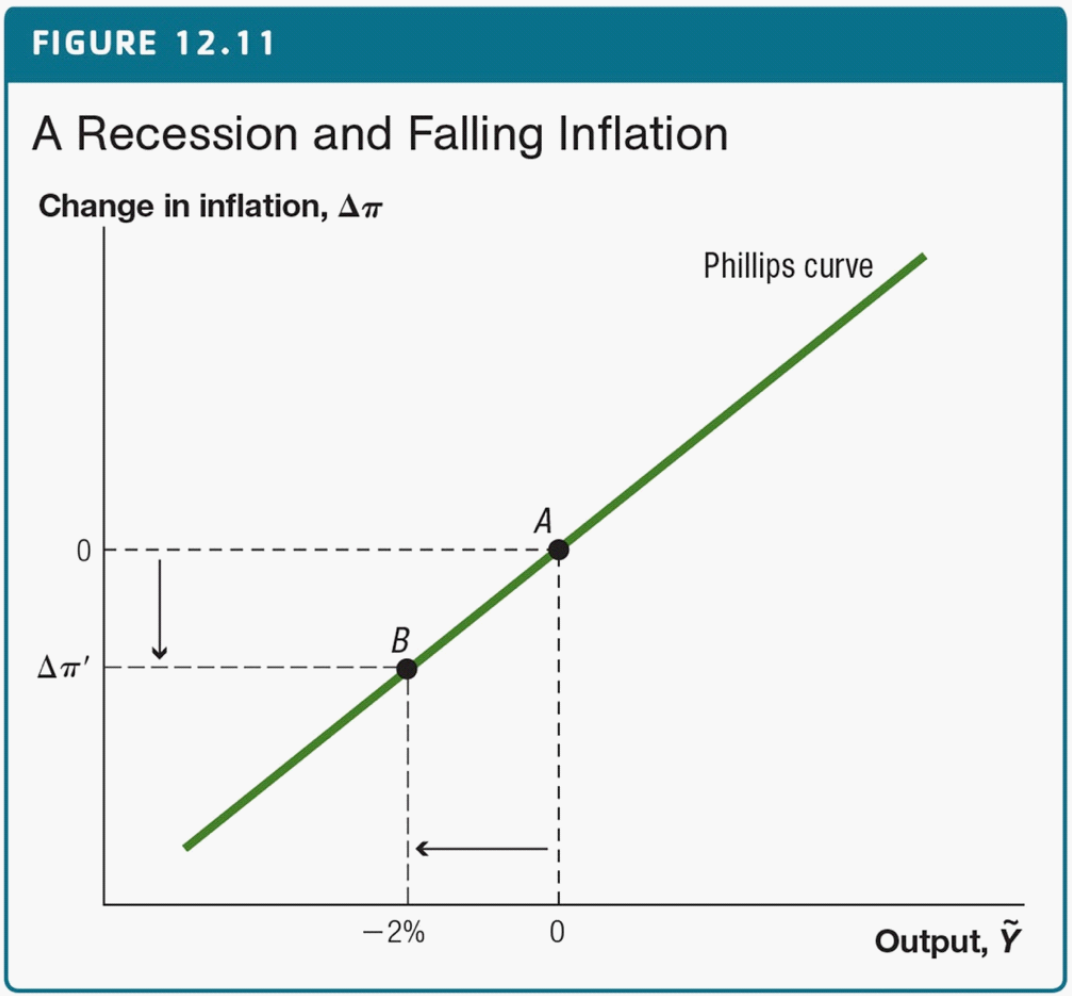


The FED increases short term nominal rates

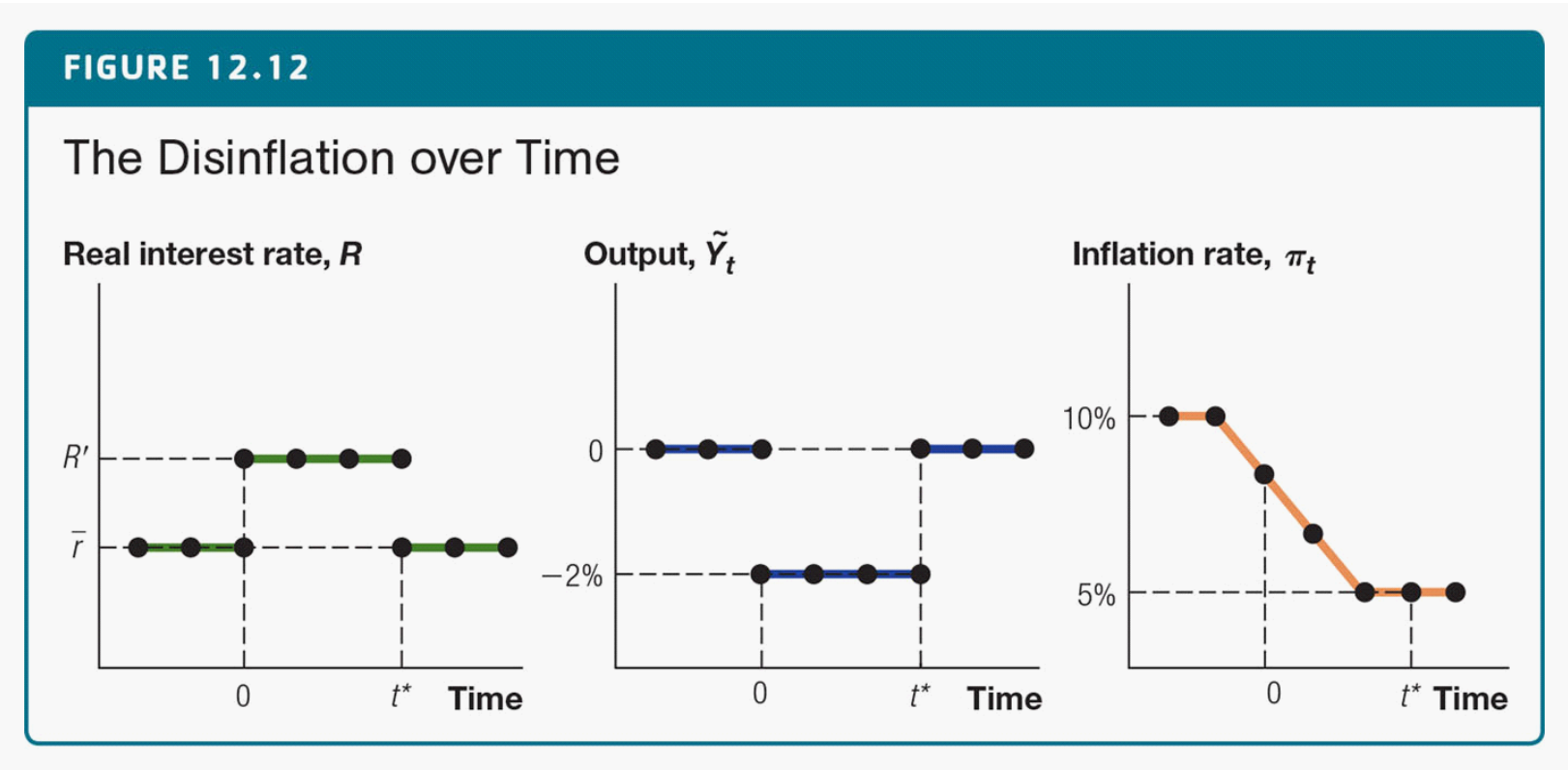


The Effect of higher interest rates on the Phillips Curve

1. The logic is: $\uparrow i \longrightarrow \uparrow R \longrightarrow \downarrow \tilde{Y} \longrightarrow \downarrow \pi$



The Effect of higher interest rates on the Phillips Curve

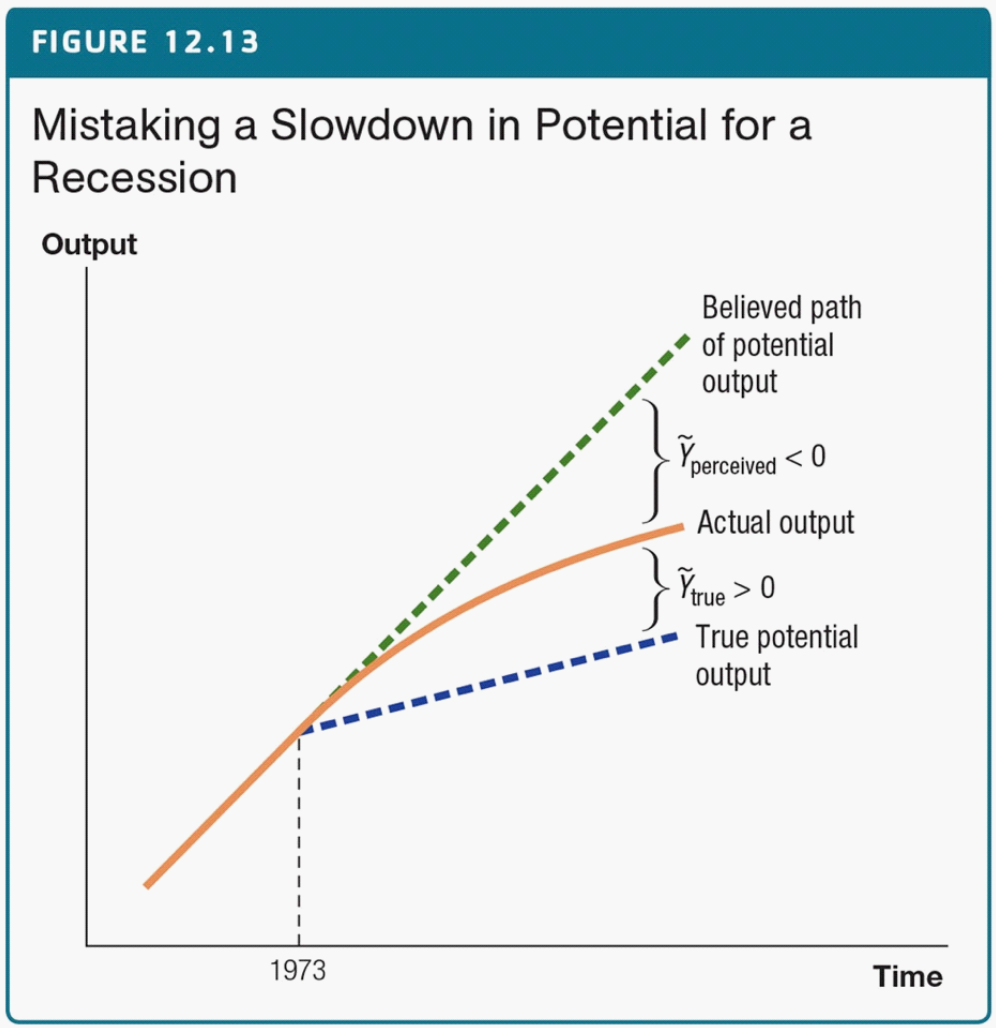


The Great Inflation of the 1970s

Inflation rose in the 1970s for three reasons:

1. OPEC coordinated oil price increases.
2. The U.S. monetary policy was too loose.
3. The Federal Reserve did not have perfect information (made a mistake)
    1. Thought the productivity slowdown was a recession

The mistake of the FED in the 1970's



The Short-Run Model in a Nutshell

MP curve	$\uparrow i_t \Rightarrow \uparrow R_t$
IS curve	$\uparrow R_t \Rightarrow \downarrow \tilde{Y}_t$
Phillips curve	$\downarrow \tilde{Y}_t \Rightarrow \downarrow \Delta\pi_t$

III – Microfoundations: Understanding Sticky Inflation

— Not covered —

IV – Microfoundations: How Central Banks Control Nominal Interest Rates

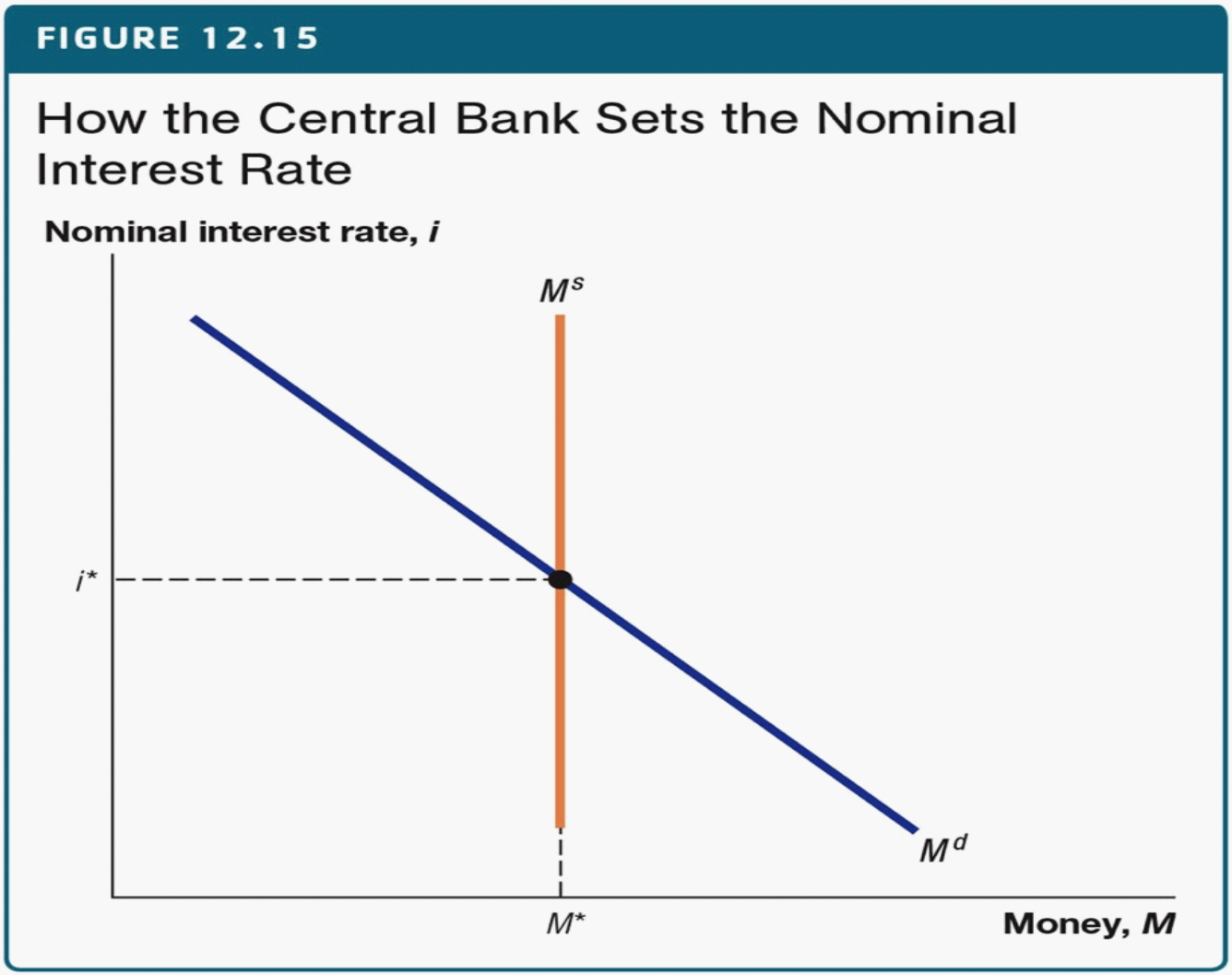
Central Banks & short term nominal interest rates

1. The central bank controls the level of the nominal interest rate by supplying the money that is demanded at that rate.
2. The nominal interest rate:
    1. Is the opportunity cost of holding money
    2. Is the amount you give up by holding money instead of keeping it in a savings account
    3. Is pinned down by equilibrium in the money market
3. It is determined by the equilibrium between **money supply** (M^s) and **money demand** (M^d)

Money Demand and Money Supply

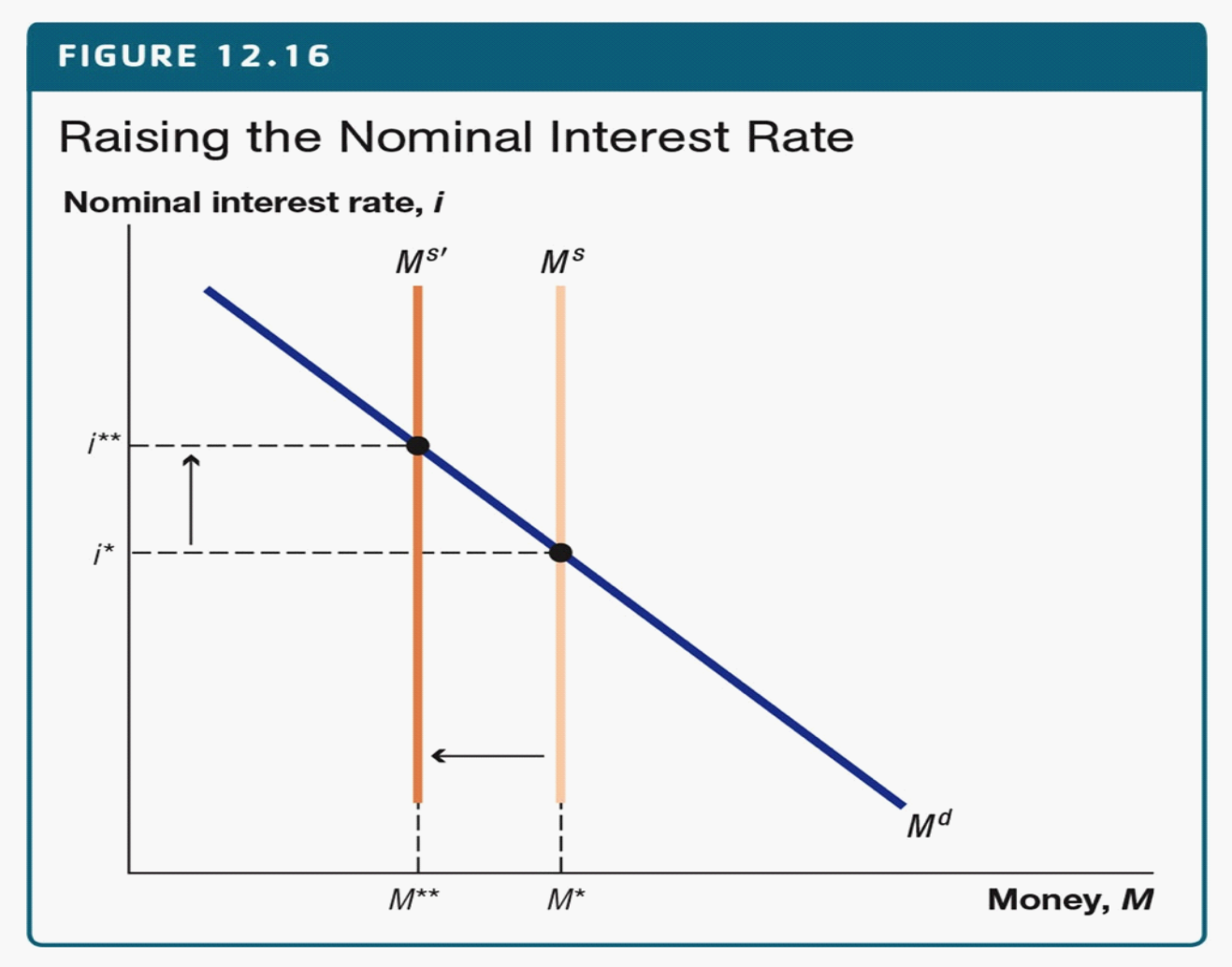
1. The demand for money
    1. Is a decreasing function of the nominal interest rate
    2. Is downward sloping
    3. Higher interest rates reduce the demand for money.
2. The supply of money
    1. Is a vertical line for the level of money the central bank provides

The equilibrium in the money market



Changing the Interest Rate: an increase in i

The central bank reduces the money supply

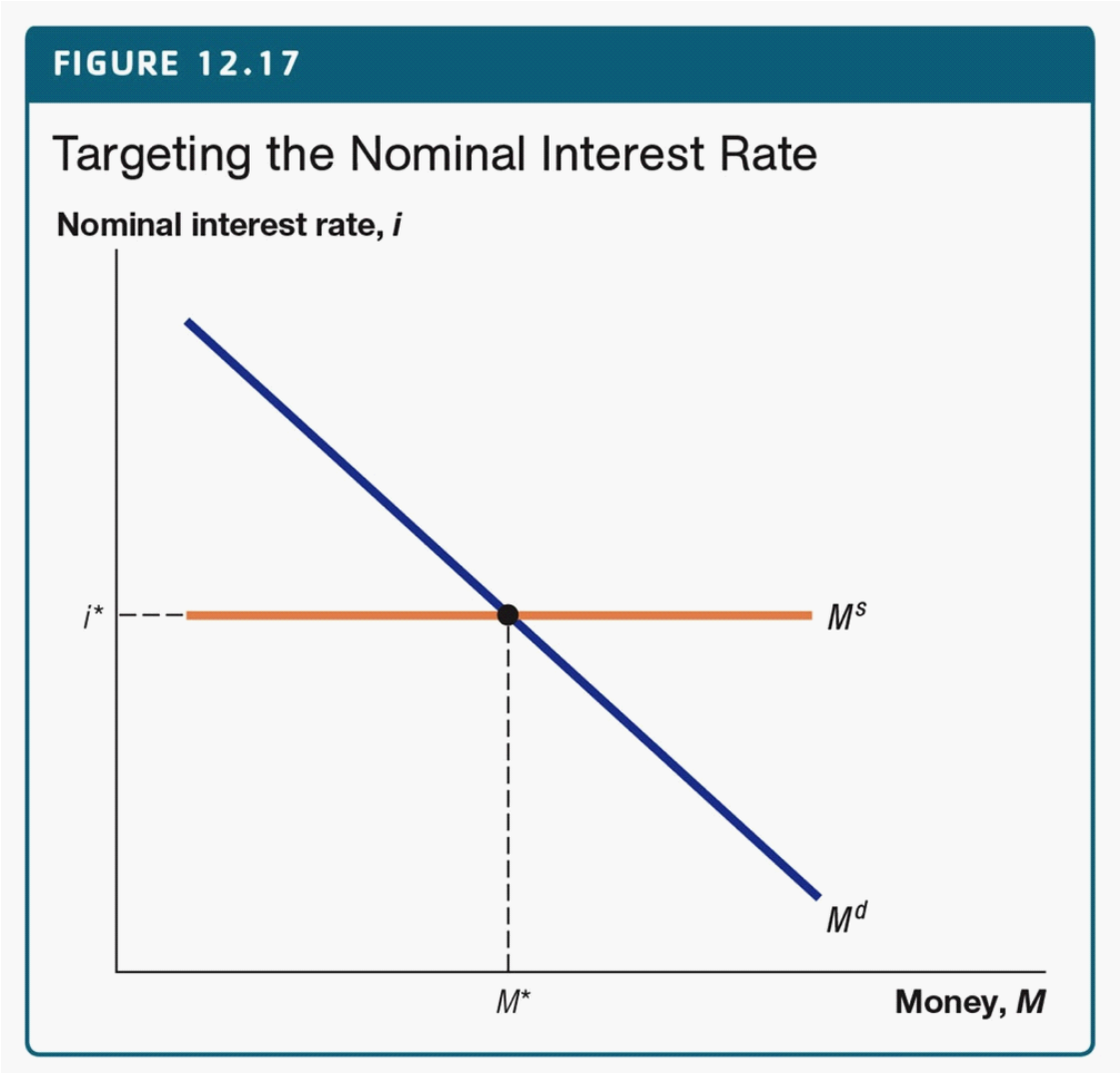


Central Banks dilemma: should they control i or Ms?

1. Nowadays Central Banks do not control the M^s
2. They try to control directly (set directly) the interest rate (i)
3. Why?
4. Because Money Demand is very unstable due to many shocks
5. How does this new set look like?
6. See next figure

Central Banks control i, the market determines M

Central Bank position: we set the interest rate at this level (i^*), and we will supply any quantity of money demanded by the market



VI – Inside the Federal Reserve

Main aggregates of the FED

1. Reserves
    1. Deposits held in accounts with the central bank
    2. Pay no interest
2. Reserve requirements
    1. Banks required to hold a certain fraction of their deposits

Main monetary policy instruments

1. Discount rate
    1. Interest rate charged by the Federal Reserve on loans made to commercial banks
2. Open-market operations
    1. The central bank trades interest-bearing government bonds in exchange for currency or non-interest bearing reserves.
3. To increase the money supply, the Fed sells government bonds in exchange for currency or reserves.
    1. The price at which the bond sells determines the nominal interest rate.

VII – Required readings

Required reading

For this week you are required to read **Read Chapter 12** of our adopted textbook.

Charles I. Jones (2014). Macroeconomics, Third Edition, W. W. Norton & Company.