

# The Adjustment Process

This lecture discusses the adjustment process that takes the economy from the short run to the long run.

## A. Features of the economy in the short run

1. Prices are sticky.
2. Output can fluctuate away from its potential.
3. Unemployment can deviate from its natural rate.

## B. Features of the economy in the long run

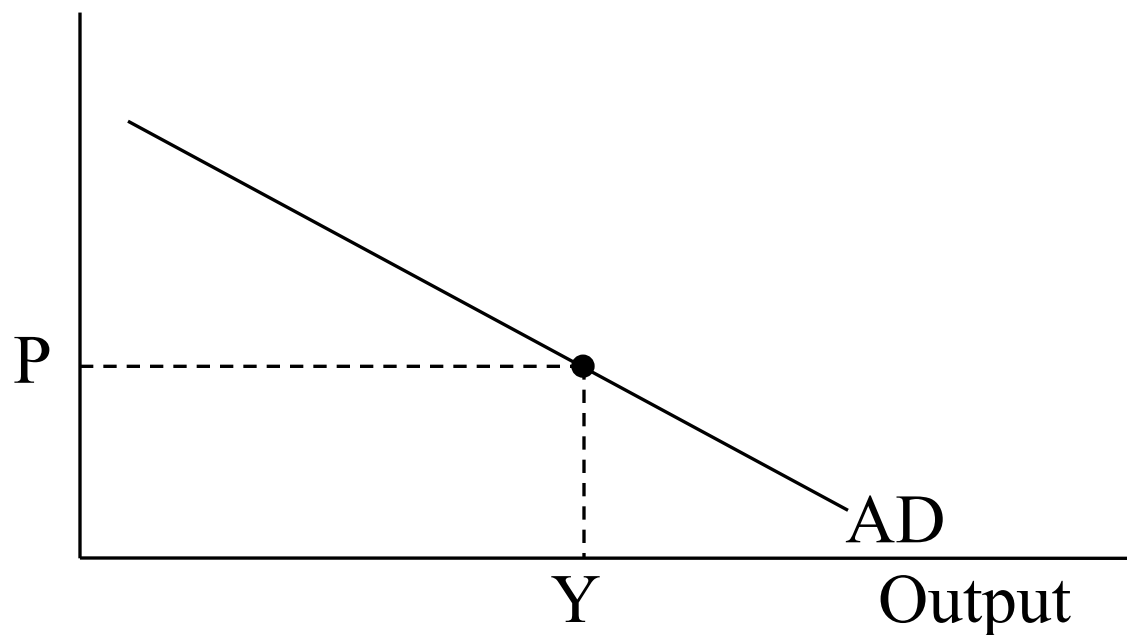
1. Prices are completely flexible.
2. Output is at its potential.
3. The economy is at full employment.

# Price Stickiness and the Short-Run Economy

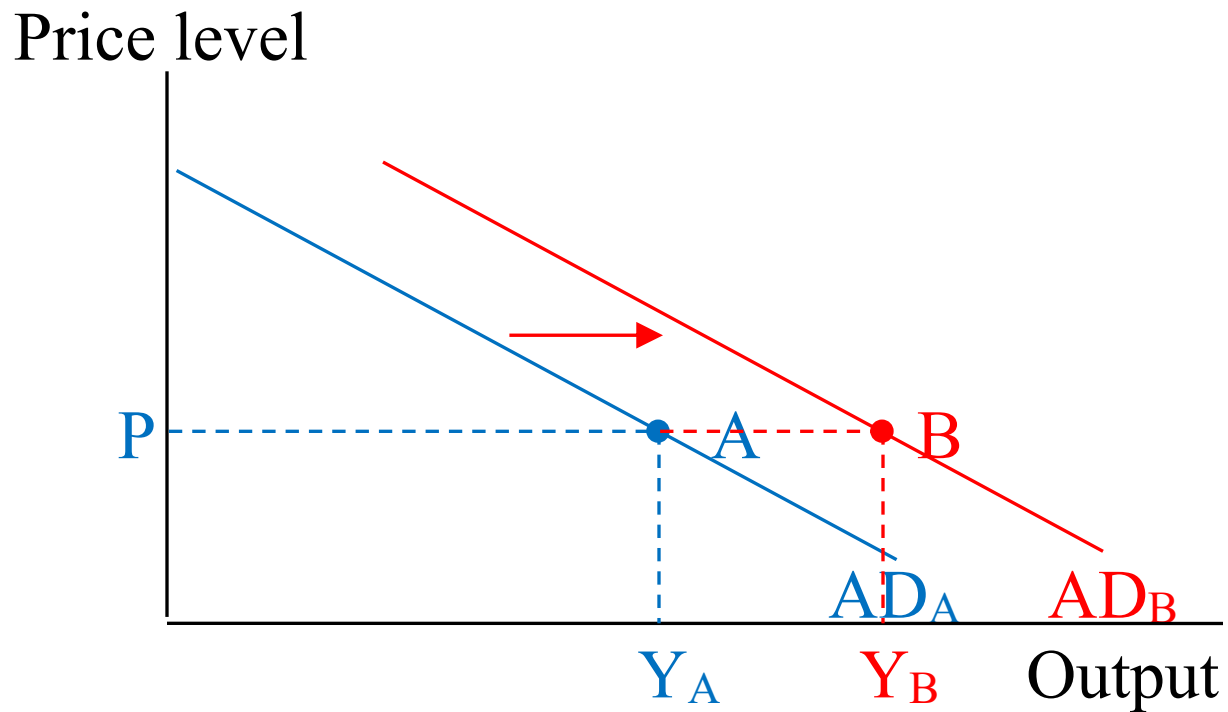
## A. The determination of output

1. Prices cannot adjust so output is demand determined.
2. The predetermined price level ( $P'$ ) and the position of the aggregate demand curve ( $AD'$ ) determines the level of output ( $Y'$ )

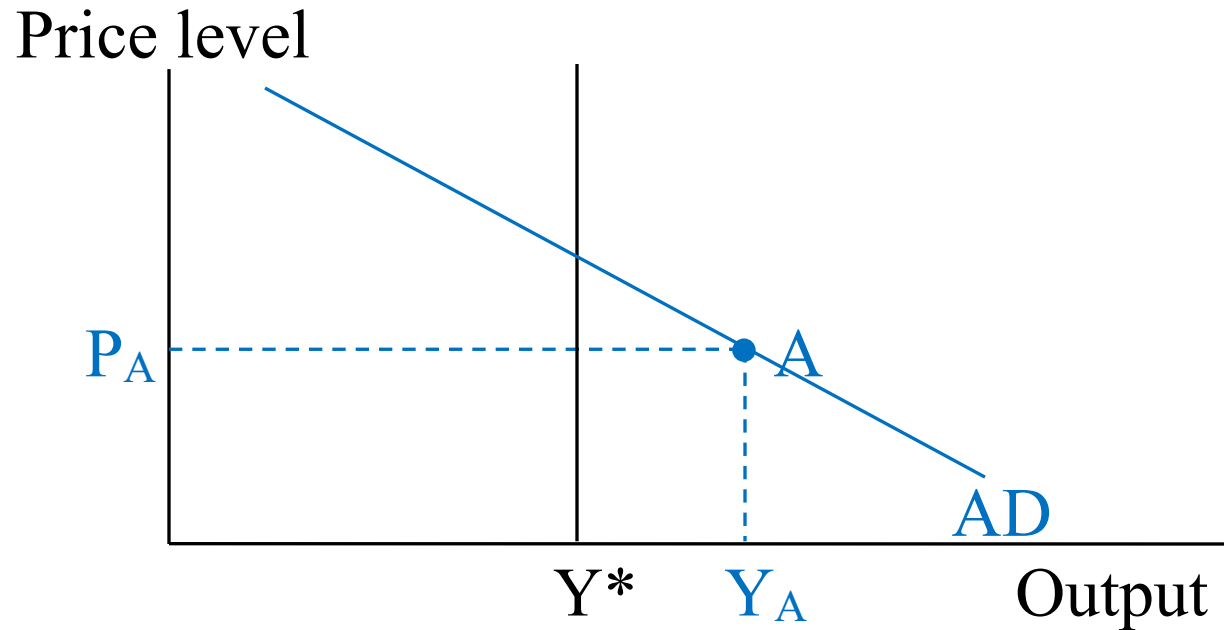
Price level



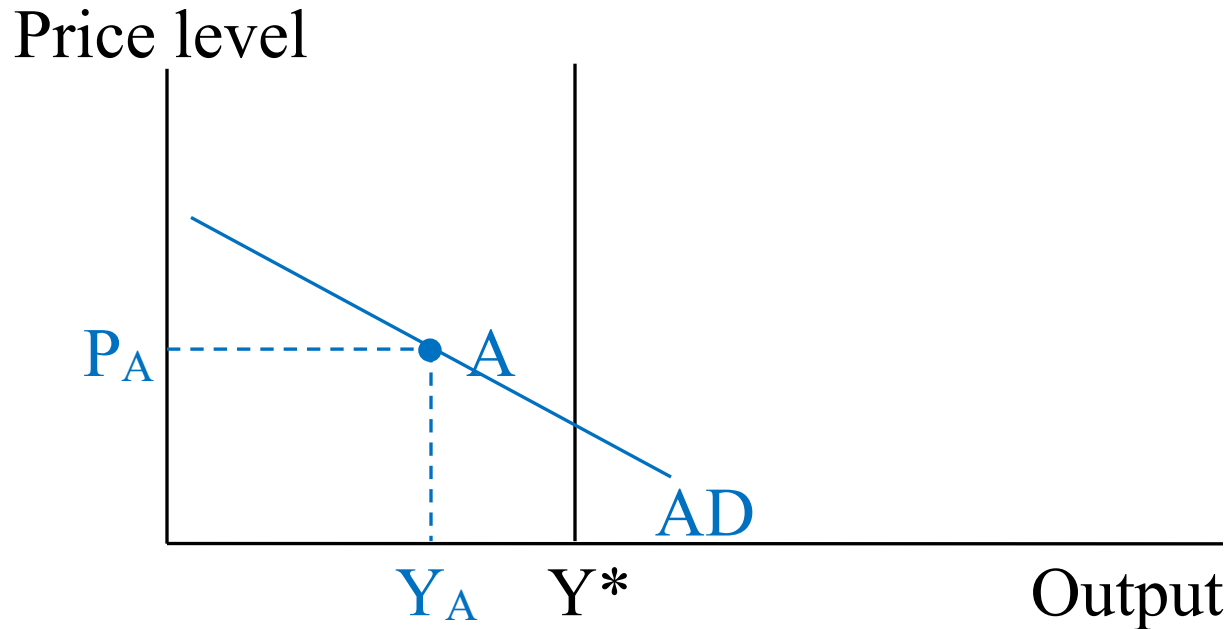
3. Increases in  $M^S$ ,  $a$ ,  $e$ ,  $G$ , and  $g_X$  or a decrease in  $g_{IM}$  cause a rightward shift in the AD curve from  $AD_A$  to  $AD_B$  and an increase in  $Y$  from  $Y_A$  to  $Y_B$ . [Note:  $P$  remains unchanged]



4. Since prices do not adjust immediately,  $Y$  can be above or below its potential ( $Y^*$ ).
- a. Example, output ( $Y_A$ )  $>$   $Y^*$



b. Example, output ( $Y_A$ )  $<$   $Y^*$



5. Since  $Y$  can be away from  $Y^*$  in the short run, firms have an incentive to raise  $P$  if  $Y > Y^*$  or lower  $P$  if  $Y < Y^*$ .

## B. The determination of unemployment

1. Okun's Law establishes the following close relationship between output (Y) and the unemployment rate (U)

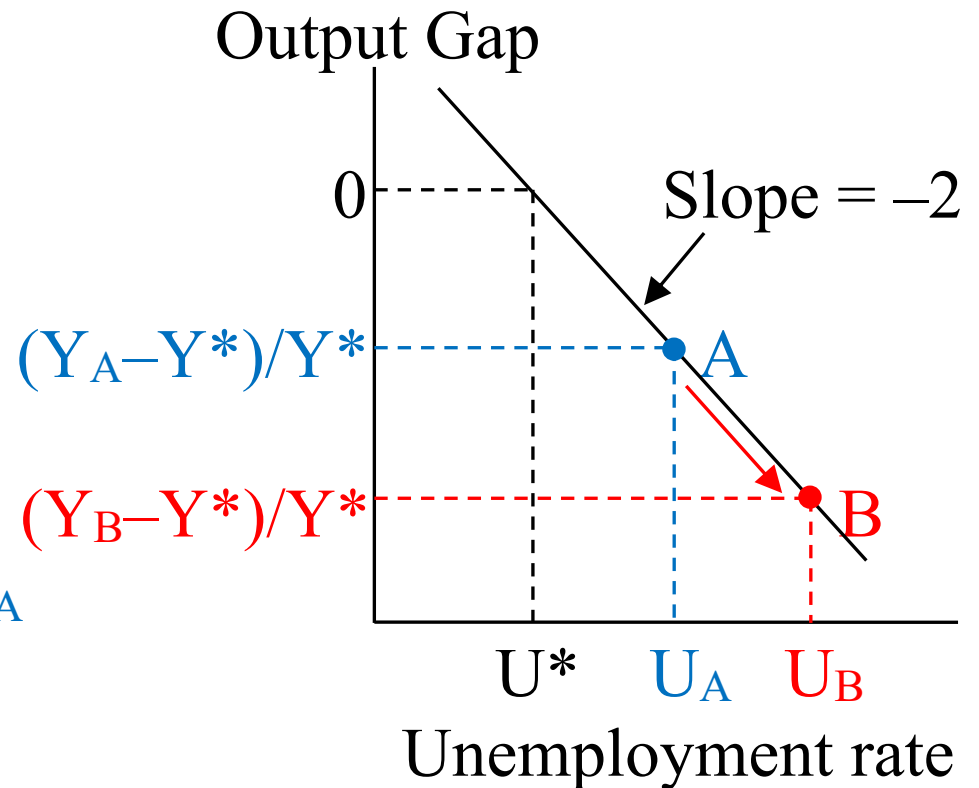
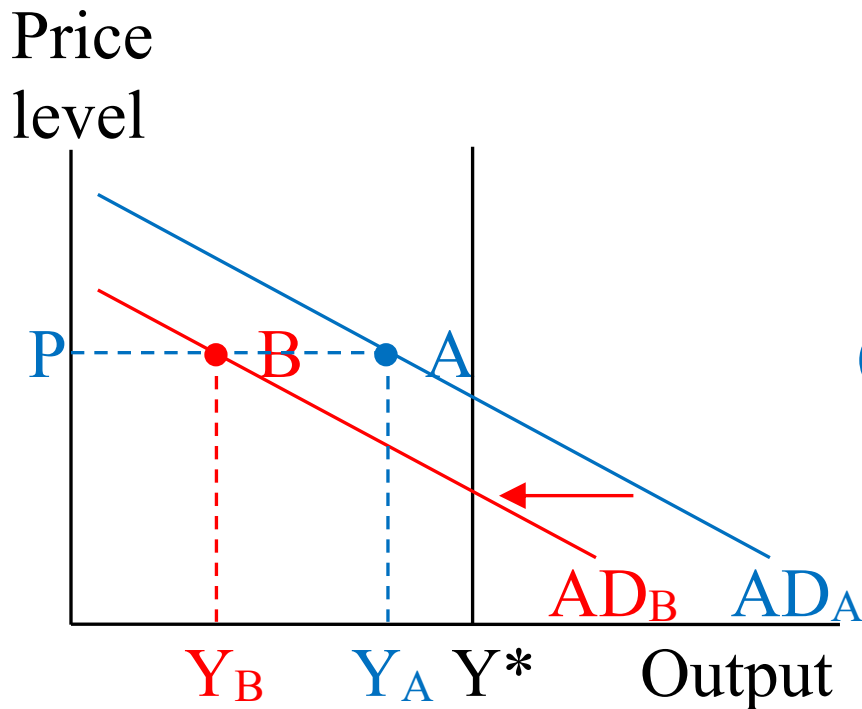
$$(Y - Y^*)/Y^* = -2 \times (U - U^*)$$

where  $Y^*$  is potential output and  $U^*$  is the natural rate of unemployment.

2. When a negative shock pushes the AD curve leftward, output falls. This means employers need less labor so unemployment rises. Thus, falling output is associated with rising unemployment as stated in Okun's Law.

### 3. A graphical interpretation

Suppose AD declines from  $AD_A$  to  $AD_B$ . This drop causes  $Y$  to fall from  $Y_A$  to  $Y_B$  and  $(Y - Y^*)/Y^*$  to decline. Thus,  $U$  rises from  $U_A$  to  $U_B$  via Okun's Law.



# Price Adjustment

## A. The determinants of inflation ( $\pi$ )

1. The % deviation of  $Y$  from its potential ( $Y^*$ ):  $(Y - Y^*)/Y^*$ 
  - a. When  $Y > Y^*$ , firms demand for labor is high, which puts upward pressure on the wage rate. Higher wages increase production costs so firms find it profitable to raise prices. [the opposite holds when  $Y < Y^*$ ]
  - b. Thus, prices usually move in the same direction as output.
  - c. Prices cannot adjust to current output, ( $Y$ ) but can adjust to output in the previous period ( $Y_{-1}$ ). [A period is usually either a year or a quarter depending on the model]
  - d. Thus, we say that current inflation responds to deviations in  $Y_{-1}$  from  $Y^*$ .



## 2. Expected inflation ( $\pi^e$ )

- a. People's expectations for inflation are often related to what the previous inflation rate ( $\pi_{-1}$ ) was.
- b. Expectations of future monetary policy actions are also key in determining expected inflation.

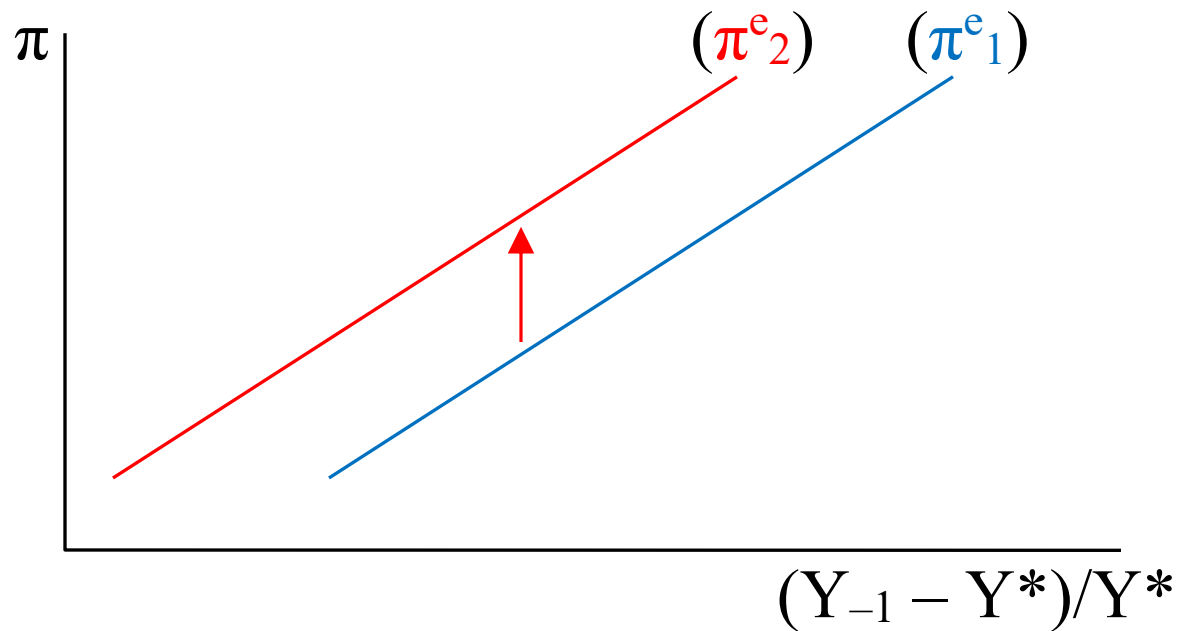
## B. The Phillips curve

1. Shows the relationship between the inflation rate and the % deviation of output from its potential.
2. Algebraic description

$$\pi = \pi^e + f[(Y_{-1} - Y^*)/Y^*]$$

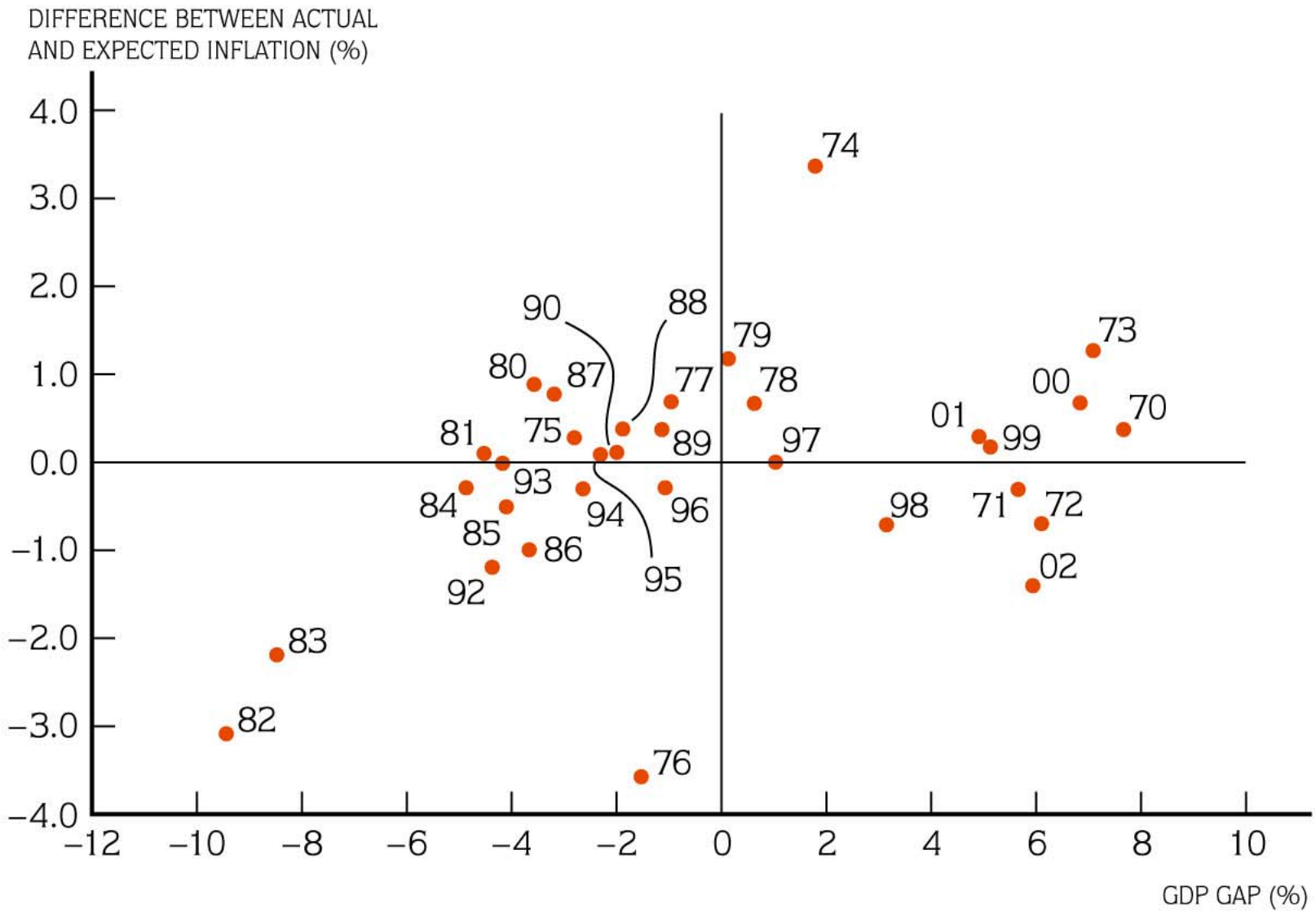
3. Each curve is drawn for a given expected inflation rate.
4. An increase (decrease) in expected inflation shifts the Phillips curve upward (downward).

## 5. Phillips curve graph



where  $\pi^e_2 > \pi^e_1$

6. A trade-off exists between output and inflation in the short run.
7. Ex. see Figure 9.2

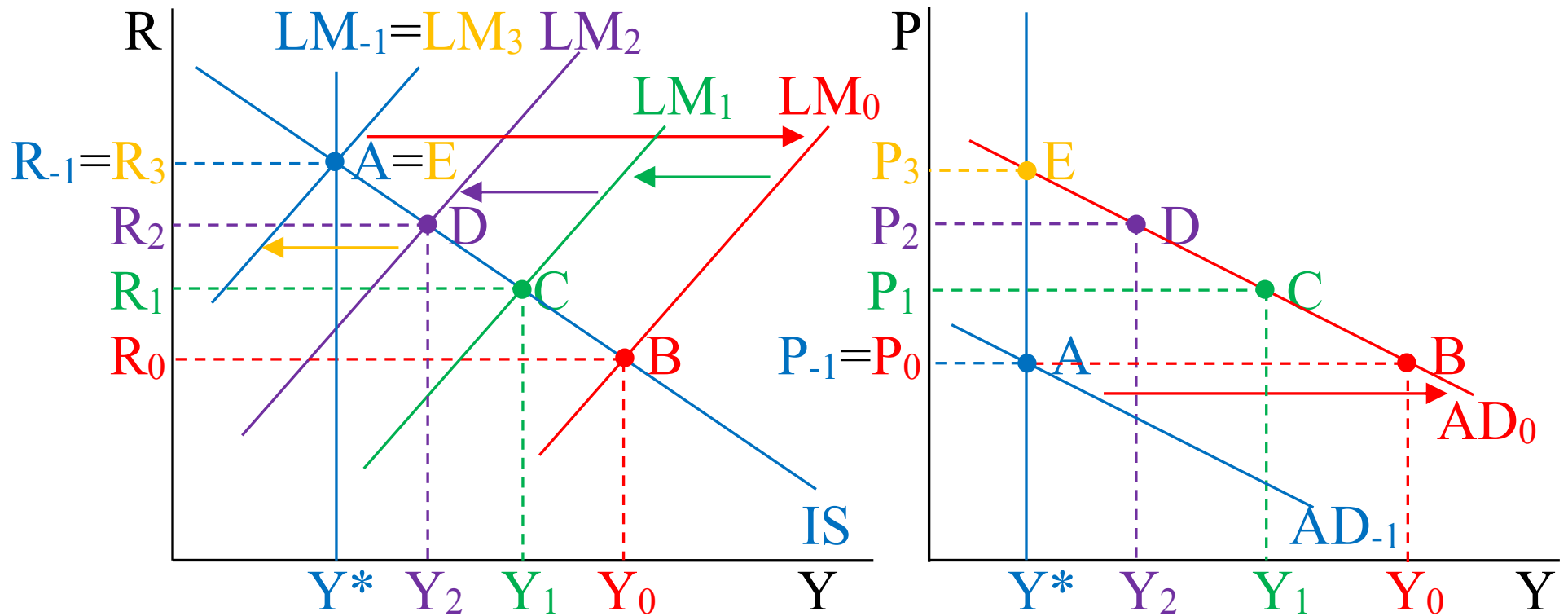


**FIGURE 9.2 Price Adjustment in the United States Since 1970**

## Combining Aggregate Demand and Price Adjustment

- A. The price level slowly adjusts over a number of periods. This is the movement from the short run to the long run.
- B. The response to an increase in the money supply
  1. In the short run, an increase in  $M^S$  causes the LM and AD curves to shift rightward from  $LM_{-1}$  and  $AD_{-1}$  to  $LM_0$  and  $AD_0$ . Thus,  $Y$  increases and  $R$  decreases.
  2. Slowly the price level starts to rise from  $P_{-1}$ , which causes the LM curve to slowly shift leftward. This leads to a gradual rise in  $R$  and a slow decline in  $Y$ . It is reflected by a movement along the AD curve.
  3. The price adjustment process stops when  $Y$  returns to its potential ( $Y^*$ ). Thus, an increase in  $M^S$  in the long run leads only to an increase in  $P$ .

4. Ex. Suppose it takes 3 periods after a period 0 increase in  $M^S$  for  $Y$  to return to  $Y^*$



## C. The response to an increase in the government spending

1. In the short run, an increase in  $G$  causes the IS and AD curves to shift rightward from  $IS_{-1}$  and  $AD_{-1}$  to  $IS_0$  and  $AD_0$ . Thus,  $Y$  and  $R$  increase.
2. Slowly, the price level starts to rise from  $P_{-1}$ , which causes the LM curve to slowly shift leftward. This leads to a gradual rise in  $R$  and a slow decline in  $Y$ . It is reflected by a movement along the AD curve.
3. The price adjustment process stops when  $Y$  returns to its potential ( $Y^*$ ). Thus, an increase in  $G$  in the long run leads to increases in  $P$  and  $R$  and decreases in  $I$  and  $(X - IM)$ .

4. Ex. Suppose it takes 3 periods after a period 0 increase in  $G$  for  $Y$  to return to  $Y^*$

