Business Cycle Theory: The Economy in the Short Run

Part IY

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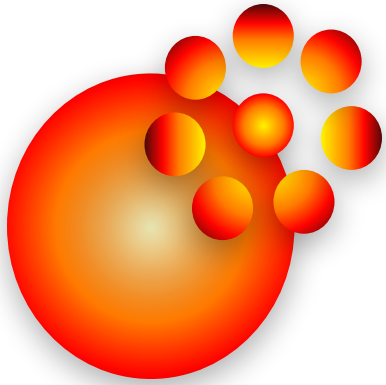
MACROECONOMICS

LECTURE 10

INTRODUCTION TO ECONOMIC FLUCTUATIONS

Outline

10-1 The Facts About the Business Cycle
10-2 Time Horizons in Macroeconomics
10-3 Aggregate Demand
10-4 Aggregate Supply
10-5 Stabilization Policy
10-6 Conclusion



10-1 The Facts About the Business Cycle

GDP and Its Components
Unemployment and Okun's Law
Leading Economic Indicators

When the economy experiences a period of **falling output and rising unemployment, the** economy is said to be in **recession.**

U↑ , Y↓

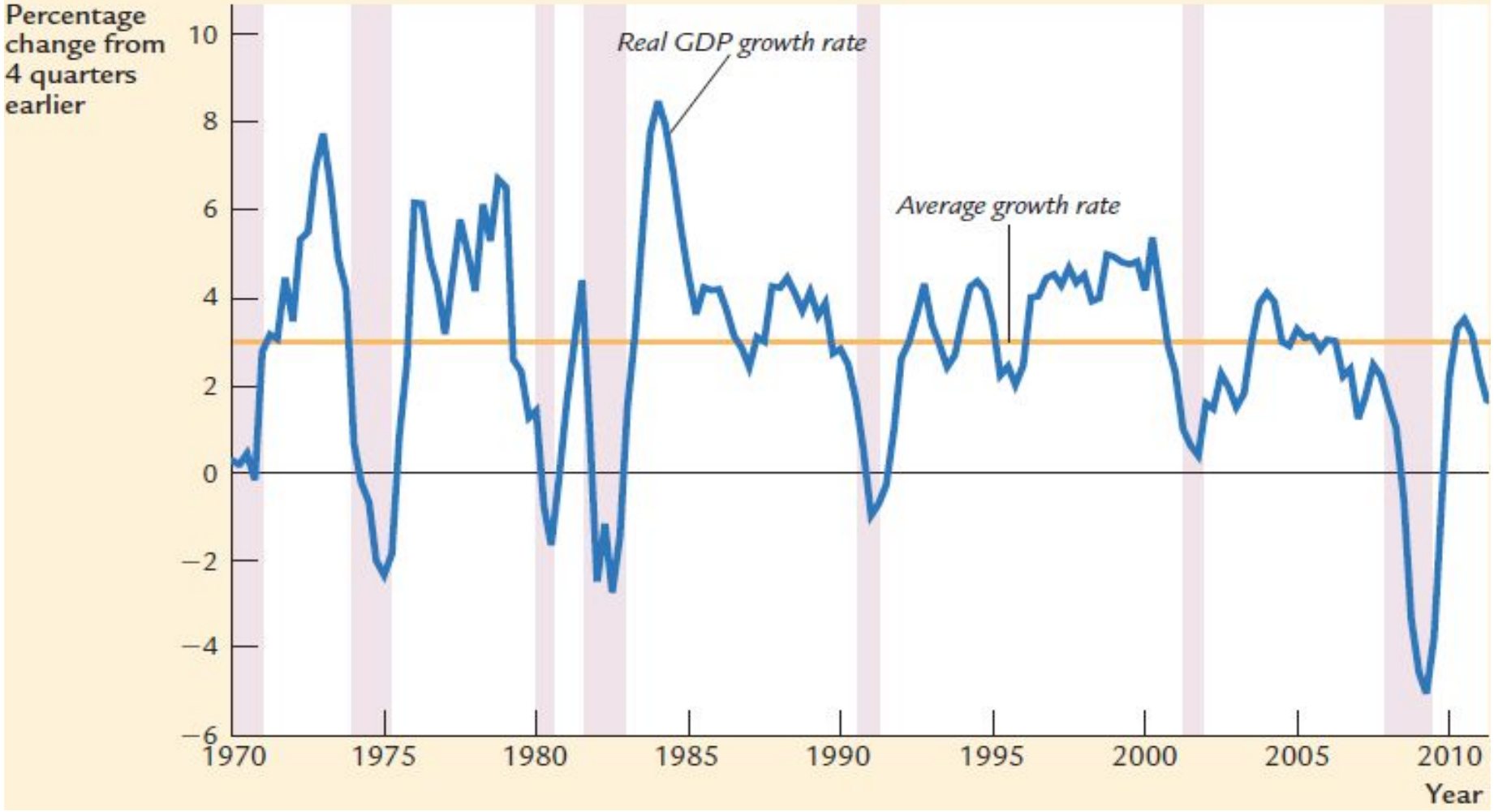
Economists call these **short-run** fluctuations in output and employment the **business cycle.**

Before thinking about the theory of business cycles, let's look at the **facts that describe SRF in economic activity.**

The official arbiter of when recessions begin and end is **the National Bureau of Economic Research (NBER):**

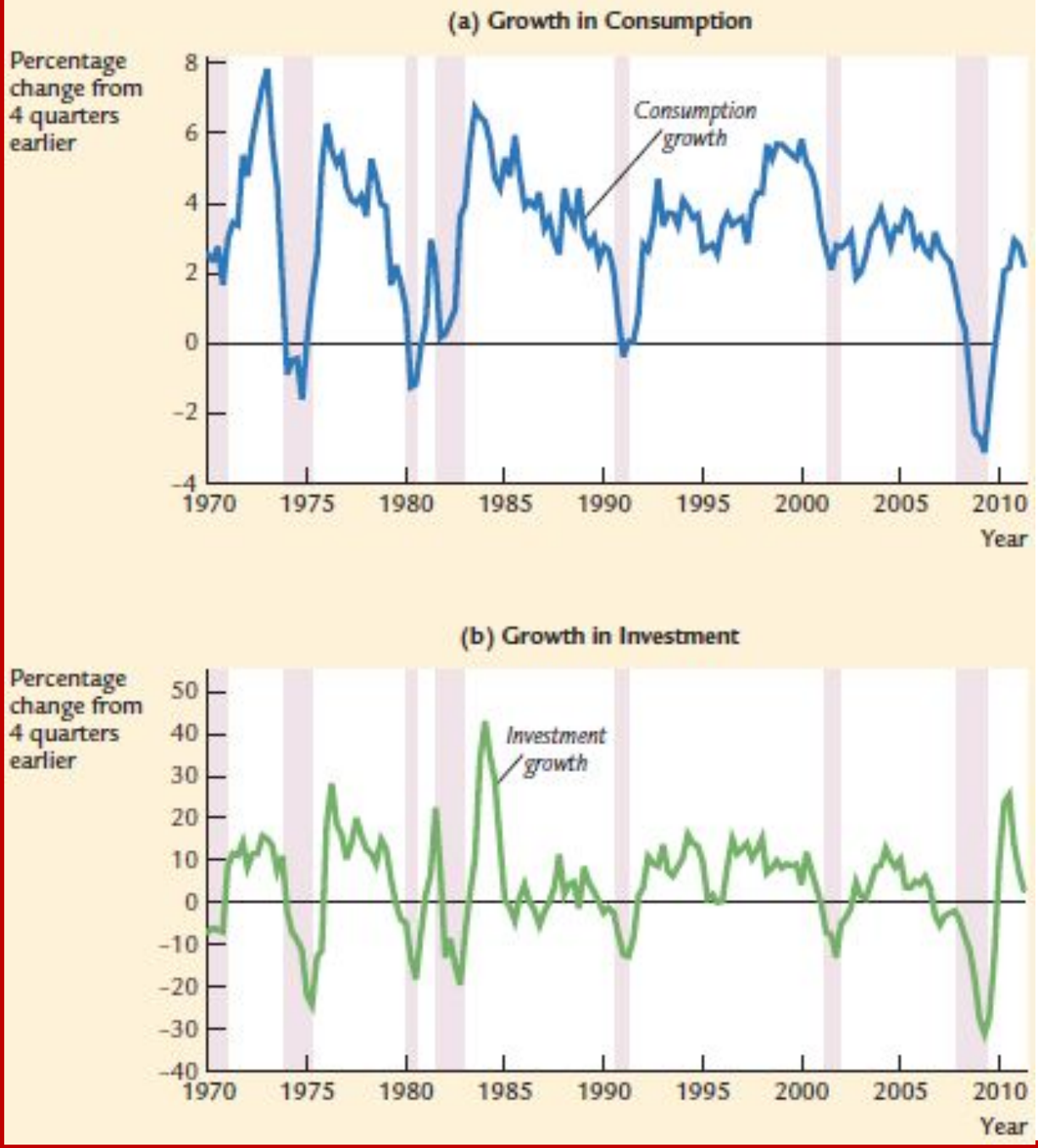
- the **stating** date of each recession = **the business cycle peak**
- the **ending** date = **the business cycle trough.**

FIGURE 10-1



- **Real GDP Growth in the United States** Growth in real GDP averages about 3% per year, but there are substantial fluctuations around this average.
- The shaded areas represent periods of recession.

FIGURE 10-2



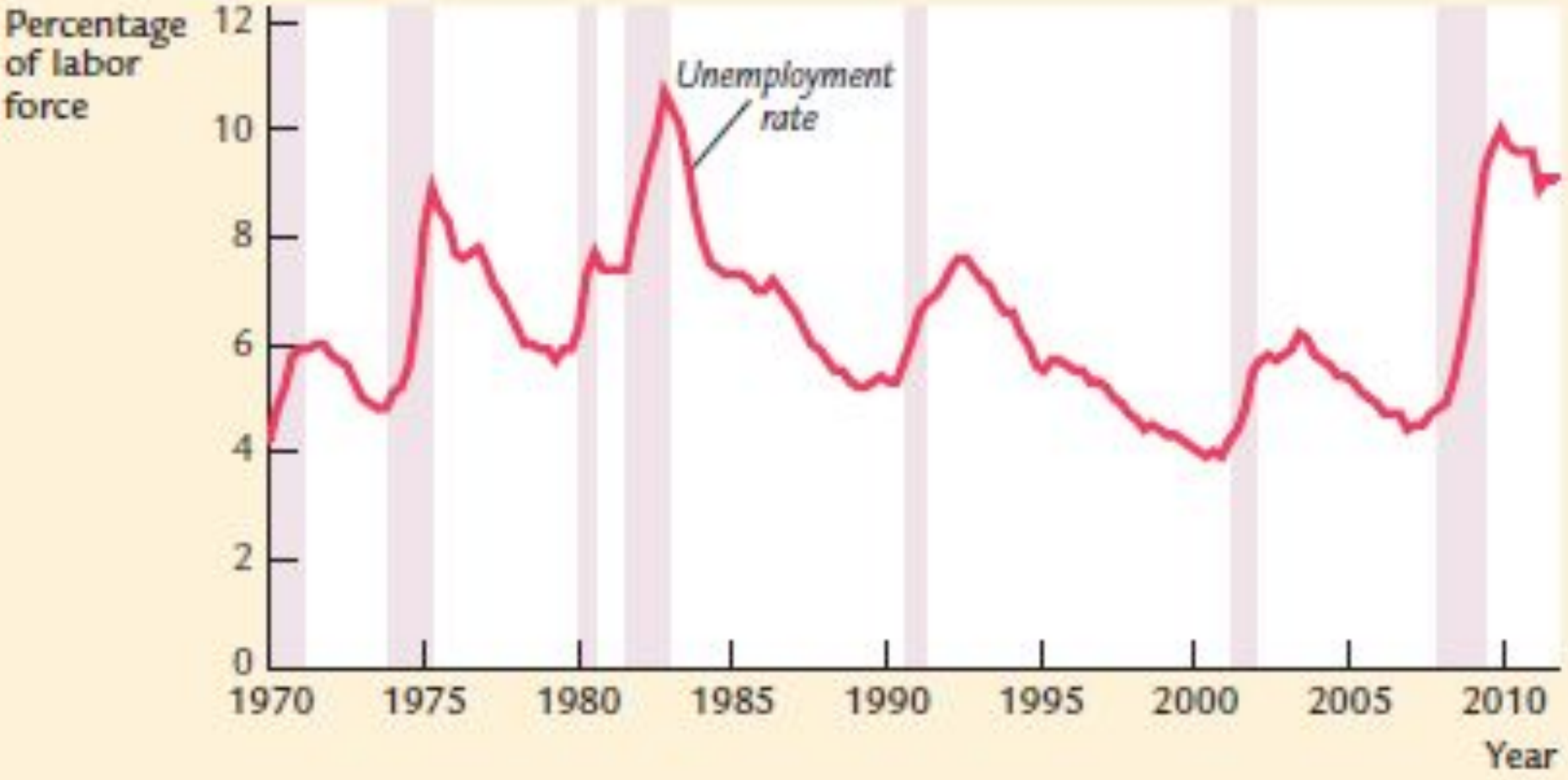
- **Growth in Consumption and Investment**

- When the economy heads into a **RECESSION,** growth in
- **real consumption** and
- **investment spending** both **decline**.

- **Investment** spending, shown in panel (b), is considerably more volatile than
- **consumption** spending, shown in panel (a).

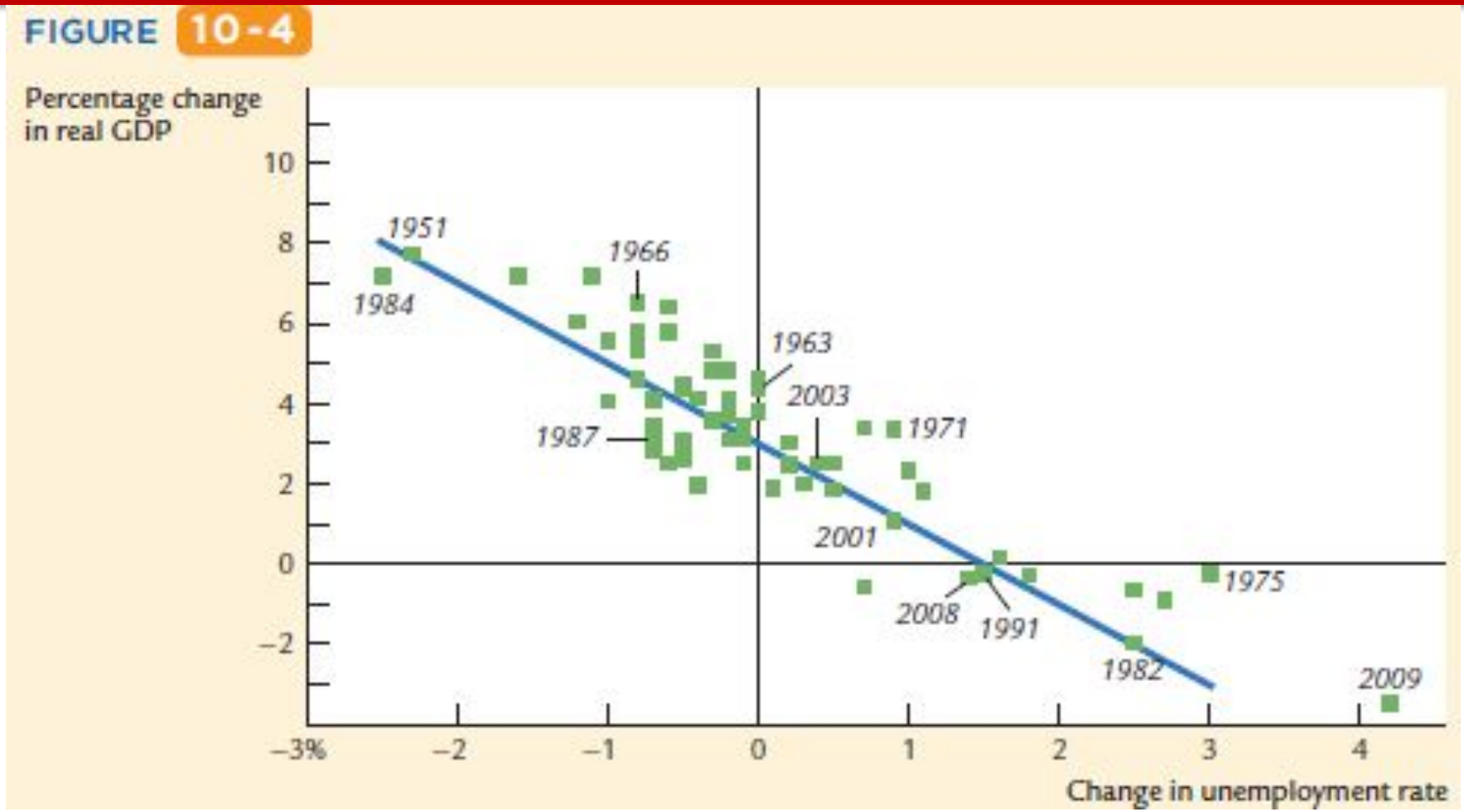
The shaded areas represent periods of recession

FIGURE 10-3



Unemployment

- The ***U*** rises significantly during periods of recession, shown here by the shaded areas.



Okun's Law

- This figure is a scatter plot of the change in the UR on the horizontal axis and the % 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 ***U*** tend to be associated with lower-than-normal growth in real GDP. The correlation between these two variables is –0.89.

10-1 The Facts About the Business Cycle

GDP and Its Components
Unemployment and Okun's Law
Leading Economic Indicators

What relationship should we expect between *U* and real *GDP*?

- Unemployed workers do not help to produce **G&S =>**
- **in↑ in the *U* rate** should be associated with **de↓ in real GDP**.
- **This negative relationship between *U* and *GDP* is called Okun's law.**

Example:

The line drawn through the scatter of points tells us that

% Change in *Real GDP*= 3% − 2 x Change in *U*.

1. **If the *U*** remains the same, real GDP grows by about 3 % ;

2. **If the *U*** rises from 5 to 7%, then ***real GDP*** growth would be

   % Change in Real GDP = 3% − 2 x (7% − 5%)= −1%.

Okun's law says that GDP would fall by 1 % , indicating that the economy is in a recession.

10-1 The Facts About the Business Cycle

GDP and Its Components
Unemployment and Okun's Law
Leading Economic Indicators

1.Solow model:

- **LR trend to** ↑er standards of living is **not associated with any LR trend in the UR.**
- **The LR growth** in GDP is determined primarily **by T/LP**

2.Okun's law:

1. **SR movements in GDP** are ↑ correlated with the utilization of the ***L***.
   - **The de↓ in the production** that occur during recessions are always associated with **in↑ in joblessness**.

SOLOW MODEL	OKUN'S LAW
LR	*SR*
GDP↑ →T/L P ↑	*GDP↑→U↓*
standards of living ≠U	*GDP↓→U↑*

10-1 The Facts About the Business Cycle

GDP and Its Components
Unemployment and Okun's Law
Leading Economic Indicators

Economists arrive at their forecasts is by looking at **leading indicators,**

- **which are variables that tend to fluctuate in advance of the overall** economy.

Forecasts can differ in part because economists hold varying opinions about which leading indicators are most reliable.

The ***Conference Board*** announces the ***index of leading economic indicators.***

- *This index includes ten data series*
- They are often used to forecast changes about **6-10 months** into the future.

10-1 The Facts About the Business Cycle

GDP and Its Components
Unemployment and Okun's Law
Leading Economic Indicators

1.Average WORKWEEK of production workers in manufacturing.

- A shorter workweek =>
- **lay off workers**
- **cut back production**

2.Average initial weekly claims for unemployment INSURANCE.

- An in↑ in the number of new claims for ***U*** insurance =>
- **lay off workers**
- **cutting back production**

3.New orders for CONSUMER goods and materials, adjusted for inflation.↑↑

4.New orders for nondefense CAPITAL goods.↑↑

5.Index of supplier deliveries.

- Slower deliveries indicate a future increase in economic activity.

6.New BUILDING permits issued↑↑

7.Index of STOCK prices. ↑↑

10-2 Time Horizons in Macroeconomics

How the Short Run and Long Run Differ

The Model of Aggregate Supply and Aggregate Demand

The theoretical separation of real and nominal variables is called the classical dichotomy.

The irrelevance of the *M* for the determination of real variables is called monetary neutrality.

LR	SR
P are • Flexible • Respond to changes in ***S&D***	many ***P***s are • sticky
r↓n in the ***M*** lowers all ***P***	A r↓n in the ***M*** does not immediately cause • all firms to cut the ***W,*** • all stores to change the ***P***
Real variables remain the same (***Y***, ***Em***)	**Real** variables must adjusti instead (***Y***, ***Em***)
	the classical dichotomy no longer holds: 1. ***nominal*** variables **CAN influence** ***real*** variables, 2. the economy **CAN deviate** from the ***equilibrium*** predicted by the classical model.

2 If You Want to Know Why Firms Have Sticky Prices, Ask Them

Case Study

TABLE 10-1

The Frequency of Price Adjustment

This table is based on answers to the question: How often do the prices of your most important products change in a typical year?

Frequency	Percentage of Firms
Less than once	10.2
Once	39.3
1.01 to 2	15.6
2.01 to 4	12.9
4.01 to 12	7.5
12.01 to 52	4.3
52.01 to 365	8.6
More than 365	1.6

Source: Table 4.1, Alan S. Blinder, "On Sticky Prices: Academic Theories Meet the Real World," in N. G. Mankiw, ed., *Monetary Policy* (Chicago: University of Chicago Press, 1994), 117–154.

Case Study

TABLE 10-2

Theories of Price Stickiness

Theory and Brief Description	Percentage of Managers Who Accepted Theory
Coordination failure: Firms hold back on price changes, waiting for others to go first	60.6
Cost-based pricing with lags: Price increases are delayed until costs rise	55.5
Delivery lags, service, etc.: Firms prefer to vary other product attributes, such as delivery lags, service, or product quality	54.8
Implicit contracts: Firms tacitly agree to stabilize prices, perhaps out of "fairness" to customers	50.4
Nominal contracts: Prices are fixed by explicit contracts	35.7
Costs of price adjustment: Firms incur costs of changing prices	30.0
Procyclical elasticity:	29.7

10-2 Time Horizons in Macroeconomics

How does the introduction of ***StP*** change our view of how the economy works? *By* ***S&D:***

FlP	***StP***
If *Y* ~ the economy's ability to SUPPLY G&S	**1. If *Y* ~ *DEMAND for G&S*,**
SUPPLY of G&S ~ the supplies of ***K*, *L* & *T/L***.	***DEMAND for G&S ~ on*:** **1. consumers'** *confidence* about their economic prospects, **2. firms'** *perceptions* about the profitability of new ***I***, **3. M. & F. policy.**
FlP are a crucial **assumption** of classical theory.	***P* stickiness** provides a rationale for **why M. & F. policy may be useful IN STABILIZING the economy in the SR.**
***FlP* adjust** to ensure that the quantity of ***Y* demanded** = the quantity **supplied.**	

10-2 Time Horizons in Macroeconomics

How the Short Run and Long Run Differ
The Model of Aggregate Supply and Aggregate Demand

The model of aggregate supply (AS) and aggregate demand (AD) *allows us to study how*

1. *the **AP** and **AY** are determined in the **SR***
2. *the economy behaves in the **LR &** in the **SR**.*

2.The model of S & D is for a **single** good, but

3.The model of AS & AD is a sophisticated model that incorporates the interactions among **many markets.**

Our goal here is

1. **not to explain the model**

but

1. **to introduce its key elements**
2. to illustrate how **the model** can help explain **SR** fluctuations.

10-3 Aggregate Demand

The Quantity Equation as Aggregate Demand
Why the Aggregate Demand Curve Slopes Downward
Shifts in the Aggregate Demand Curve

Aggregate demand (*AD*) is the relationship between the quantity of ***Y*** demanded and the aggregate ***P***.

- **The AD curve tells us the quantity of G&S people want to buy at any given *P*.**
- Here we use **the quantity theory of money** to provide a simple derivation of the ***AD*** curve.

From Ch.5 $M\overline{V} = PY$

M *is the money supply,*
V *is the velocity of money,*
P *is the price level, and*
Y *is the amount of output.*

If ***V*** is **constant => M** determines the nominal value of ***Y***,

nominal value of ***Y*** is the product of ***P*** **& amount of *Y*.**

The equation can be rewritten in terms of the **S&D** for **real money balances (RMB)**:

$$M/P = (M/P)^d = kY$$

10-3 Aggregate Demand

$$M / P = (M / P)^d = kY$$

k = 1/V is a parameter representing
how much money people want to hold for every $ of income.

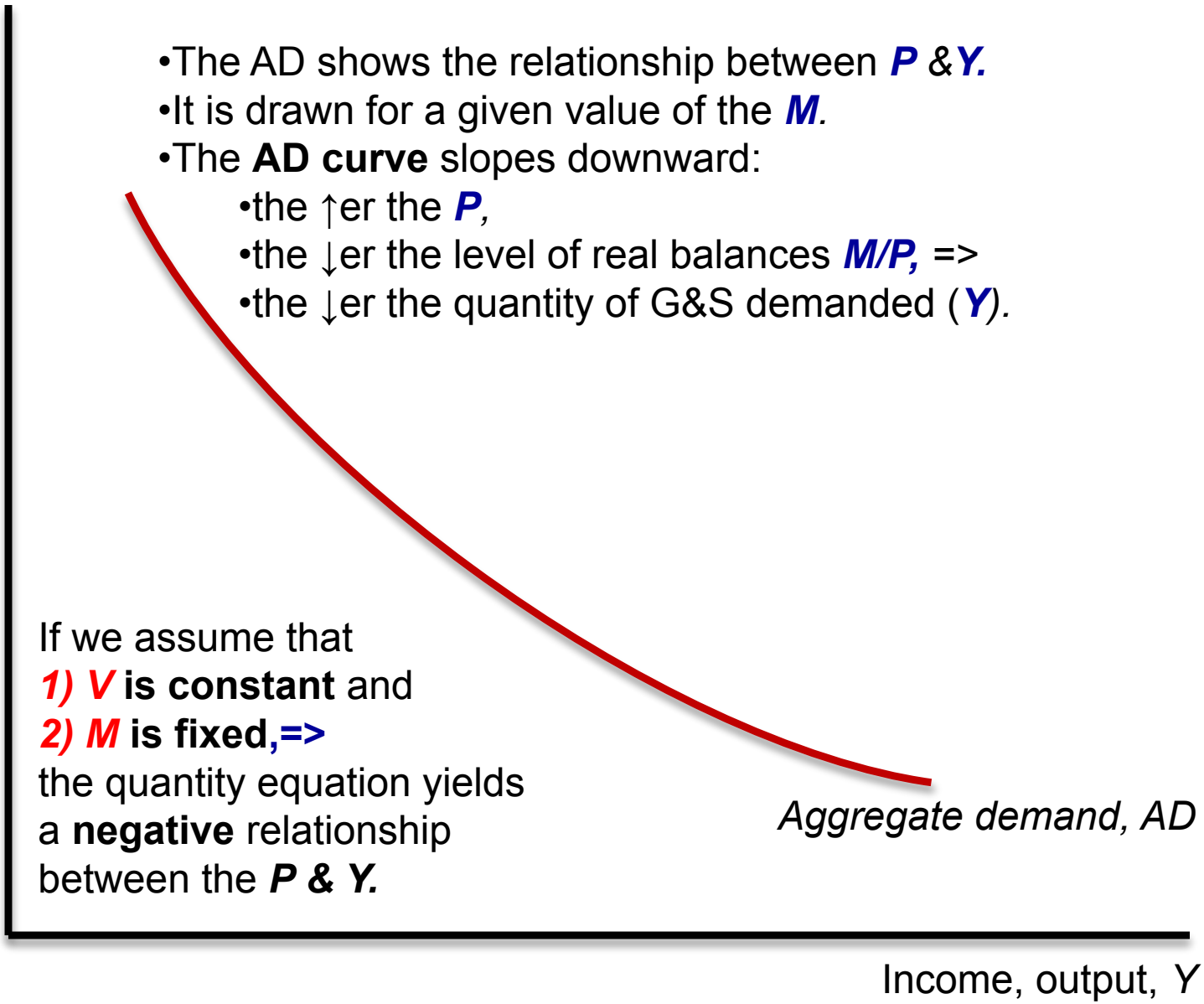
- **S** of **RMB** *M/P* **= D** for **RMB** $(M/P)^d$ *and*
- **D** is proportional to output ***Y.***

- ***V*** is the flip side of the money demand **parameter *k*.**
- The assumption of $\bar{V}$ is = to the assumption of a $\bar{\mathbf{D}}$ for ***M/P*** per unit of ***Y***.

10-3 Aggregate Demand

The Quantity Equation as Aggregate Demand
Why the Aggregate Demand Curve Slopes Downward
Shifts in the Aggregate Demand Curve

The Aggregate Demand Curve



10-3 Aggregate Demand

The Quantity Equation as Aggregate Demand

Why the Aggregate Demand Curve Slopes Downward

Shifts in the Aggregate Demand Curve

We have **assumed**

- $\bar{V}$ =>
- ***M*** determines the **$ value of all transactions**

Why the AD Curve Slopes Downward.

2 explanations:

1. If the *P* r↑, each transaction requires **> $$,** →

- the **#** of transactions and =>
- the quantity of **G&S** purchased

} **Must** ↓

2.If *Y* is ↑er, people engage in **> transactions** and need **↑er *M/P*.**

- For a $\bar{M}$, ↑*er* ***M/P*** *imply a* ↓*er* ***P***.
- the ↑er level of ***M/P*** allows a > volume of transactions =>
- > **quantity of *Y* is demanded**.

10-3 Aggregate Demand

The AD curve is drawn for a fixed value of the *M* .

If the Fed changes the *M* ,

- then the combinations of *P*&*Y* change,
- which means the AD curve shifts.

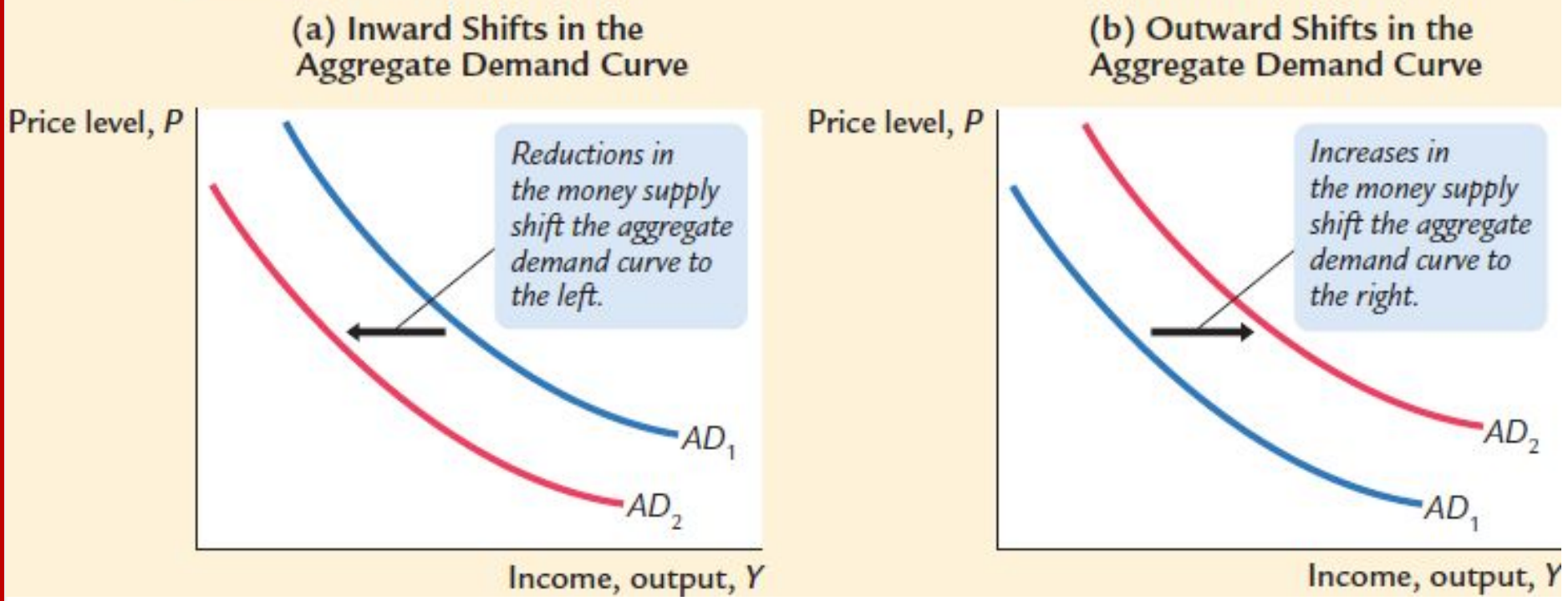
For example,

consider what happens if the Fed **reduces** the M .

- The quantity equation, *MV = PY,* tells us that the r↓ in the *M*
- → a proportionate r↓ in the nominal value of output *PY:*
  - ✔ **For any given *P*,** the amount of *Y* is ↓**er**, and
  - ✔ **For any given amount of *Y*,** the *P* is ↓**er.**

→ The aggregate demand curve relating ***P*** and ***Y*** **shifts inward**.

FIGURE 10-6



Shifts in the Aggregate Demand Curve Changes in the ***M*** shift the ***AD*** curve.

- **In panel (a),** a ↘ in the *M* reduces the nominal value of output *PY.*
- For any given *P,* output *Y* is **lower.**
  → a ↘ in the *M* shifts the aggregate demand curve inward from *AD1 to AD2.*

- **In panel (b),** an ↗in the *M* raises the nominal value of output *PY.*
- For any given *P,* output *Y* is **higher.**
  → an ↗in the *M* shifts the aggregate demand curve outward from *AD1 to AD2.*

10-4 Aggregate Supply

Aggregate supply (*AS)* is the relationship between the **quantity of G&S supplied** and **the *P***.

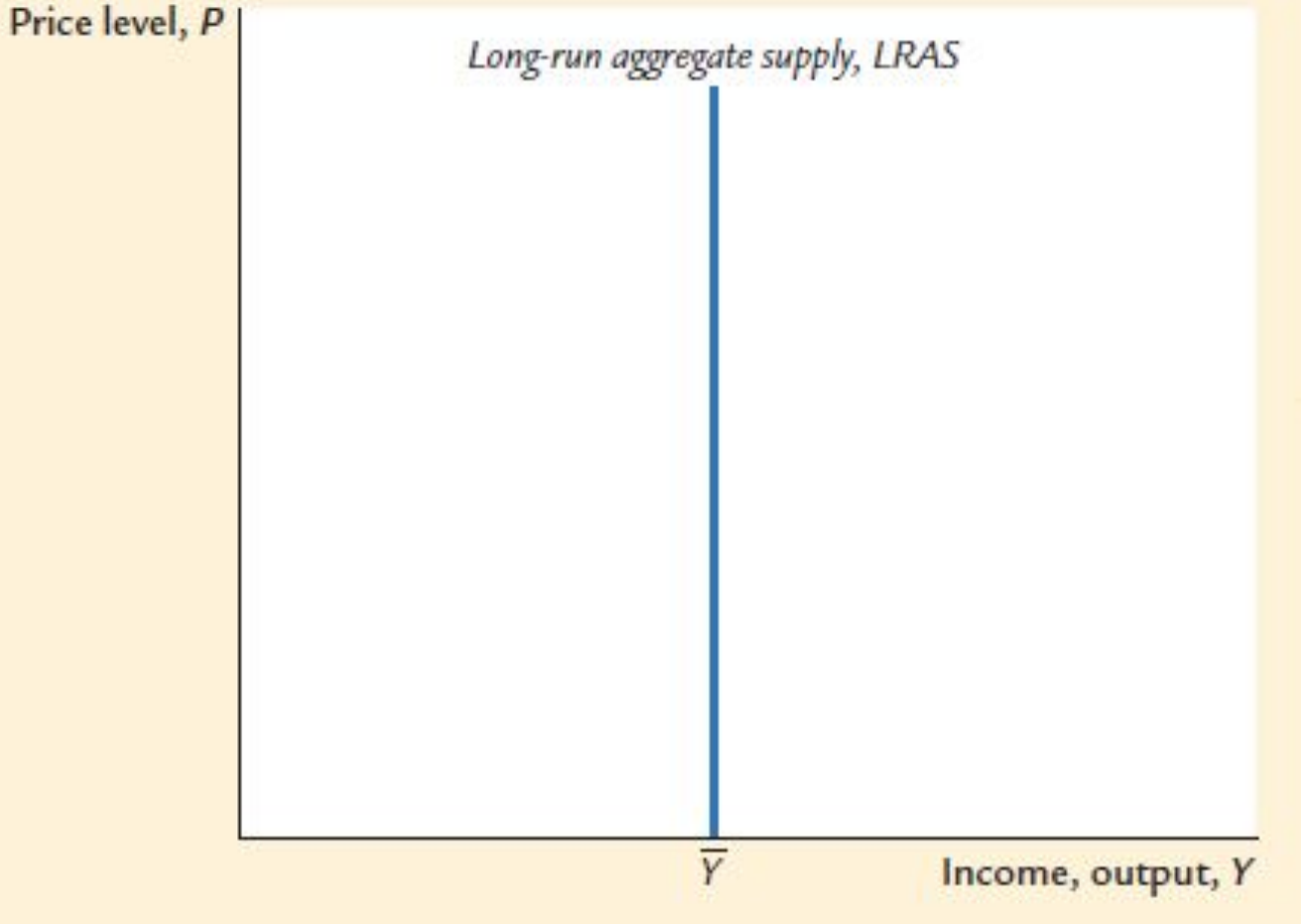
The ***AS*** relationship depends on the time horizon.

- We need to discuss two different *AS* curves:
  1. the long-run aggregate supply curve ***LR AS*** and
  2. The short-run aggregate supply curve ***SR AS.***

The Long Run: The Vertical Aggregate Supply Curve
The Short Run: The Horizontal Aggregate Supply Curve
From the Short Run to the Long Run

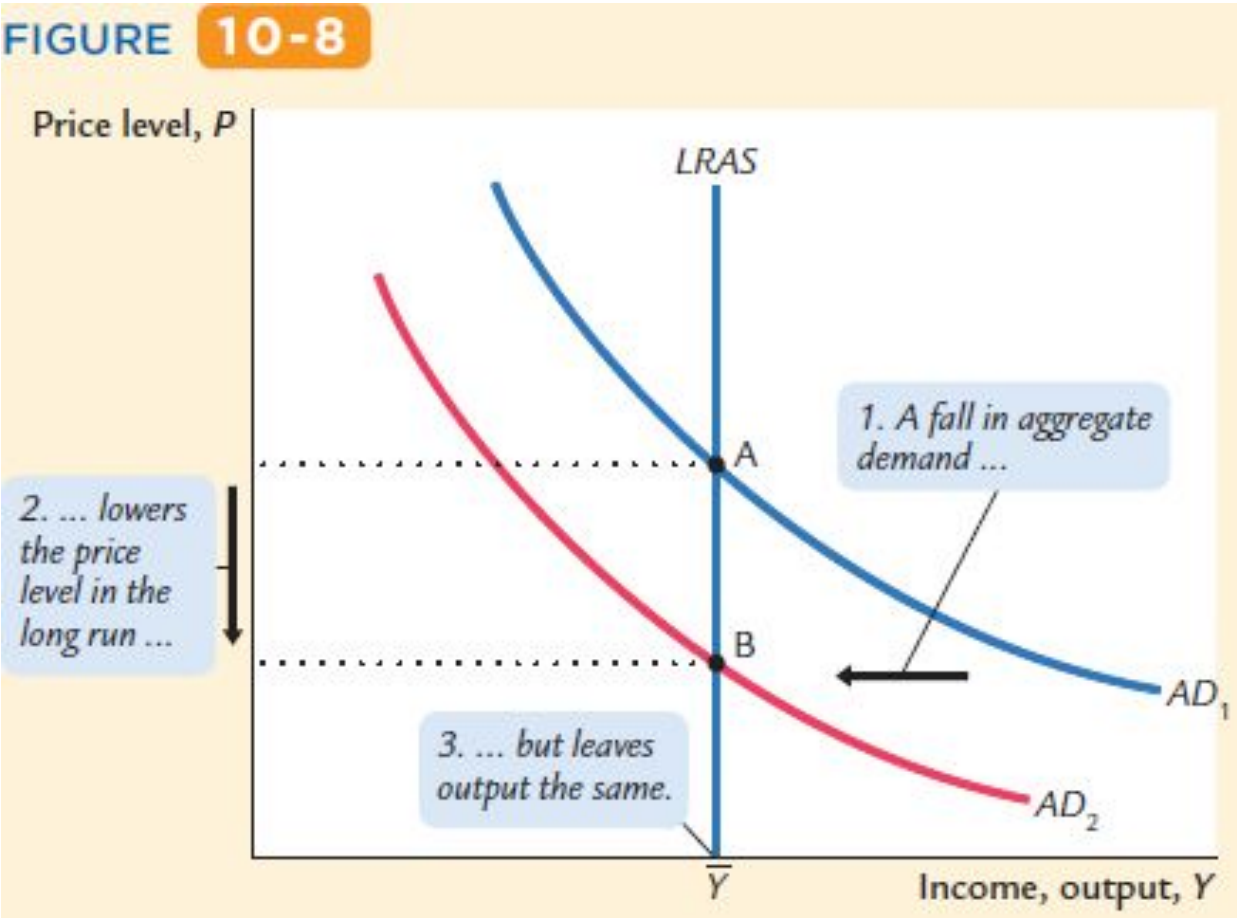
10-4 Aggregate Supply

FIGURE 10-7



- **The Long-Run Aggregate Supply Curve**
- In the **lR**, the level of output is determined by the amounts of **K & L** and by the **T/L**;
- it does not depend on the price level.
- The long-run aggregate supply curve, *LRAS,* is vertical.

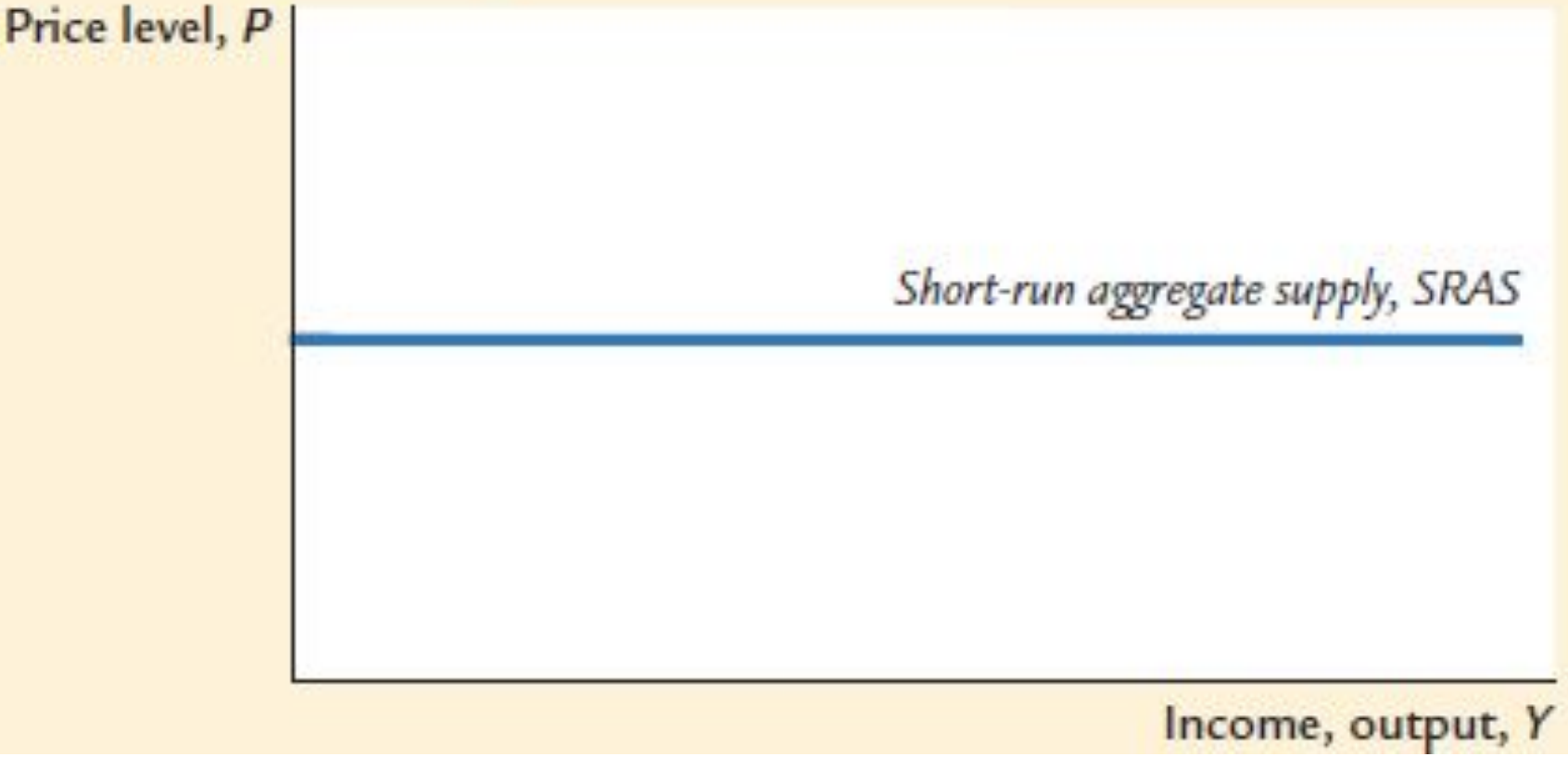
10-4 Aggregate Supply



- **Shifts in Aggregate Demand in the Long Run**
- **A reduction** in the M shifts the aggregate demand curve downward from *AD1 to AD2.*
- *The equilibrium for the* economy moves from point A to point B.
- Because the AS curve is vertical in the long run, the reduction in AD affects the P but not the level of output.

10-4 Aggregate Supply

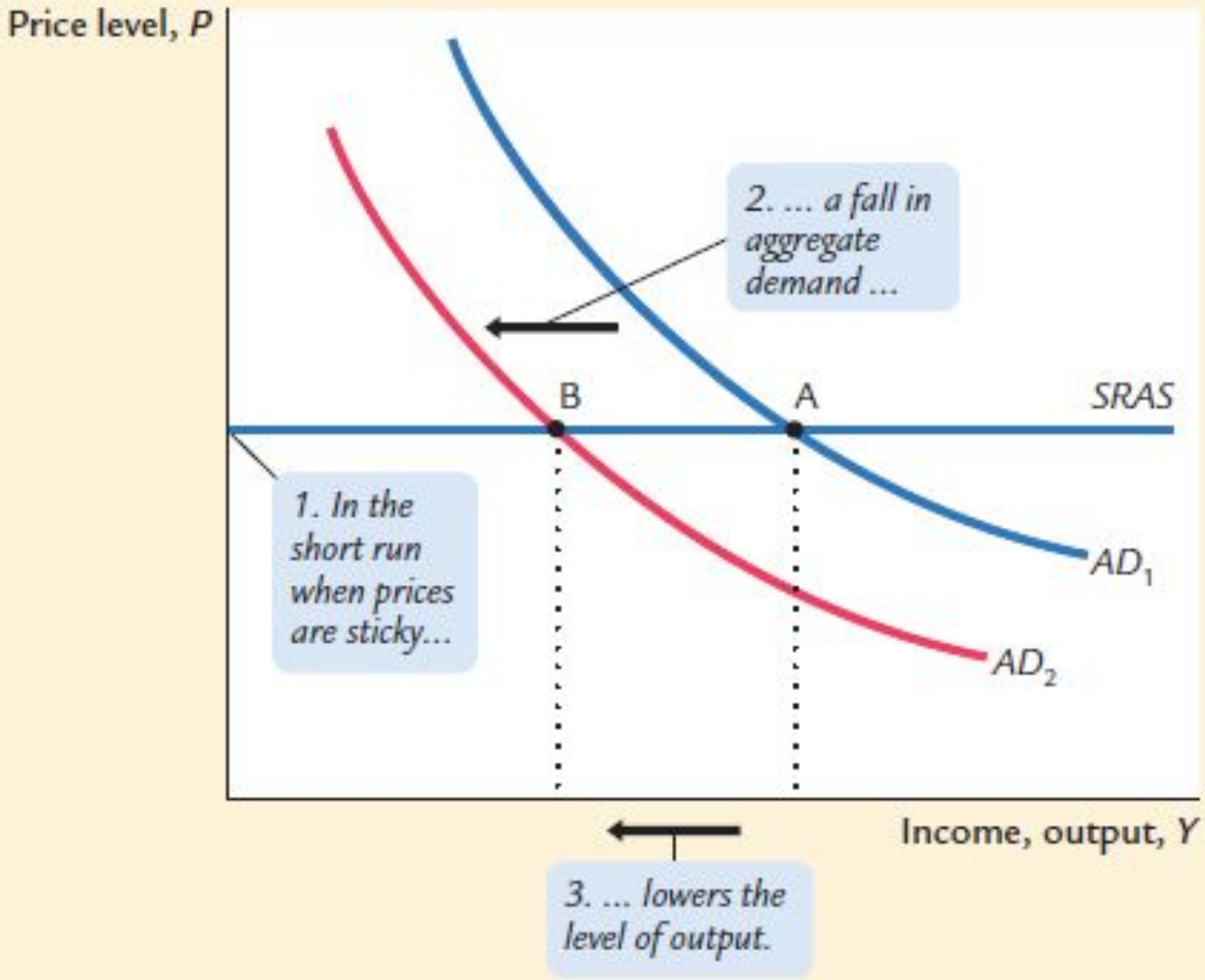
FIGURE 10-9



- **The Short-Run Aggregate Supply Curve**
- **In this extreme** example, all prices are fixed in the short run.
- Therefore, the short-run aggregate supply curve, *SRAS, is horizontal.*

10-4 Aggregate Supply

FIGURE 10-10

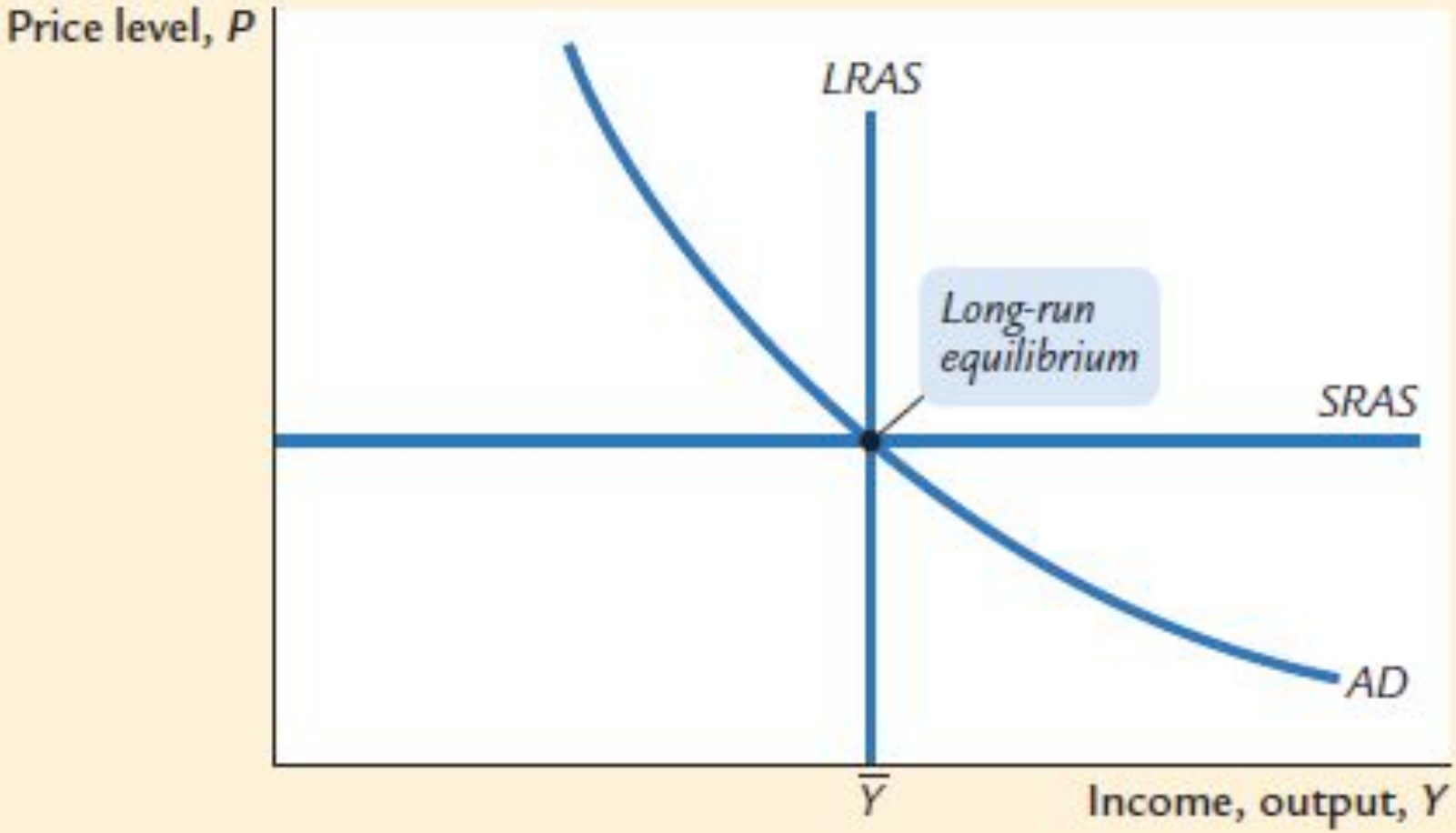


Shifts in Aggregate Demand in the Short Run

- **A reduction in** the **M** shifts the ***AD*** curve downward from *AD1 to AD2.*
- The equilibrium for the economy moves from point A to point B.
- Because the AS curve is horizontal in the SR, the reduction in AD reduces the level of *Y*.

10-4 Aggregate Supply

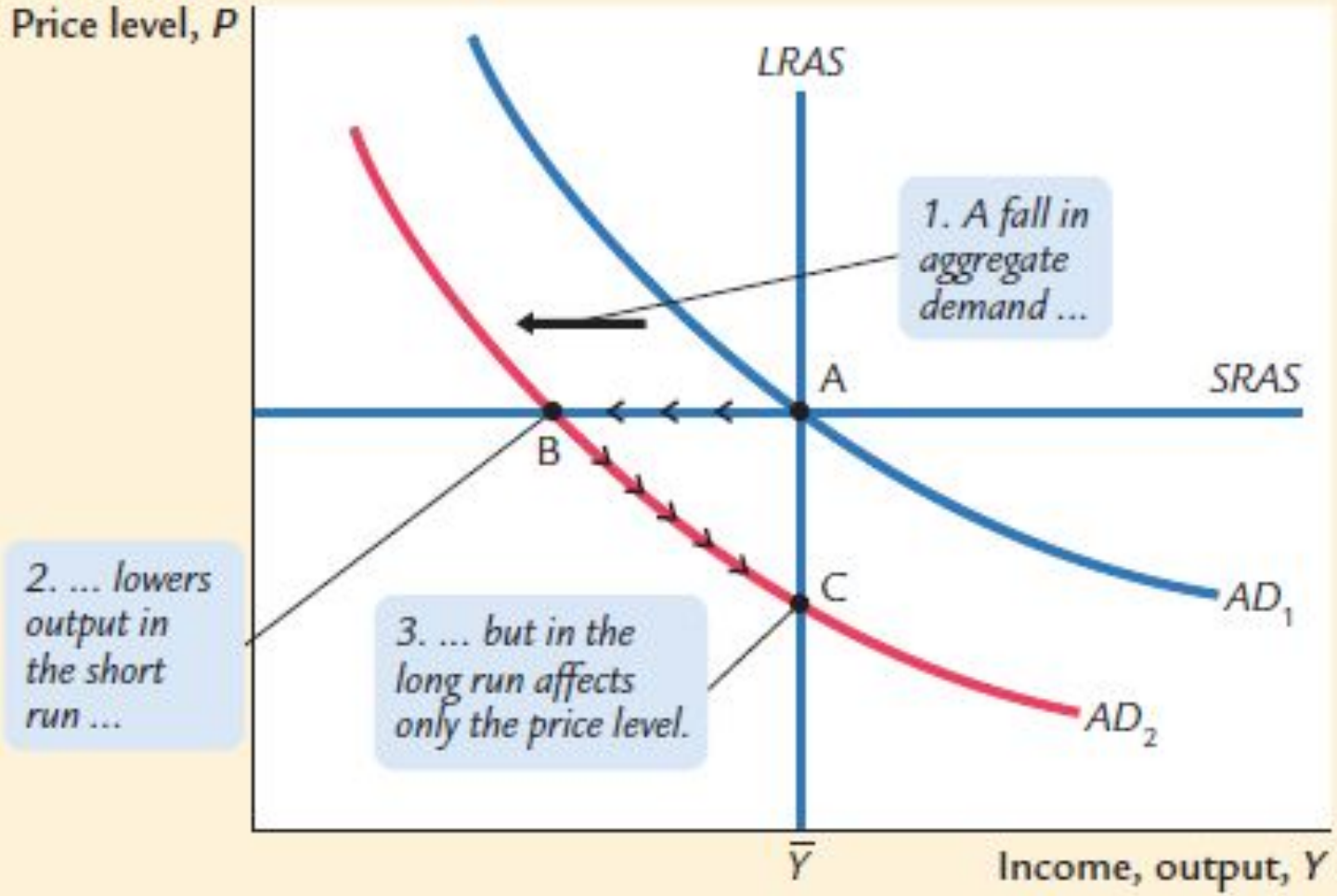
FIGURE 10-11



- **Long-Run Equilibrium**
- In the **LR**, the economy finds itself at the intersection of the **LR AS** curve and the **AD** curve.
- Because prices have adjusted to this level, **the SRAS** curve crosses this point as well.

10-4 Aggregate Supply

FIGURE 10-12



A Reduction in Aggregate Demand

- **The economy begins** in long-run equilibrium at point A.
- A reduction in AD, perhaps caused by a decrease in the M ,
- moves the economy from point A to point B, where output is below its natural level.
- As prices fall, the economy gradually recovers from the recession, moving from point B to point C.

A Monetary Lesson From French History

Case Study

- The story begins with the unusual nature of French money at the time. The money stock in this economy included a variety of gold and silver coins that, in contrast to modern money, did not indicate a specific monetary value. Instead, the monetary value of each coin was set by government decree, and the government could easily change the monetary value and thus the M . Sometimes this would occur literally overnight. It is almost as if, while you were sleeping, every $1 bill in your wallet was replaced by a bill worth only 80 cents. Indeed, that is what happened on September 22, 1724. Every person in France woke up with 20 % less money than he or she had the night before. Over the course of seven months, the nominal value of the money stock was reduced by about 45 % . The goal of these changes was to reduce prices in the economy to what the government considered an appropriate level.

David Hume on the Real Effects of Money

- Here
- is how Hume described a monetary injection in
- his 1752 essay *Of Money:*
- To account, then, for this phenomenon, we must
- consider, that though the high price of commodities
- be a necessary consequence of the increase of gold
- and silver, yet it follows not immediately upon that
- increase; but some time is required before the money
- circulates through the whole state, and makes its
- effect be felt on all ranks of people. At first, no
- alteration is perceived; by degrees the price rises, first
- of one commodity, then of another; till the whole at
- last reaches a just proportion with the new quantity
- of specie which is in the kingdom. In my opinion,
- it is only in this interval or intermediate situation,
- between the acquisition of money and rise of prices,
- that the increasing quantity of gold and silver is
- favorable to industry.

FA Y

10-5 Stabilization Policy

Shocks to Aggregate Demand
Shocks to Aggregate Supply

Fluctuations in the economy as a whole come from changes AS or AD.

Economists call exogenous events that shift these curves shocks to the economy.

- **a shock that shifts the AD curve** is called a **demand shock.**
- **a shock that shifts the AS curve** is called a **supply shock.**

These shocks disrupt the economy by pushing output and employment away from their natural levels.

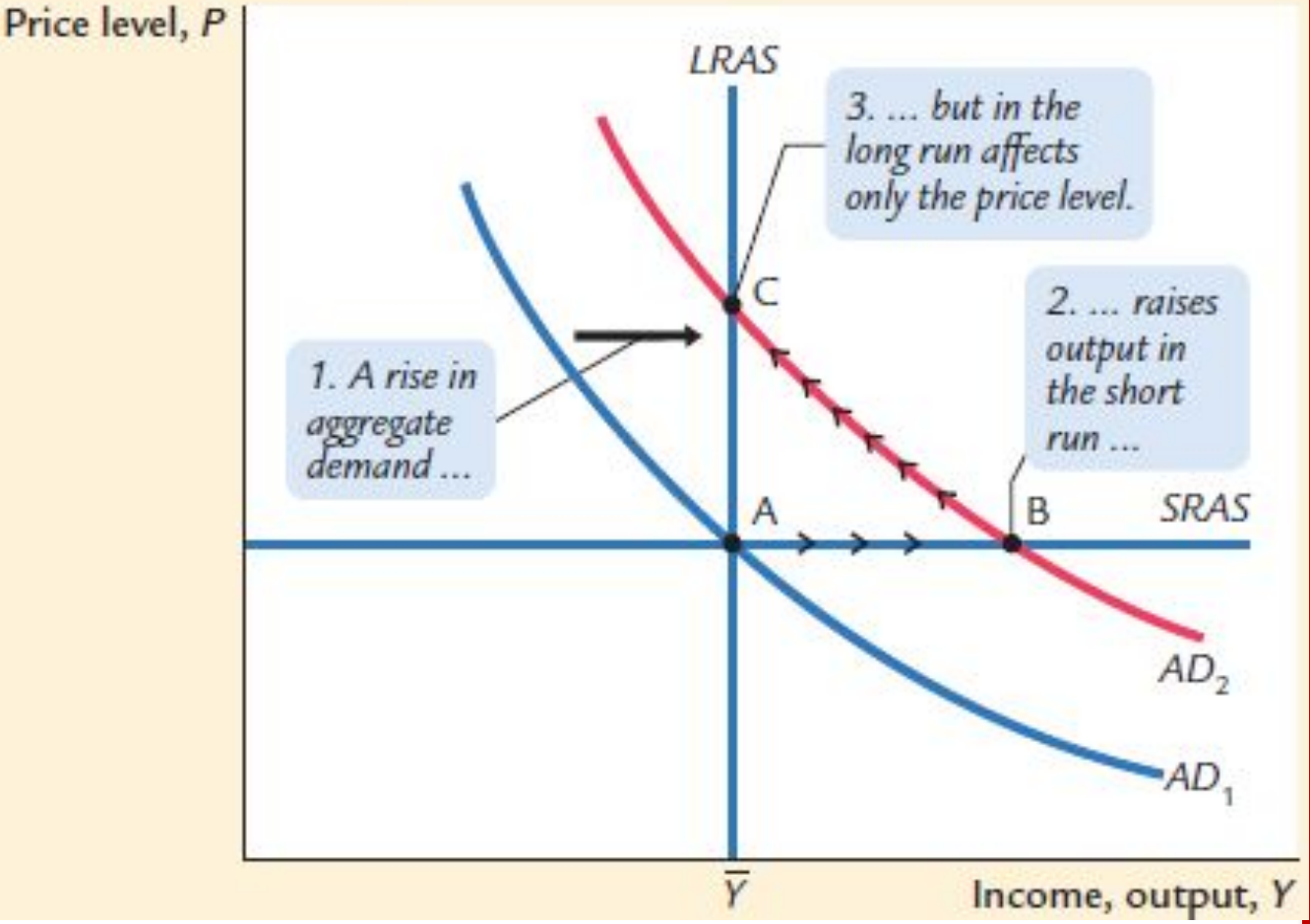
Goals of the model of AS & AD:

2. to show how **shocks cause economic fluctuations**.
3. to evaluate how **macroeconomic policy can respond**.

The stabilization policy is a policy aimed to reduce the severity of SR economic fluctuations.

10-5 Stabilization Policy

FIGURE 10-13



- **An Increase in Aggregate Demand**
- **The economy begins** in long-run equilibrium at point A.
- An increase in AD, perhaps due to an increase in the **velocity of money**, moves the economy from point A to point B, where **Y** is above its natural level.
- As prices rise, output gradually returns to its natural level, and the economy moves from point B to point C.

10-5 Stabilization Policy

Because supply shocks have a direct impact on the price level, they are sometimes called **price shocks**.

Examples:

- **A drought that destroys crops.**

  The reduction in food supply pushes **up food *P***.

- **A new environmental protection law** that requires firms to reduce their emissions of pollutants.

  Firms in↗ P.

- **An increase in union aggressiveness.**

  This pushes up wages and the prices.

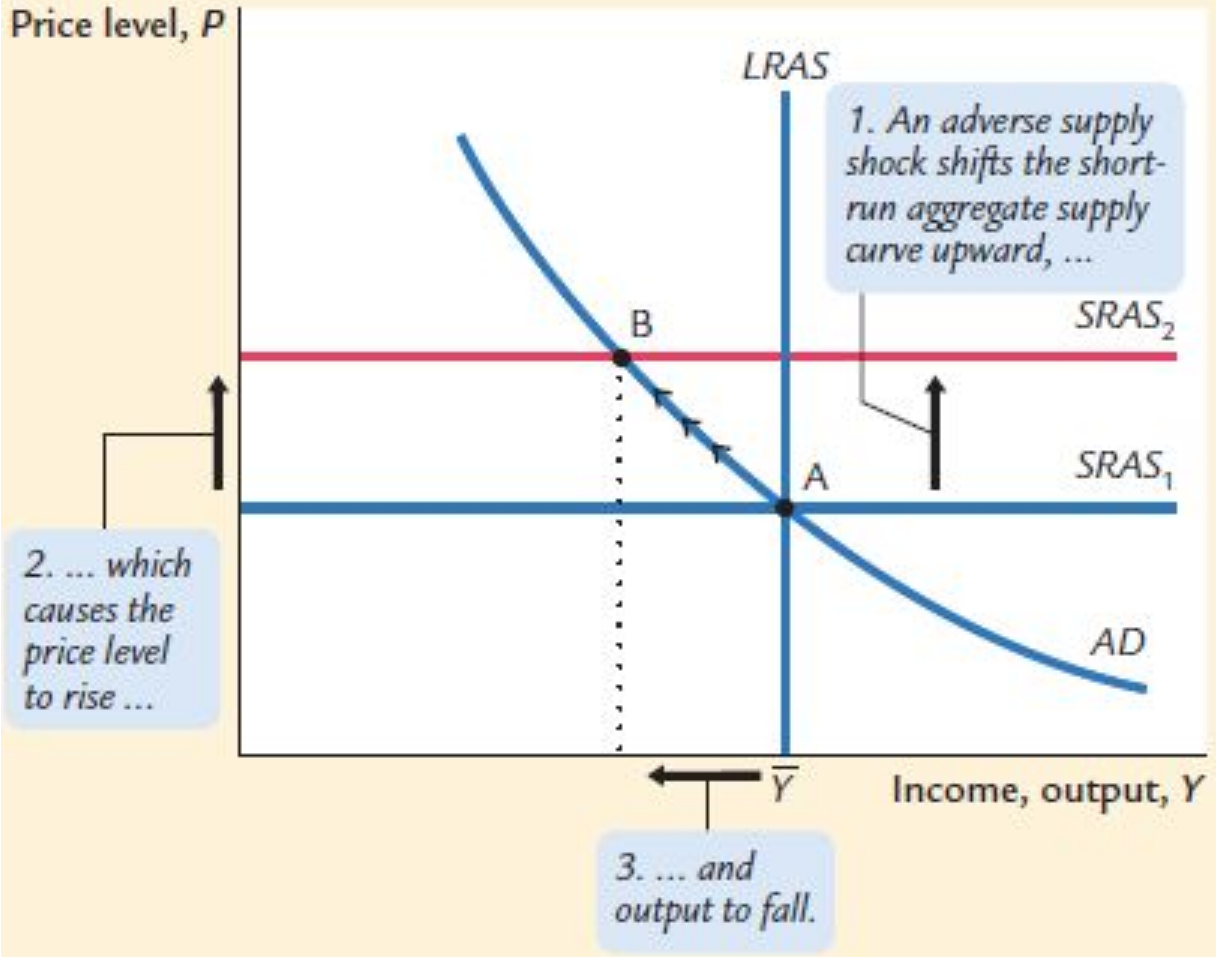
- **The organization of an international oil cartel**.

  By curtailing competition, the major oil producers can raise the world *P* of oil.

1. All these events are **adverse supply shocks**, which means they push costs and prices upward.
2. A **favorable supply shock** reduces costs and prices.

10-5 Stabilization Policy

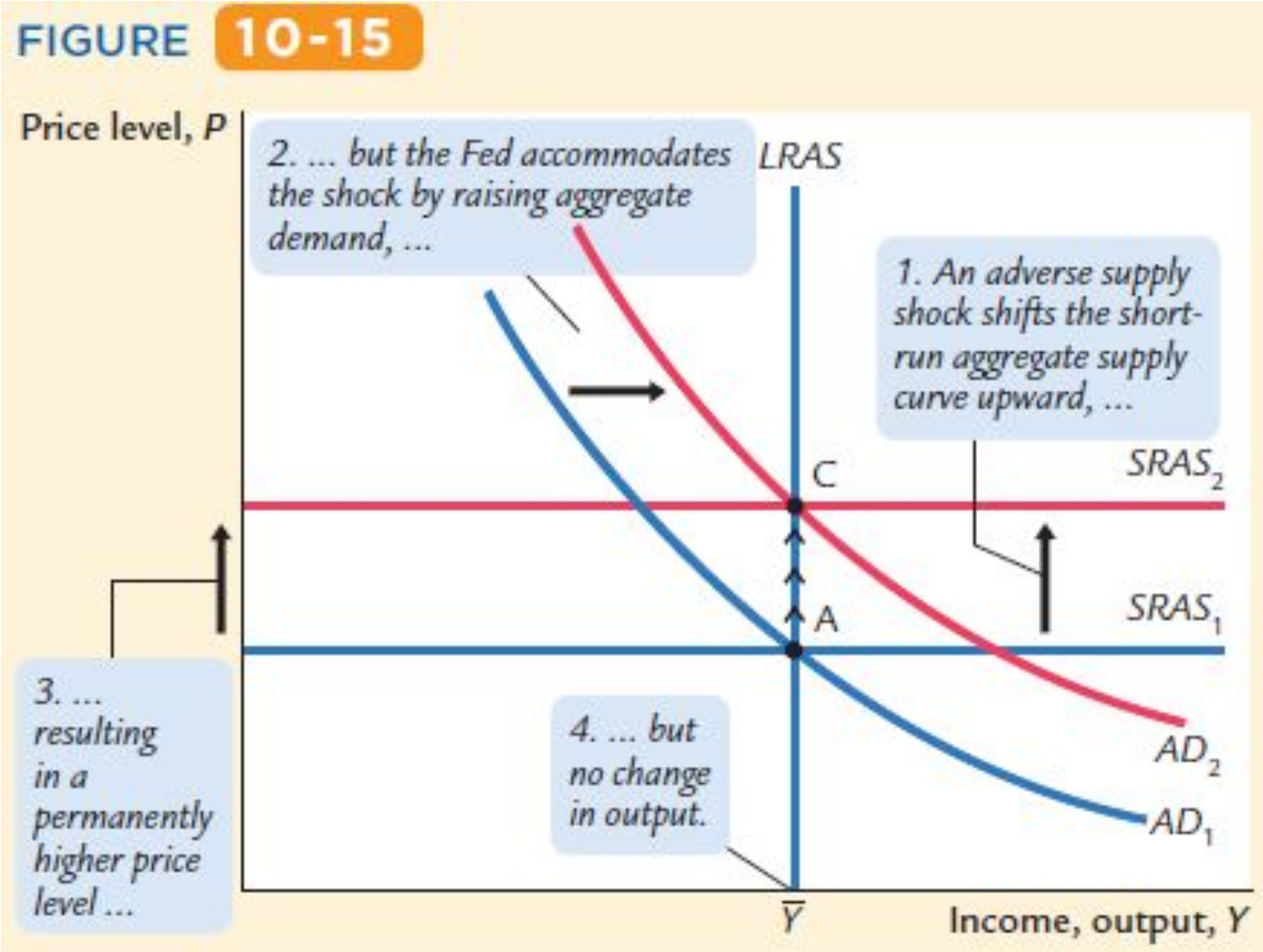
FIGURE 10-14



An Adverse Supply Shock

- An adverse supply shock pushes up costs and thus prices.
- If AD is held constant, the economy moves from point A to point B, leading to **stagflation - a combination of increasing prices and falling output.**
- Eventually, as prices fall, the economy returns to the natural level of *Y*, point A.

10-5 Stabilization Policy



Accommodating an Adverse Supply Shock

- **In response to** an adverse supply shock,
- **the Fed can increase AD** to prevent a reduction in output. The economy moves from point A to point C.
- The cost of this policy is a permanently higher level of prices.

How OPEC Helped Cause Stagflation in the 1970s and Euphoria in the 1980s

Case Study

Year	Change in Oil Prices	Inflation Rate (CPI)	Unemployment Rate
1973	11.0%	6.2%	4.9%
1974	68.0	11.0	5.6
1975	16.0	9.1	8.5
1976	3.3	5.8	7.7
1977	8.1	6.5	7.1

Year	Change in Oil Prices	Inflation Rate (CPI)	Unemployment Rate
1978	9.4%	7.7%	6.1%
1979	25.4	11.3	5.8
1980	47.8	13.5	7.0
1981	44.4	10.3	7.5
1982	-8.7	6.1	9.5

Year	Changes in Oil Prices	Inflation Rate (CPI)	Unemployment Rate
1983	−7.1%	3.2%	9.5%
1984	−1.7	4.3	7.4
1985	−7.5	3.6	7.1
1986	−44.5	1.9	6.9
1987	18.3	3.6	6.1

10-6 Conclusion

1. **This chapter introduced a framework to study economic fluctuations:**
   a. the model of aggregate supply and aggregate demand.
   b. The model is built on the assumption that prices are sticky in the short run and flexible in the long run.
   c. It shows how shocks to the economy cause output to deviate temporarily from the level implied by the classical model.
2. **The model also highlights the role of monetary policy.**
   a. On the one hand, poor monetary policy can be a source of destabilizing shocks to the economy.
   b. On the other hand, a well-run monetary policy can respond to shocks and stabilize the economy.

THANKS !