



THE OFFICE OF
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Complexity in Macroeconomics within Short Run Fluctuation (Financial Crisis)

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Objectives:

In this class, you will learn:

- Facts about the business cycle
- How the short run differs from the long run
- An introduction to aggregate demand
- An introduction to aggregate supply in the short run and in the long run
- How the model of aggregate demand and aggregate supply can be used to analyze the short-run and long-run effects of “shocks.”



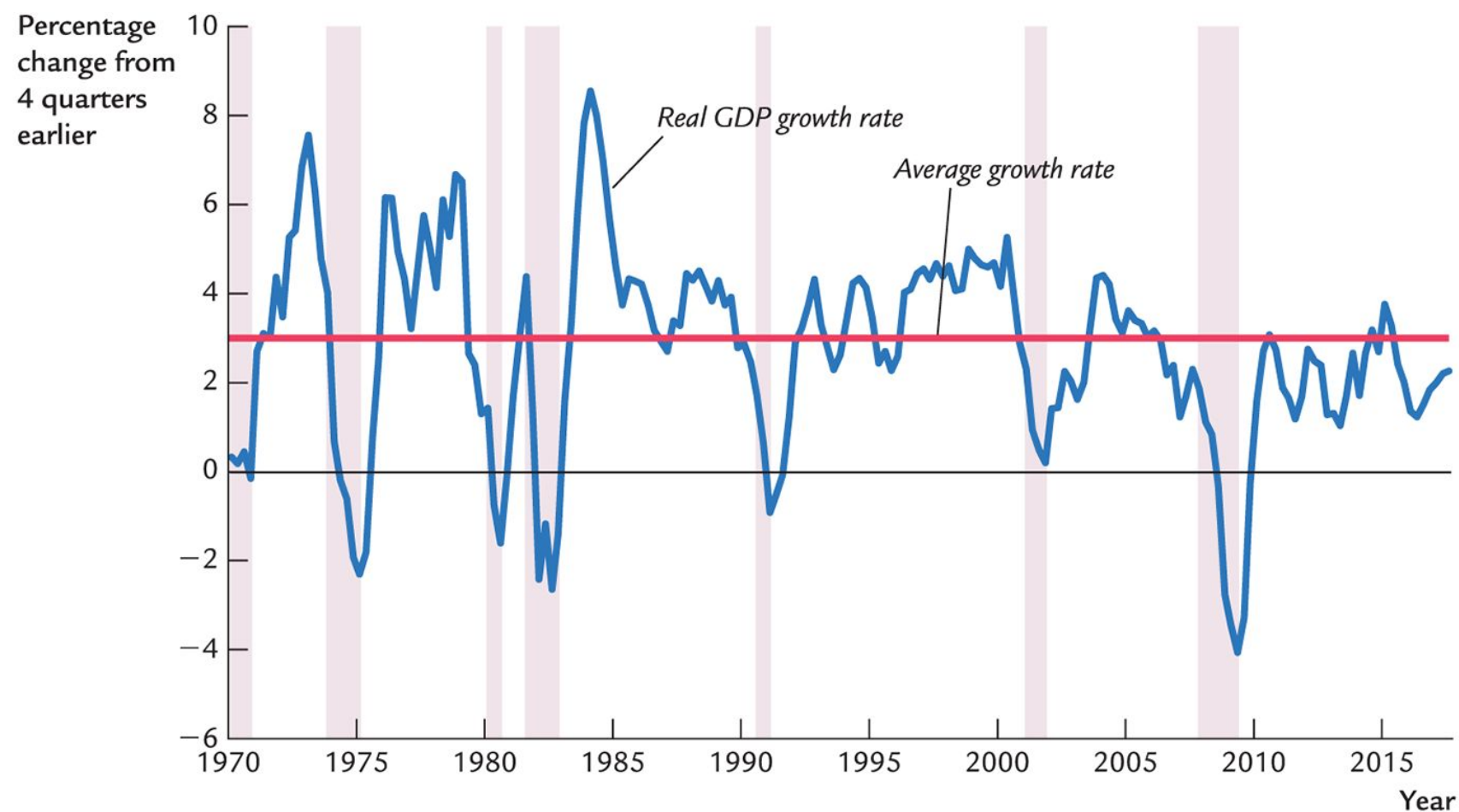
Facts About The Business Cycle

- GDP growth averages 3–3.5% per year over the long run, with large fluctuations in the short run.
- Consumption and investment fluctuate with GDP, but consumption tends to be less volatile and investment more volatile than GDP.
- Unemployment rises during recessions and falls during expansions.
- **Okun's law:** the negative relationship between GDP and unemployment



Growth rates of real GDP

Growth rates of real GDP, consumption



- The shaded vertical bars denote recessions.
- Over the long run, real GDP grows about 3 percent per year. Over the short run, though, there are substantial fluctuations in GDP, as this graph clearly shows.
- This graph also shows the growth rate of consumption. It's easy to see that consumption is usually less volatile than income. Consumers prefer smooth consumption, so they use saving as a buffer against income shocks.
- (An exception occurs in the late 1990s, when consumption growth exceeded income growth—probably due to the stock market boom.)

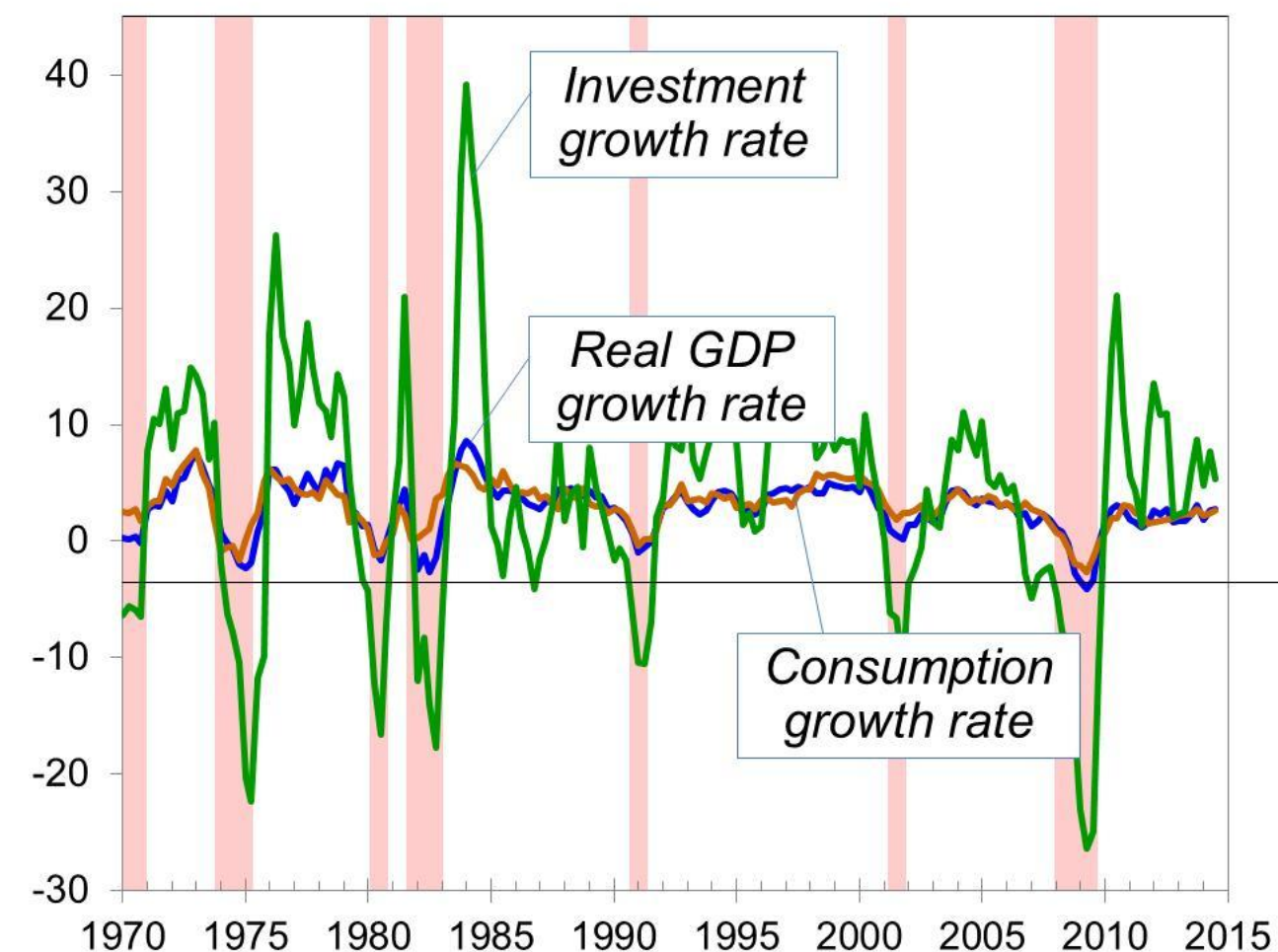


Growth rates of real GDP

Growth rates of real GDP, consump., investment

- This graph shows consumption growth and GDP growth, the same data from the previous slide, but now the vertical axis has a much bigger scale to accommodate the addition of investment growth.
- **The point: Investment is far more volatile than GDP or consumption.**

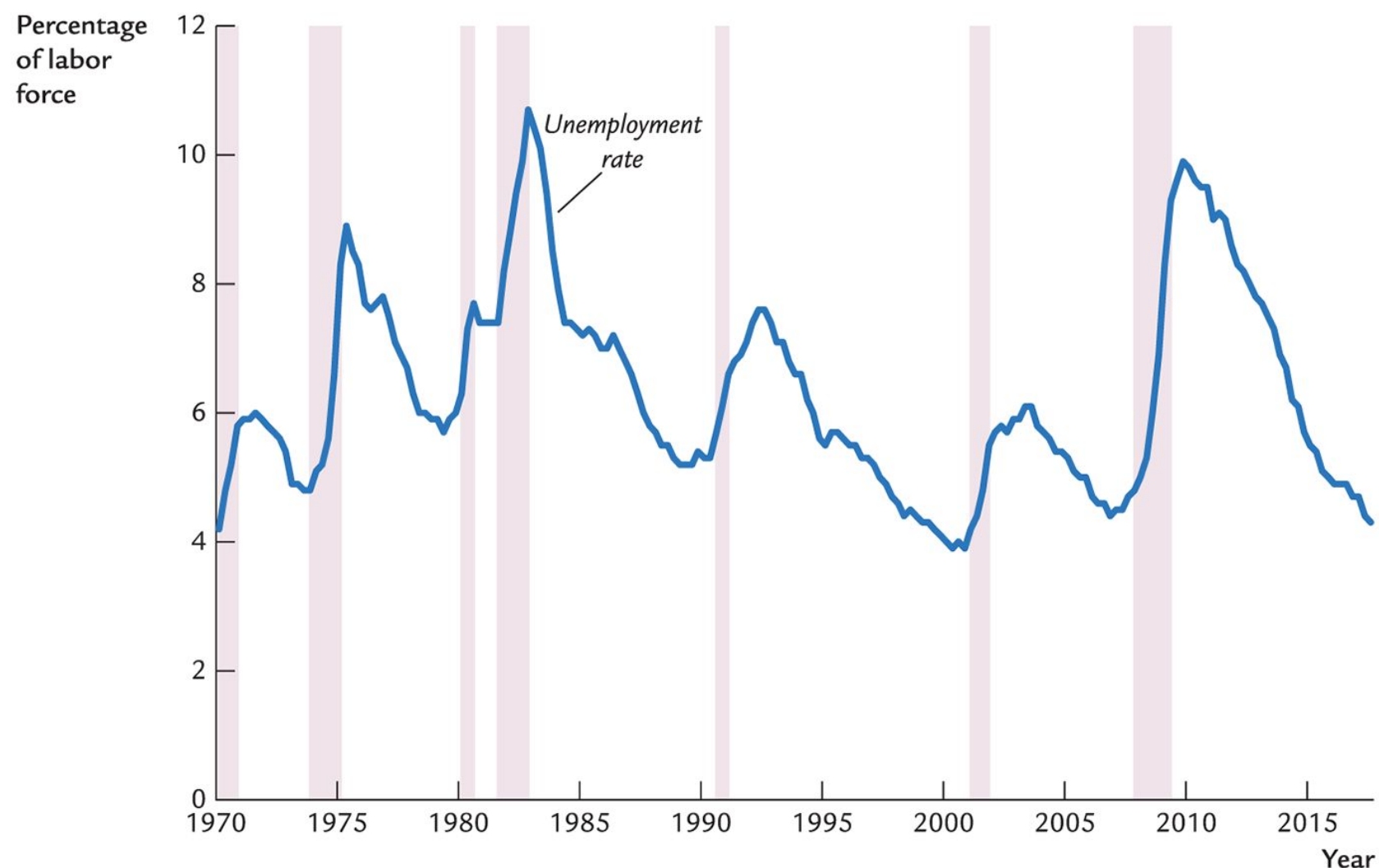
Percent
change from
4 quarters
earlier





Facts About The Business Cycle

Unemployment

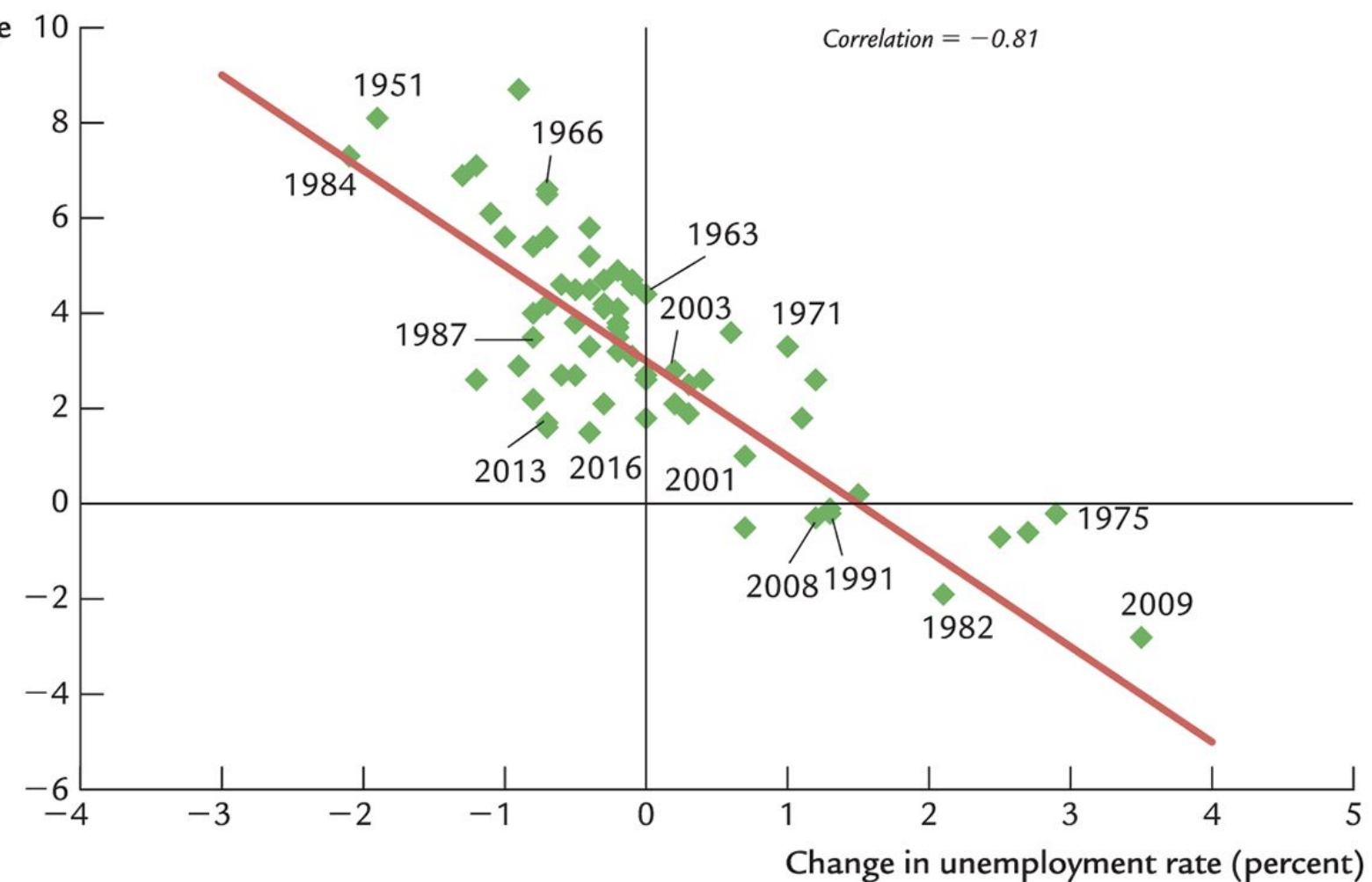


- The unemployment rate rises during recessions and falls during expansions.
- Since the 1991 recession, the unemployment rate has lagged GDP growth, particularly in recoveries. In each of the three recessions since 1990, the unemployment rate has continued rising for a few months after the recession ends before it beginning to fall.

Facts About The Business Cycle

- This figure is a scatterplot of the change in the unemployment rate on the horizontal axis and the percentage change in real GDP on the vertical axis, using data on the U.S economy.
- Each point represents one year.
- The figure shows that increases in unemployment tend to be associated with lower-than-normal growth in real GDP.
- The correlation between these two variables is -0.81.

Okun's law





Index of Leading Economic Indicators

- Published monthly by the Conference Board.
- Aims to forecast changes in economic activity 6–9 months into the future.
- Used in planning by businesses and government, despite not being a perfect predictor.



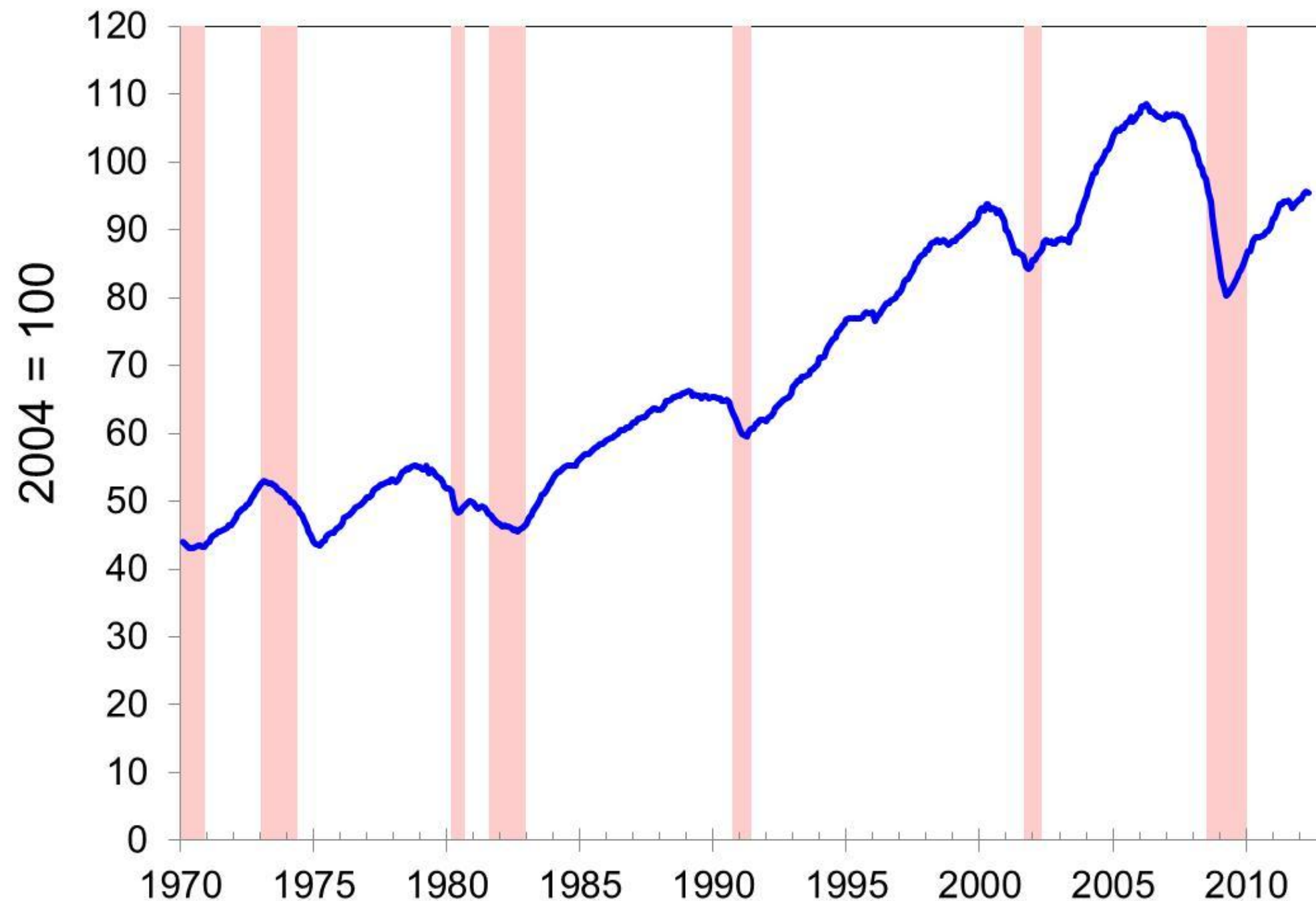
Components of The LEI Index

- Average workweek in manufacturing
- Initial weekly claims for unemployment insurance
- New orders for consumer goods and materials
- New orders, nondefense capital goods
- ISM new orders index
- New building permits issued
- Index of stock prices
- Lending credit index
- Yield spread (10-year minus 3-month) on Treasuries
- Index of consumer expectations



Components of The LEI Index

Index of leading economic indicators, 1970–2012



- The index turns downward a few months to a year before almost every recession.
- It also turns upward just prior to the end of almost every recession.

Source: Conference Board,
<http://www.conference-board.org>



Time Horizons in Macroeconomics

- Long run
Prices are flexible, responding to changes in supply or demand.
- Short run
Many prices are “sticky” at a predetermined level.

The economy behaves much differently when prices are sticky.



Recap of Classical Macro Theory

- Output is determined by the supply side:
 - supplies of capital, labor
 - technology
- Changes in demand for goods and services (**C**, **I**, **G**) only affect prices, not quantities.
- Assumes complete price flexibility.
- Applies to the long run.



When prices are sticky....

. . . output and employment also depend on demand, which is affected by:

- fiscal policy (G and T)
- monetary policy (M)
- other factors, like exogenous changes in C or I



The Model of Aggregate Demand and Supply

- The paradigm most mainstream economists and policymakers use to think about economic fluctuations and policies to stabilize the economy
- Shows how the price level and aggregate output are determined
- Shows how the economy's behavior is different in the short run and in the long run

Aggregate demand

- The aggregate demand curve shows the relationship between the price level and the quantity of output demanded.
- For this chapter's intro to the AD/AS model, we use a simple theory of aggregate demand based on the quantity theory of money.

The quantity equation as aggregate demand

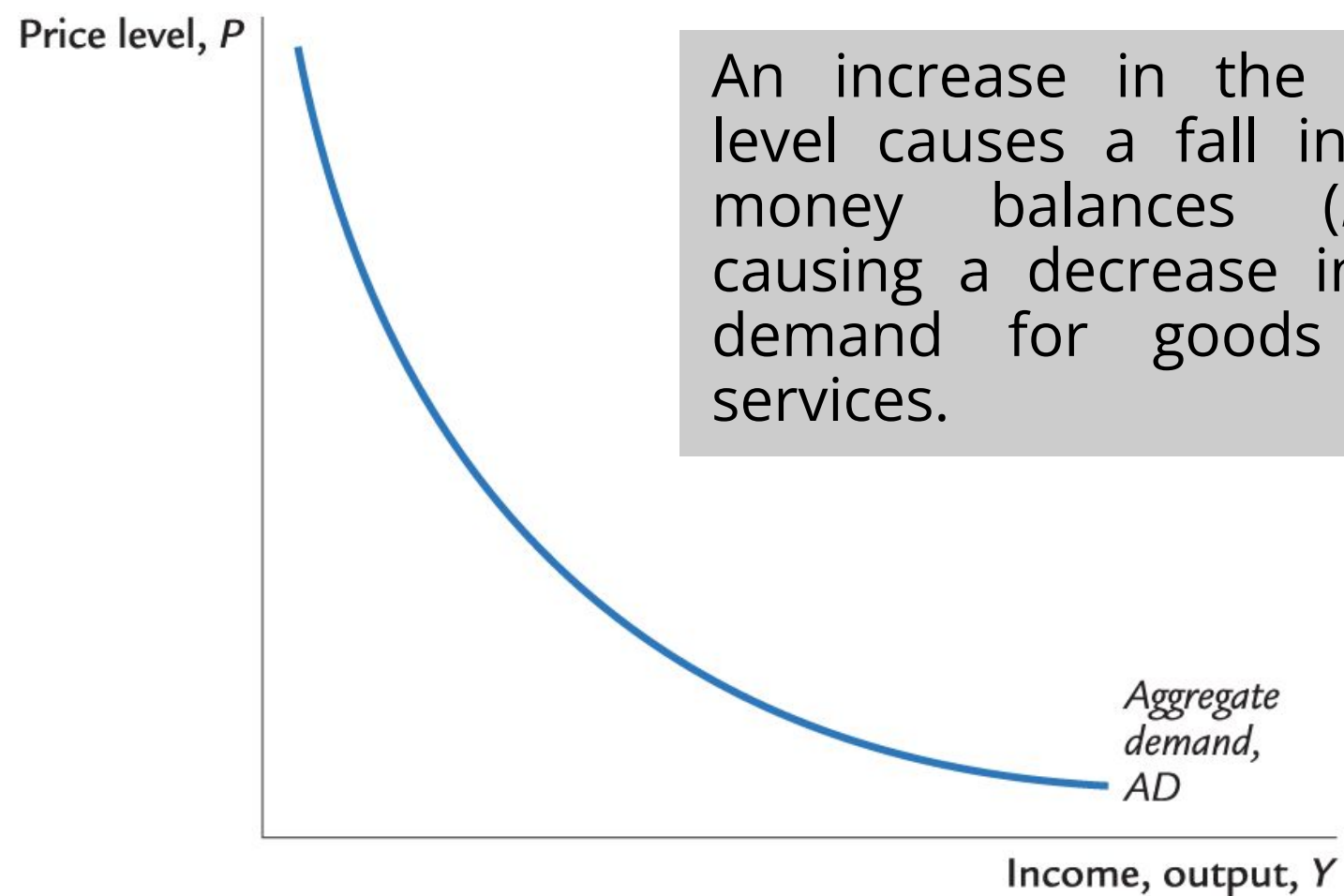
- Quantity equation:
$$M V = P Y$$
- For given values of M and V , this equation implies an inverse relationship between P and Y ...

M is the supply of money; V is the velocity of the circulation of money, that is, the average number of transactions that a unit of money performs within a specified interval of time; P is the price level; and Y is the final output.



Aggregate Demand Curve

The downward-sloping AD curve



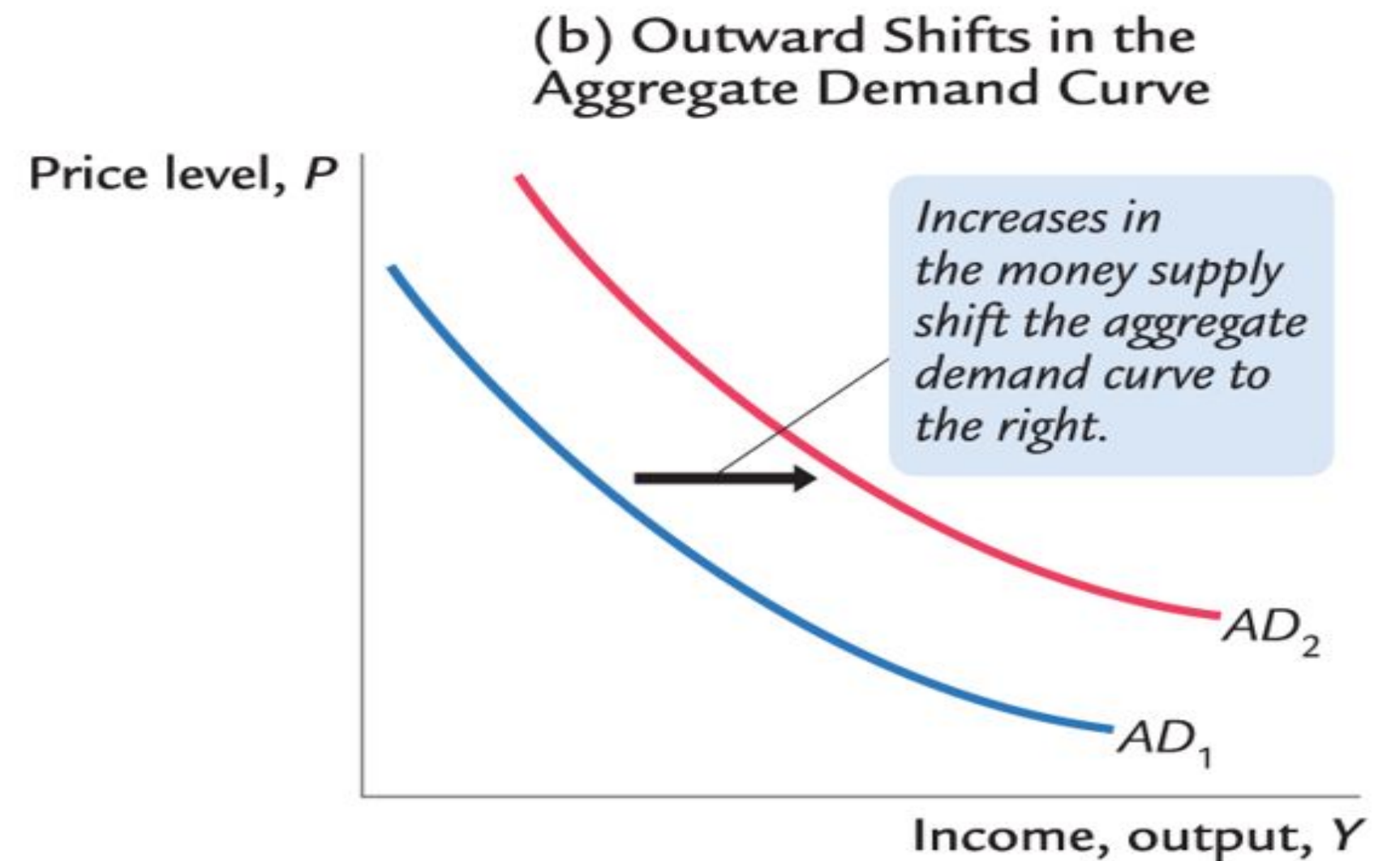
An increase in P reduces real money balances. In order to buy the same amount of stuff, velocity would have to increase. But, by definition, velocity is constant along the **AD** curve. For simplicity, suppose $V = 1$. With lower real money balances (or, equivalently, the same nominal balances but higher goods prices), people demand a smaller quantity of goods and services.

Aggregate Demand Curve

With velocity fixed, the quantity equation implies that PY is determined by M . An increase in M causes an increase in PY , which means higher Y for each value of P or higher P for each value of Y .

Or, for a given value of P , an increase in M implies higher real money balances. In the simple money demand function associated with the quantity theory, the demand for real balances is proportional to the demand for output, so output must rise at each P in order for real money demand to rise and equal the new, higher supply of real balances M/P .

Shifting the AD curve





Aggregate Supply in The Long Run

- In the long run, output is determined by factor supplies and technology.

$$\bar{Y} = F(\bar{K}, \bar{L}) \quad \text{K= Capital, L=Labor}$$

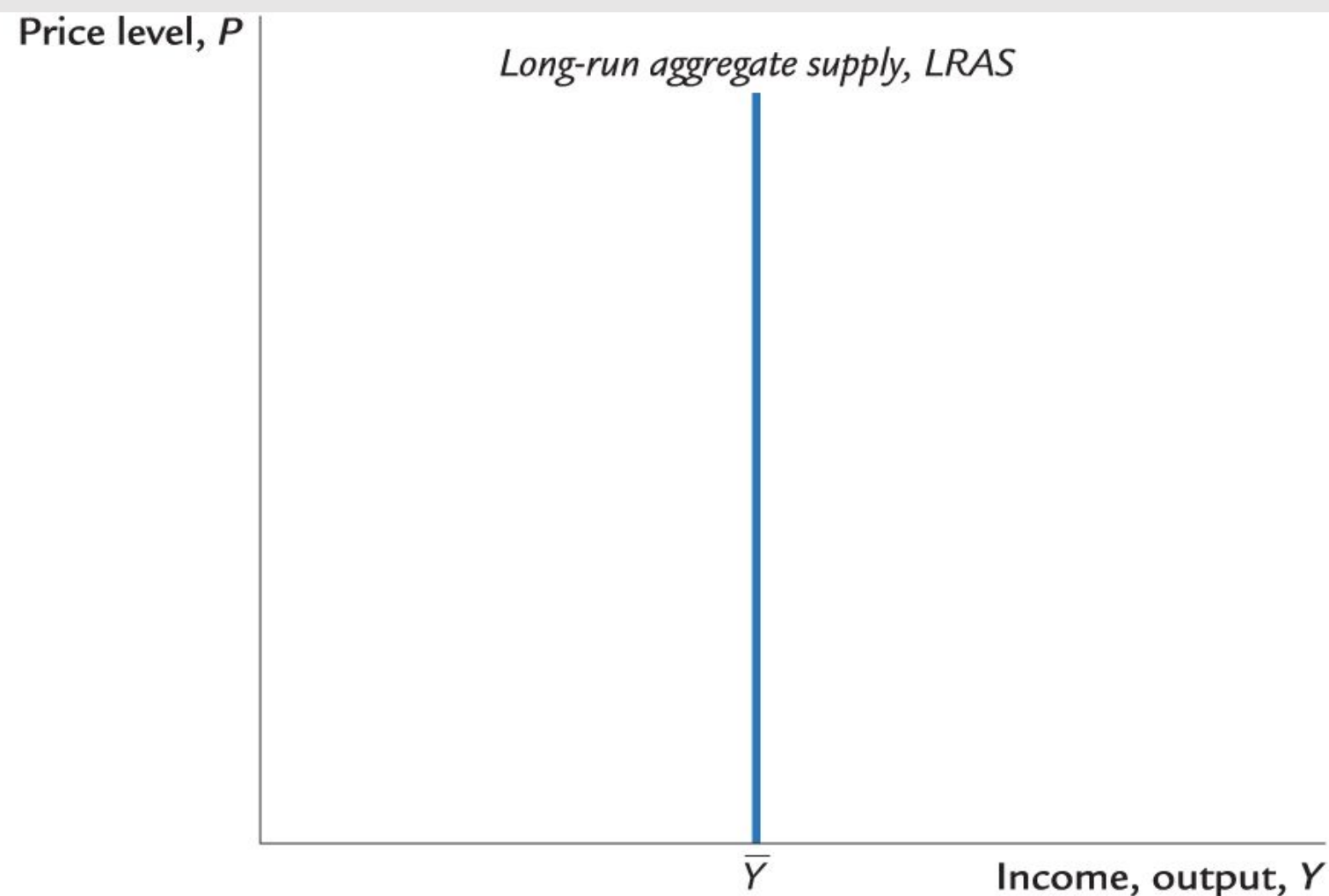
\bar{Y} is the **full-employment** or **natural** level of output, at which the economy's resources are fully employed.

“Full employment” means that unemployment equals its natural rate (not zero).



Aggregate Supply Curve (Long Run)

The long-run aggregate supply curve



Mankiw, *Macroeconomics*, 10e, © 2019 Worth Publishers

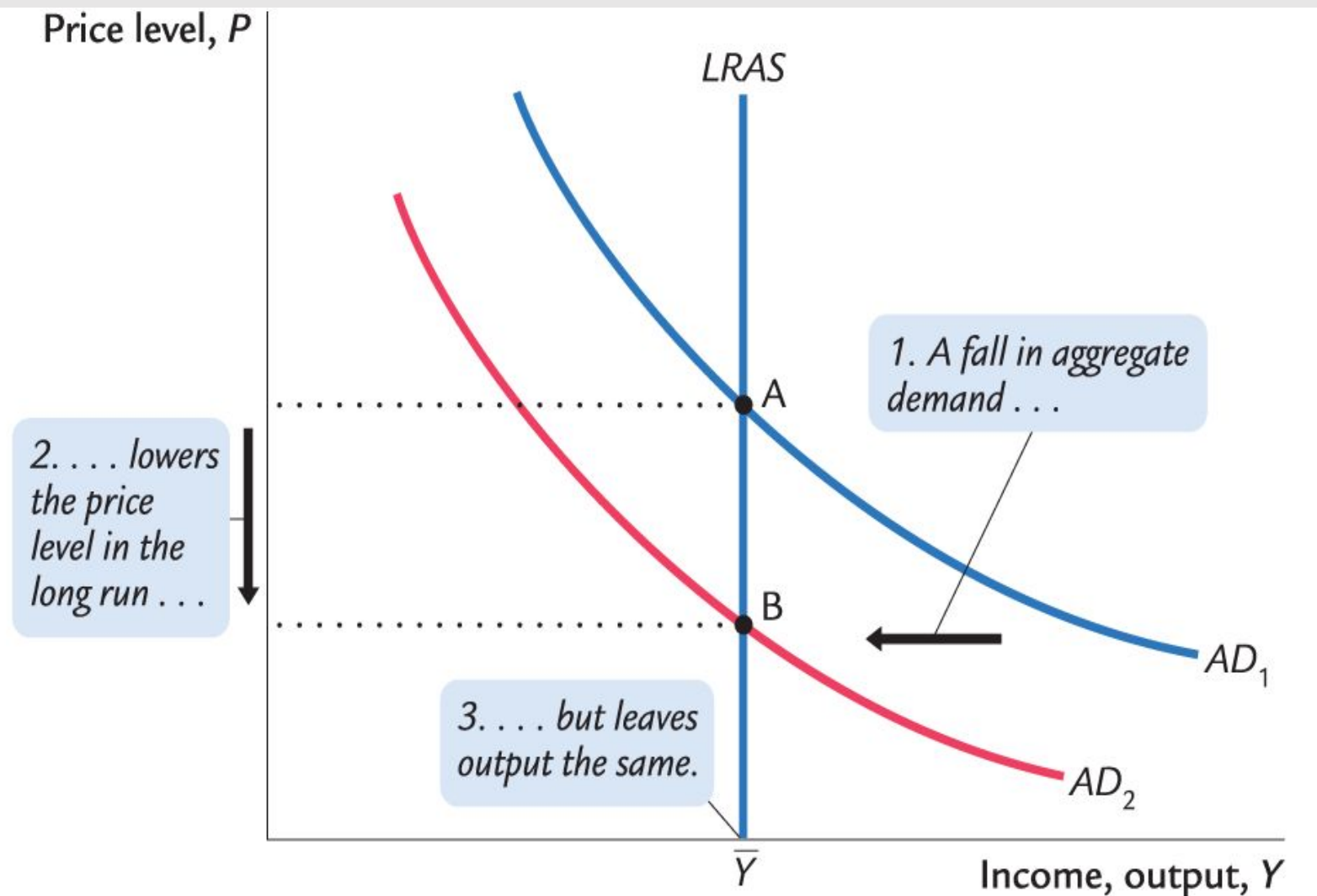
P on the vertical axis is the economy's overall price level—the average price of **EVERYTHING**. A 10% increase in the price level means that, on average, **EVERYTHING** costs 10% more. Thus, a firm can get 10% more revenue for each unit it sells. But the firm also pays an average of 10% more in wages, prices of intermediate goods, advertising, and so on. **Thus, the firm has no incentive to increase output.**

Another thought: We learn from microeconomics that a firm's supply depends on the RELATIVE price of its output. If all prices increase by 10%, then each firm's relative price is the same as before, **so firms have no incentive to alter output.**

Aggregate Supply Curve (Long Run)

A change in the money supply affects the price level but not the quantity of output. Here, we are seeing these results on a graph with different variables on the axes (P and Y), but it's the same model.

Long-run effects of an increase in M





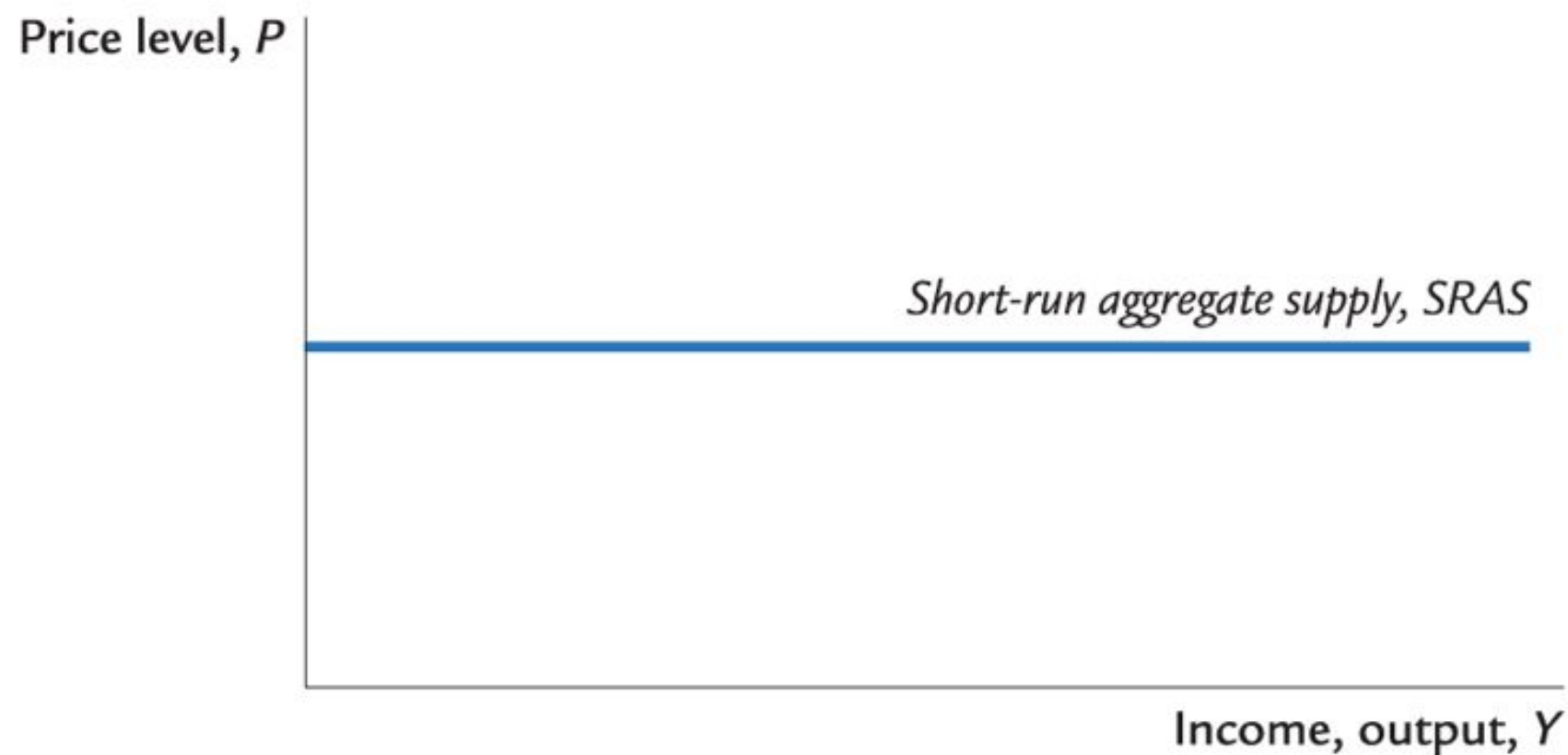
Aggregate Supply in The Short Run

- Many prices are sticky in the short run.
- For now, we assume
 - all prices are stuck at a predetermined level in the short run.
 - firms are willing to sell as much at that price level as their customers are willing to buy.
- Therefore, the short-run aggregate supply (*SRAS*) curve is horizontal.



Aggregate Supply Curve (Short Run)

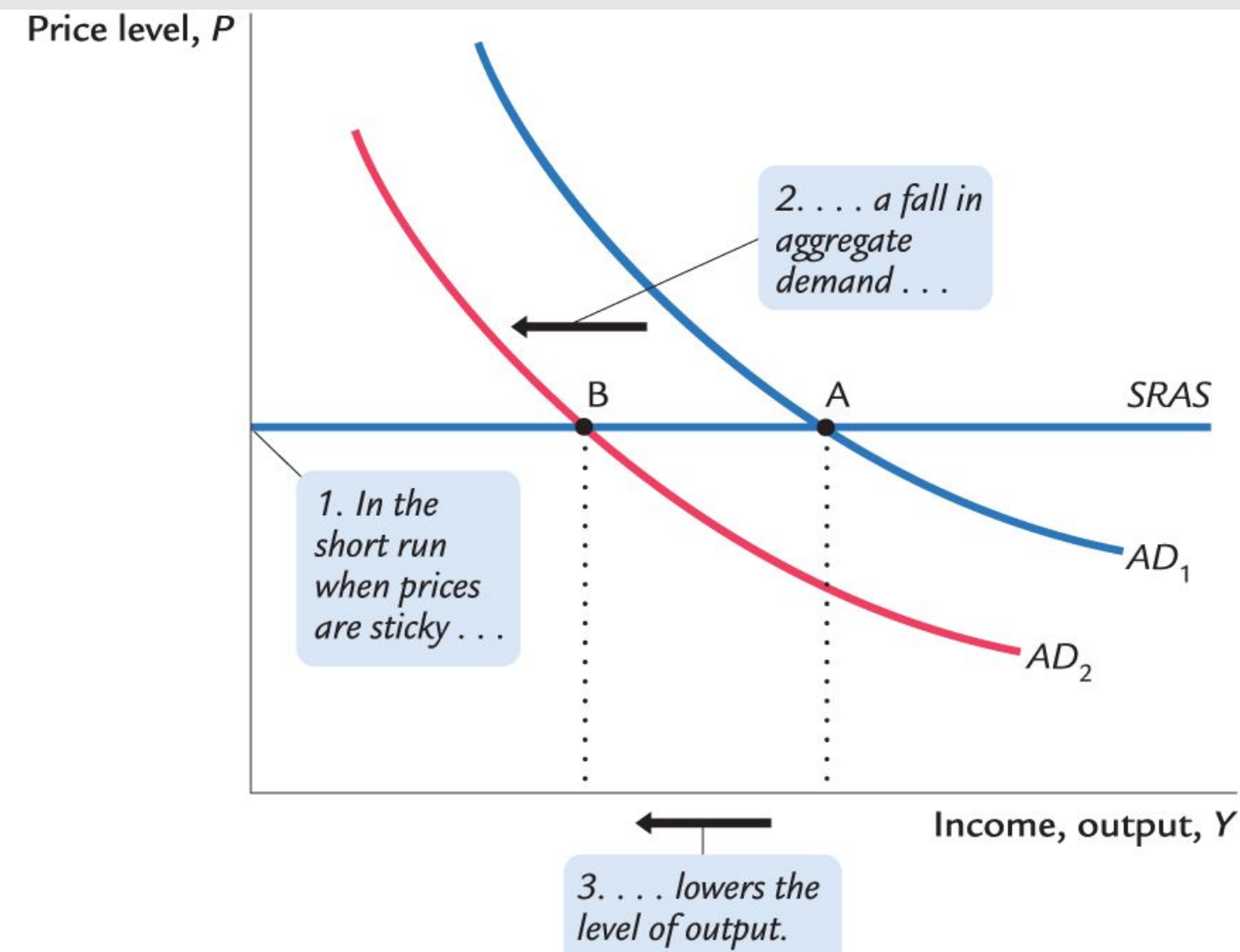
The short-run aggregate supply curve



The $SRAS$ curve is horizontal:

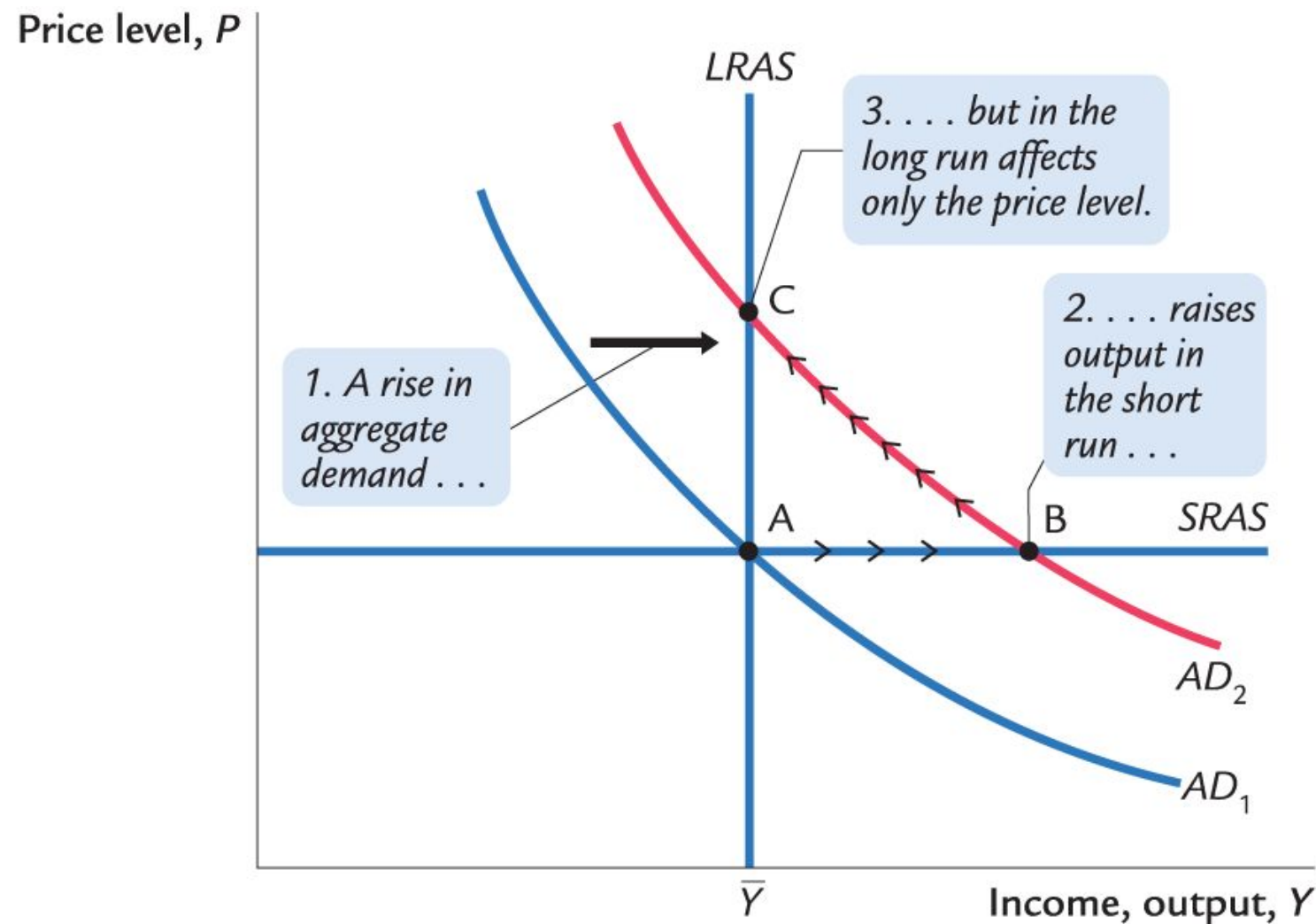
The price level is fixed at a predetermined level, and firms sell as much as buyers demand.

Short-run effects of an increase in M





The Short- and Long-Run Effects of $\Delta M > 0$



This slide puts together the pieces that have been developed over the previous slides: the short-run and long-run effects, as well as the adjustment of prices over time that causes the economy to move from the short-run equilibrium **at point B** to the long-run equilibrium **at C**.

The economy starts at point A; output and unemployment are at their natural rates. The Fed increases the money supply, shifting AD to the right. In the short run, prices are sticky, so output rises. The new short-run equilibrium is at point B in the graph.

In order for firms to increase output, they hire more workers, so unemployment falls below the natural rate of unemployment, putting upward pressure on wages. The high level of demand for goods and services at **point B** puts upward pressure on prices.

Over time, as prices become unstuck, they begin to rise in response to these pressures. The price level rises, and the economy moves up its (new) AD curve, **from point B toward point C**.

This process stops when the economy gets to point C: output again equals the natural rate of output, and unemployment again equals the natural rate of unemployment, so there is no further pressure on prices to change.



How shocking! ●

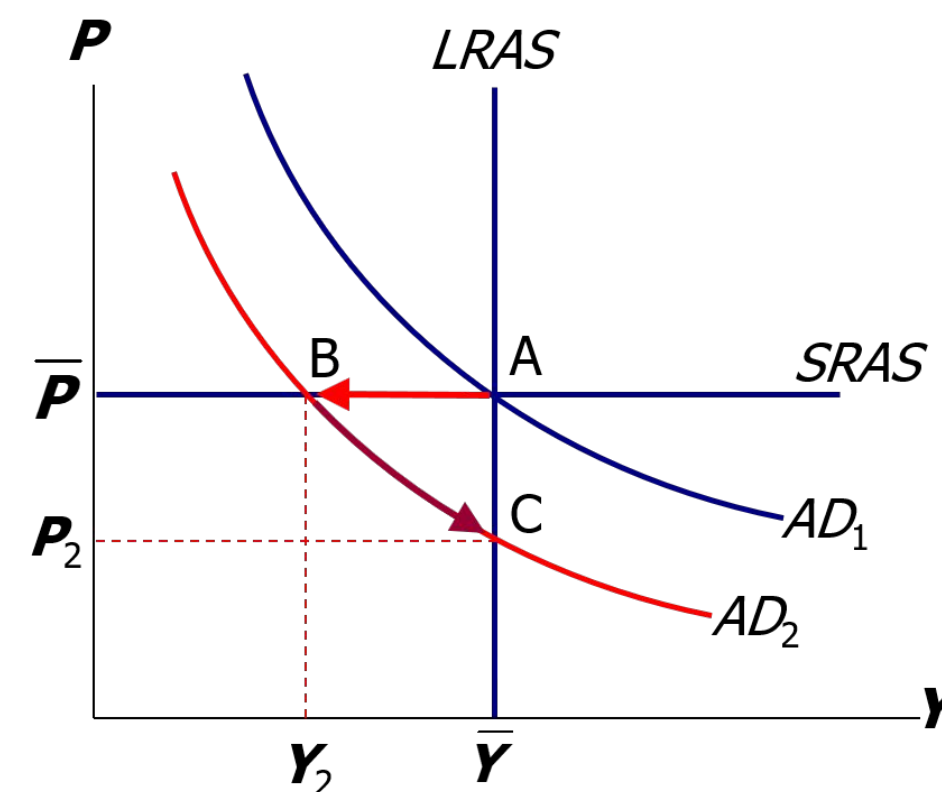
- **Shocks:** exogenous changes in aggregate supply or demand
- Shocks temporarily push the economy away from full employment.
- example: exogenous decrease in velocity
If the money supply is held constant, a decrease in V means people will be using their money in fewer transactions, causing a decrease in demand for goods and services.



The Effects of A Negative Demand Shock

AD shifts left, depressing output and employment in the short run (B).

Over time, prices fall, and the economy moves down its demand curve toward full employment (C).



Note the economy's self-correction mechanism:

When in a recession, the economy—left to its own devices—fixes itself. The gradual adjustment of prices helps the economy recover from the shock and return to full employment. Of course, before the economy has finished self-correcting, a period of low output and high unemployment is endured.



Supply Shocks

- A **supply shock** alters production costs, affects the prices that firms charge (also called **price shocks**).
- Examples of *adverse* supply shocks:
 - Bad weather reduces crop yields, pushing up food prices.
 - Workers unionize, negotiate wage increases.
 - New environmental regulations require firms to reduce emissions. Firms charge higher prices to help cover the costs of compliance.
- *Favorable* supply shocks lower costs and prices.



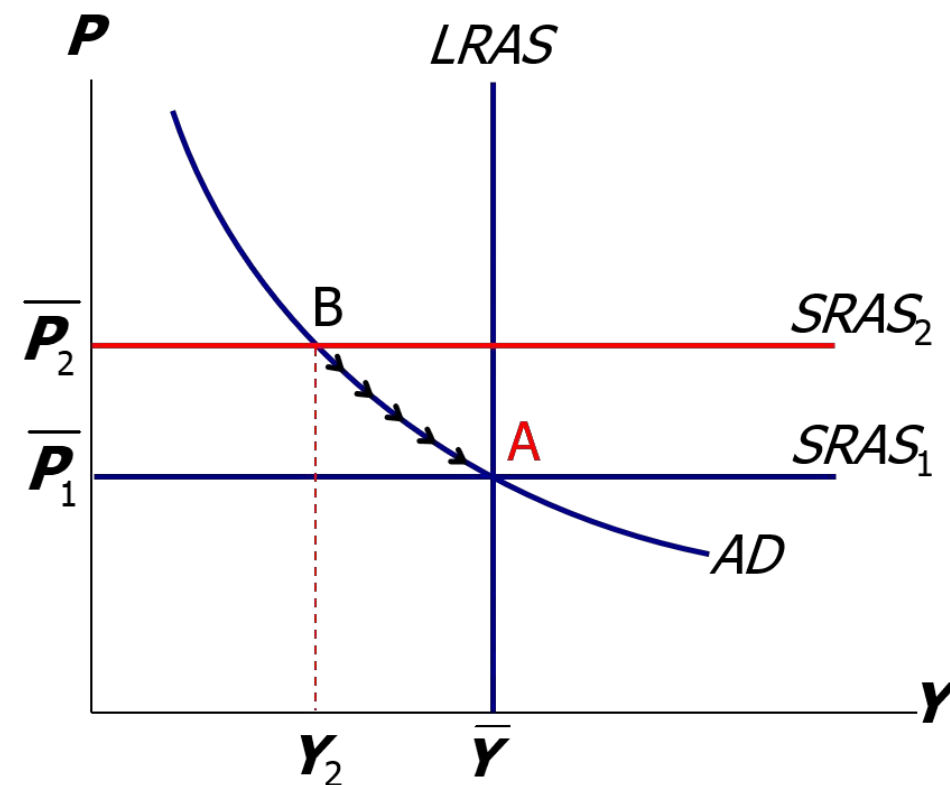
Case Study: The 1970s Oil Shocks (1)

- Early 1970s: OPEC coordinated a reduction in the supply of oil.
- Oil prices rose
 - 11% in 1973**
 - 68% in 1974**
 - 16% in 1975**
- Such sharp oil price increases are supply shocks because they significantly impact production costs and prices.

Oil is required to heat the factories in which goods are produced and to fuel the trucks that transport the goods from the factories to the warehouses to Walmart stores. A sharp increase in the price of oil, therefore, has a substantial effect on production costs.



Case Study: The 1970s Oil Shocks (2)



- The oil price shock shifts up SRAS, causing output and employment to fall (B)
- In the absence of further price shocks, prices will fall over time, and economy moves back toward full employment (A)

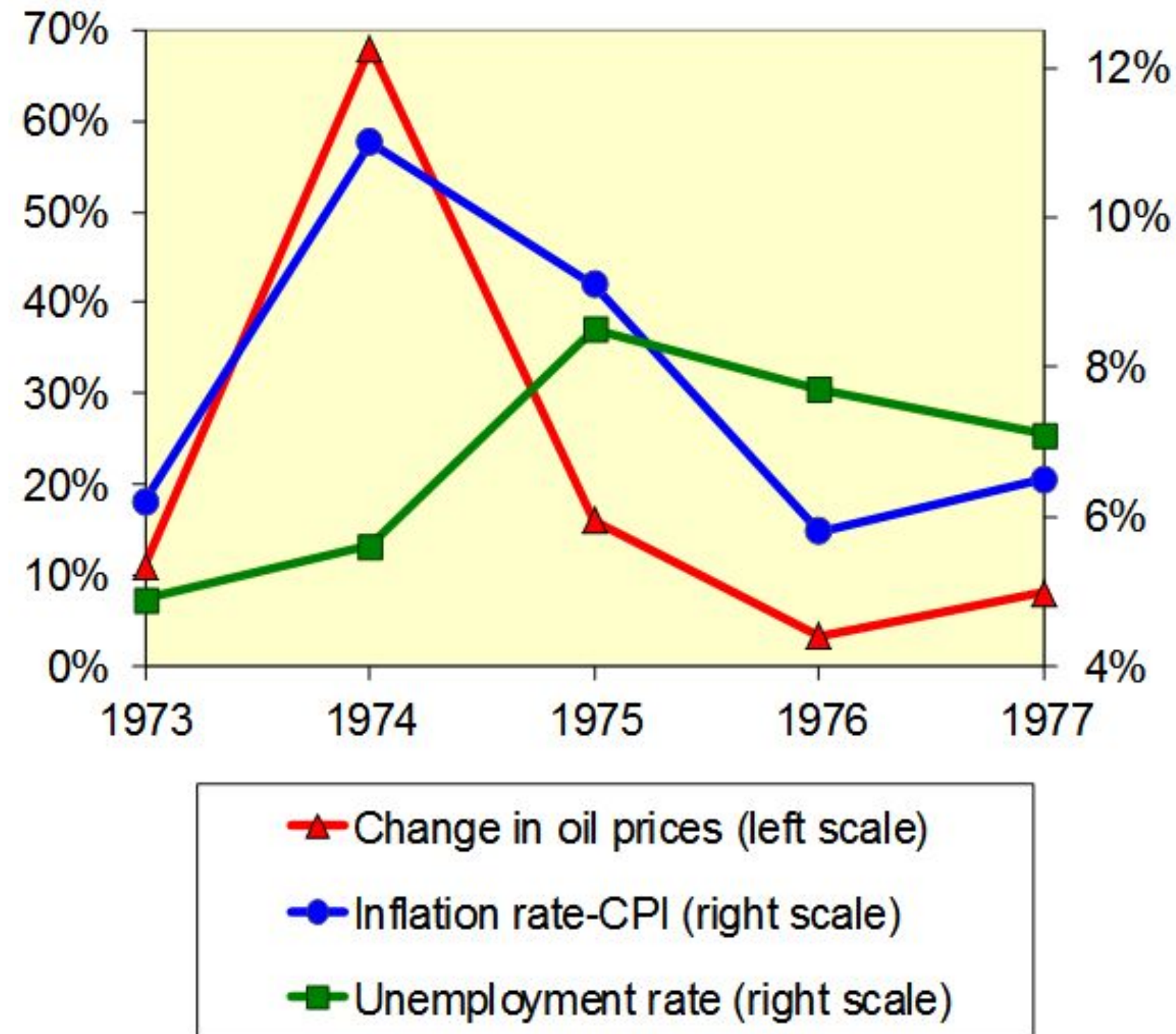
- As output falls from \bar{Y} to Y_2 in the graph, we would expect to see unemployment increase above the natural rate of unemployment. **(Okun's law says that output and unemployment are inversely related.)**
- Note the phrase "in the absence of further price shocks." As we will see shortly, just as the economy was recovering from the first big oil shock, a second one came along.

Case Study: The 1970s Oil Shocks (3)

Predicted effects
of the oil shock:

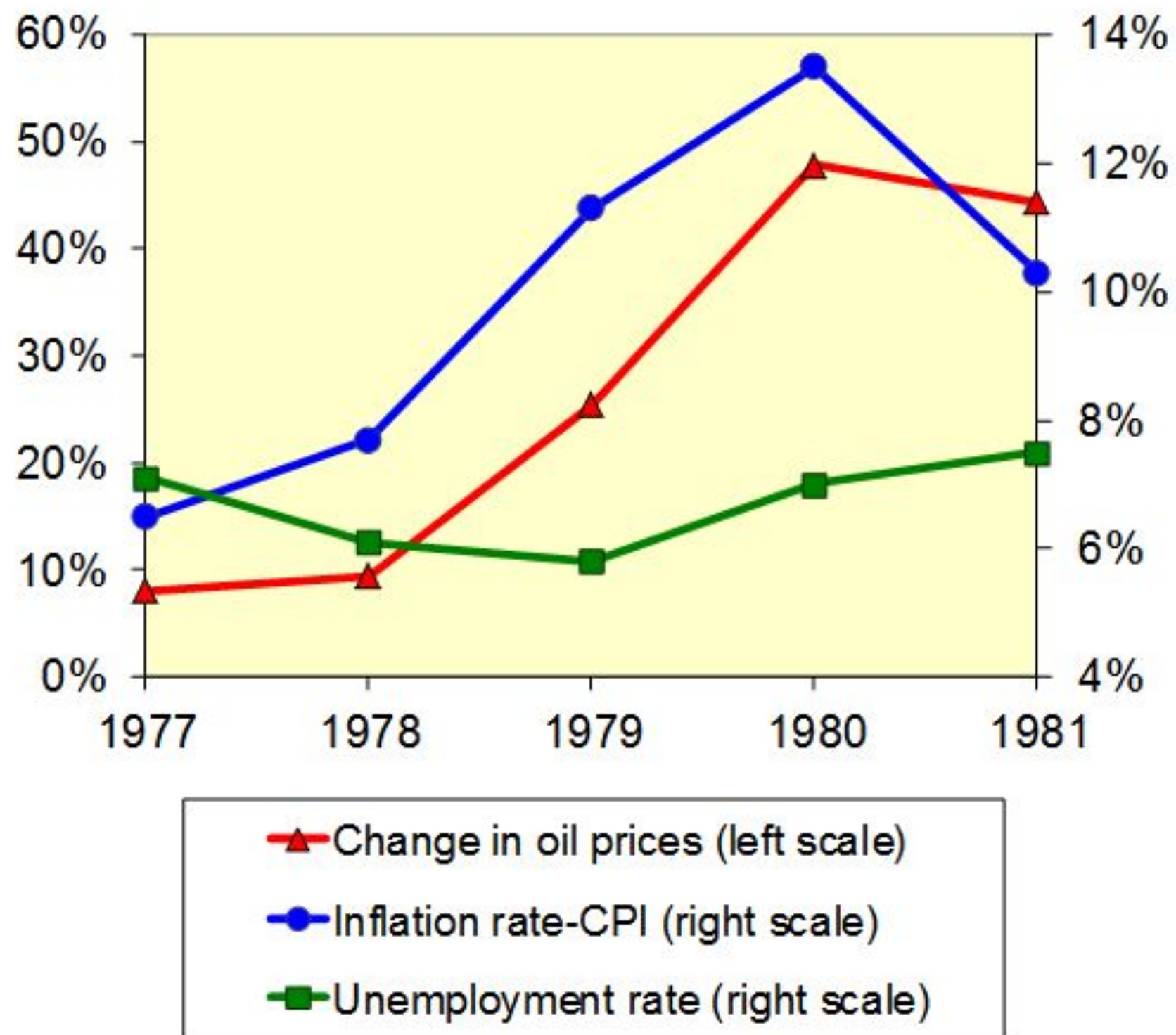
- inflation #
- output \$
- unemployment #

...and then a gradual
recovery





Case Study: The 1970s Oil Shocks (4)

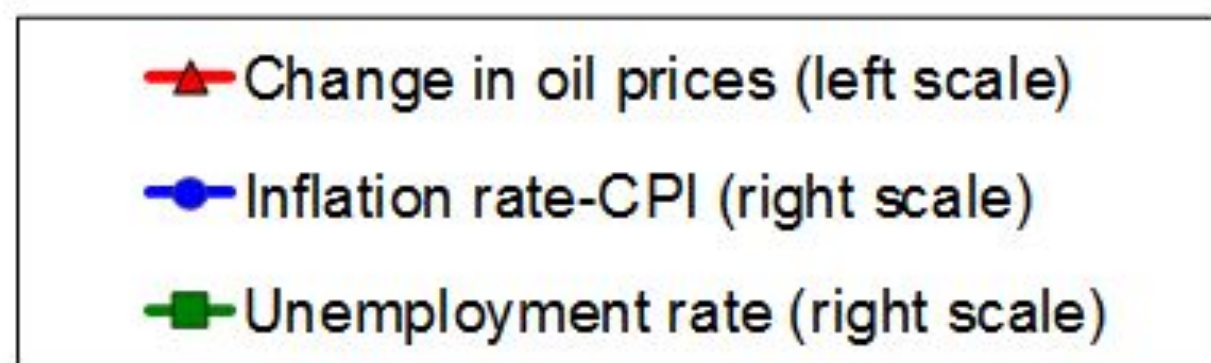
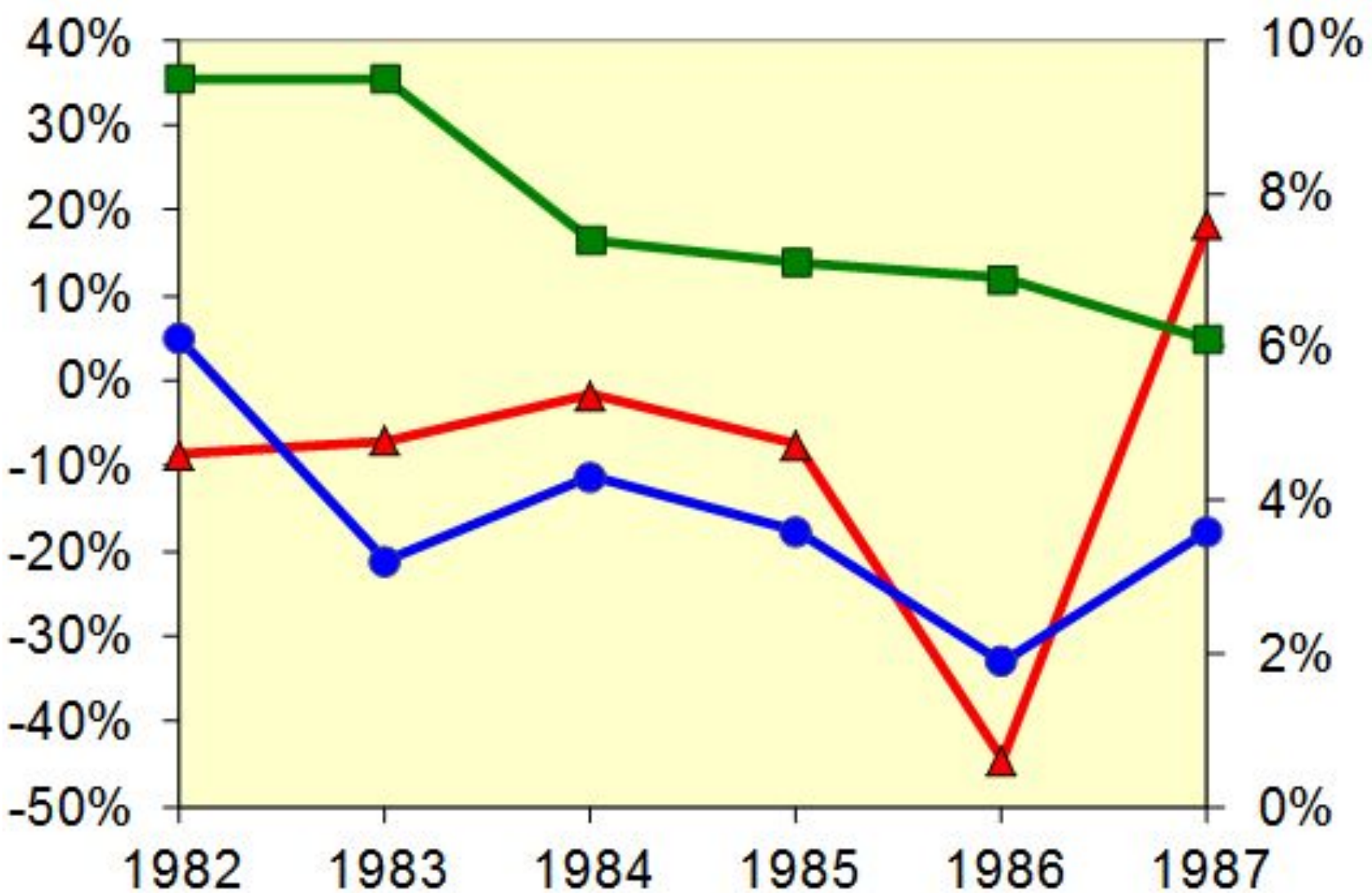


Late 1970s: As the economy was recovering, oil prices shot up again, causing another huge supply shock!

This second shock was associated with the revolution in Iran. The Shah, who maintained cordial relations with the West, was deposed. The new leader, Ayatollah Khomeini, was considerably less friendly toward the West. (He even forbade his citizens from listening to Western music.)



Case Study: The 1970s Oil Shocks (5)



1980s: A favorable supply shock—a significant fall in oil prices.

As the model predicts, inflation and unemployment fell.

A few slides back, we analyzed the effects of an adverse supply shock. It might be worth noting that the predicted effects of a favorable supply shock are just the opposite: in the short run, the price level (or inflation rate) falls, output rises, and unemployment falls.

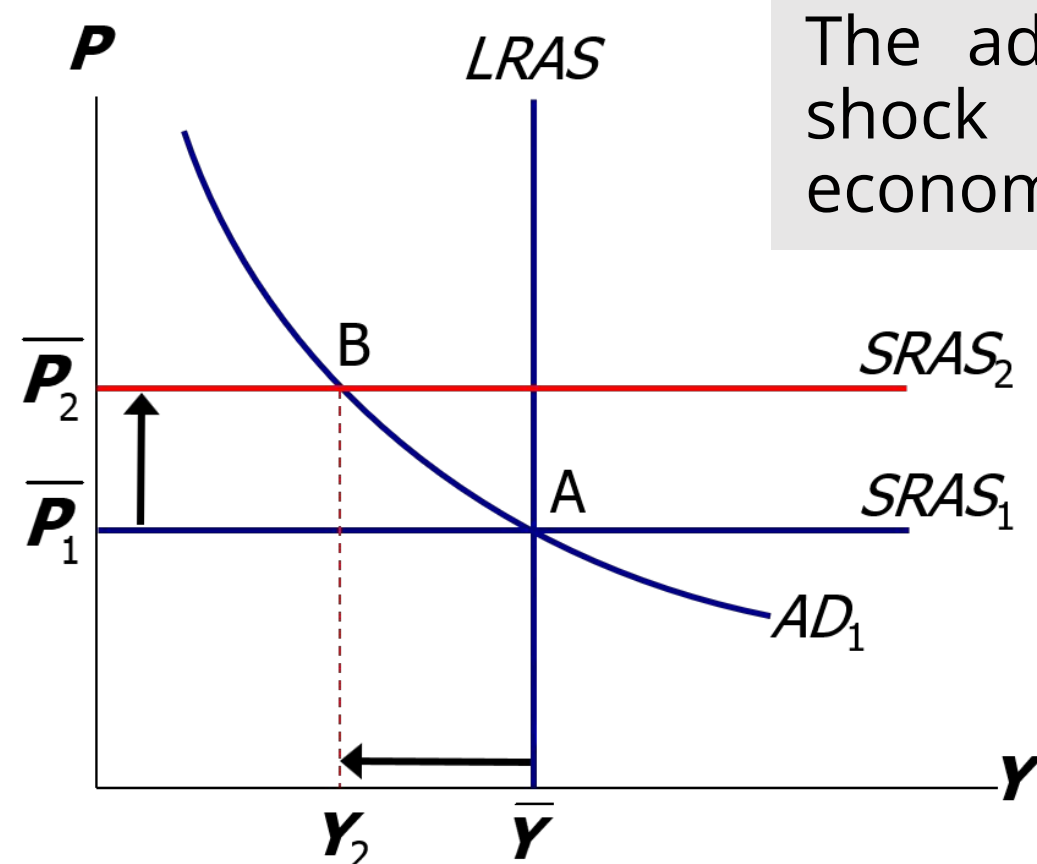
Looking at the graph: at first glance, it may seem that the fall in oil prices doesn't occur until 1986. Oil prices fell about 10% in 1982 and generally fell during most years between 1982 and 1986.



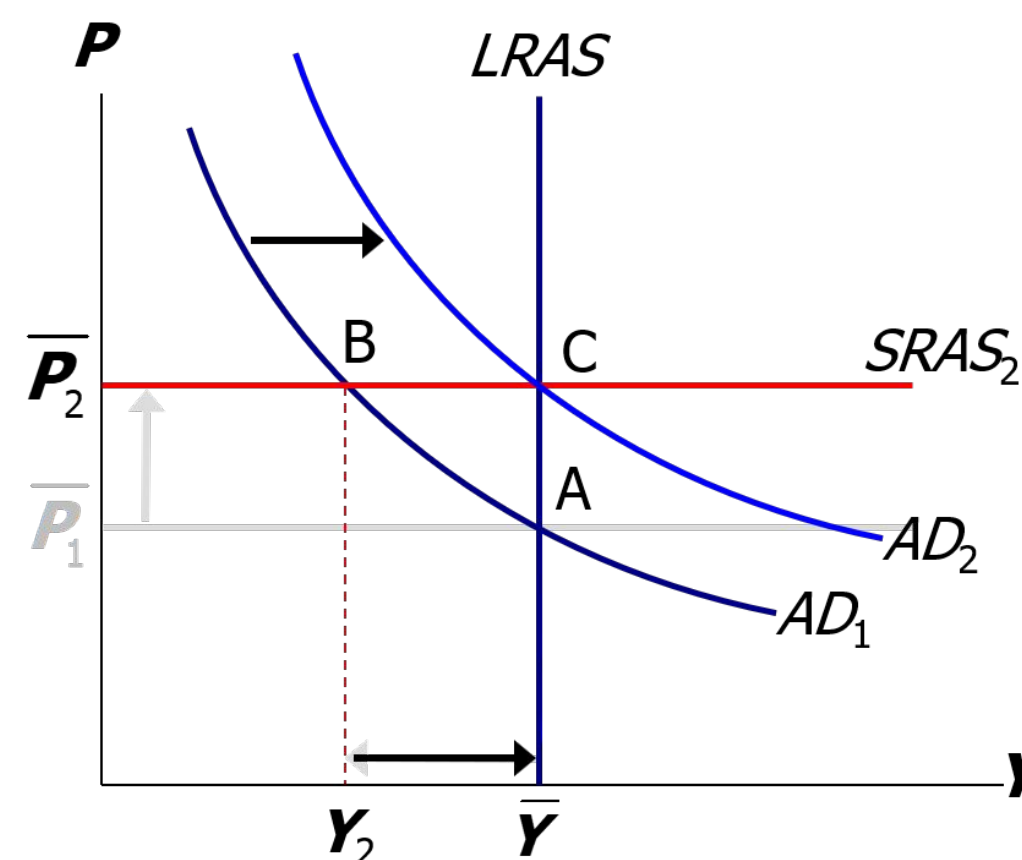
Stabilization Policy

- **Stabilization policy:** policy actions aimed at reducing the severity of short-run economic fluctuations.
- Example: using monetary policy to combat the effects of adverse supply shocks

Stabilizing output with monetary policy



The adverse supply shock moves the economy to point B.



But the Fed accommodates the shock by raising aggregate demand (C).

Results:

P is permanently higher, but Y remains at its full-employment level.

Note: If the Fed correctly anticipates the sign and magnitude of the shock, then the Fed can respond as the shock occurs rather than after, and the economy would never go to point B—but would go immediately to point C.



Summary

- Long run: prices are flexible, output and employment are always at their natural rates, and the classical theory applies.
- Short run: prices are sticky, shocks can push output and employment away from their natural rates.
- Aggregate demand and supply: a framework to analyze economic fluctuations
- The aggregate demand curve slopes downward.
- The long-run aggregate supply curve is vertical because output depends on technology and factor supplies but not prices.
- The short-run aggregate supply curve is horizontal because prices are sticky at predetermined levels.
- Shocks to aggregate demand and supply cause fluctuations in GDP and employment in the short run.
- The Fed can attempt to stabilize the economy with monetary policy.

THANK YOU

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