

MACROECONOMICS I

Aggregate Demand and Aggregate Supply

Lecture 9

April 29, 2022

LOOK FOR THE ANSWERS TO THESE QUESTIONS:

- What are economic fluctuations? What are their characteristics?
- How does the model of aggregate demand and aggregate supply explain economic fluctuations?
- Why does the Aggregate-Demand curve slope downward? What shifts the AD curve?
- What is the slope of the Aggregate-Supply curve in the short run? In the long run?
What shifts the AS curve(s)?

INTRODUCTION

Real GDP over the long run

- Grows about 3% per year on average

GDP in the short run

- Fluctuates around its trend

Recessions

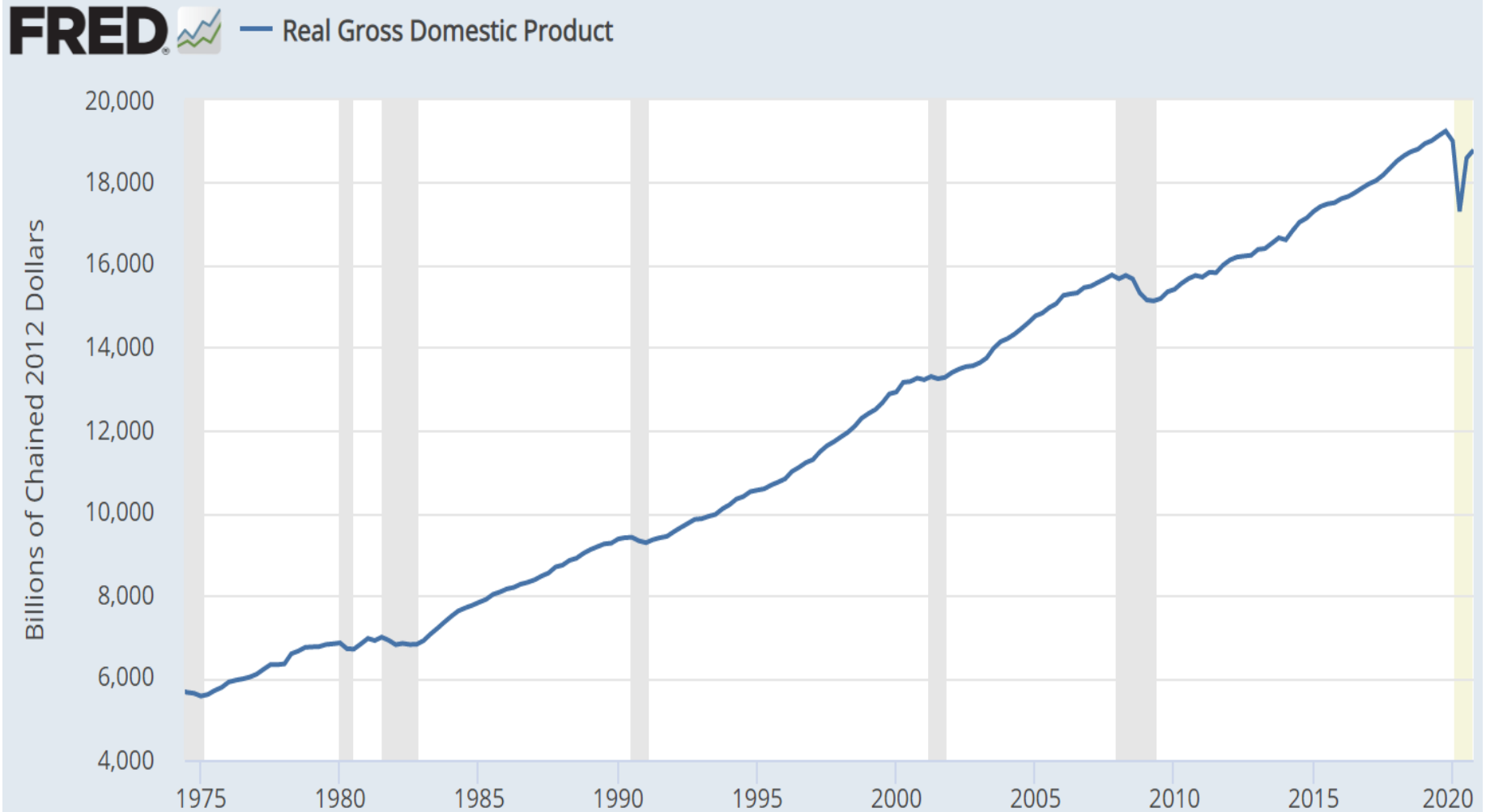
- Periods of falling real incomes and rising unemployment

Depressions

- Severe recessions (very rare)

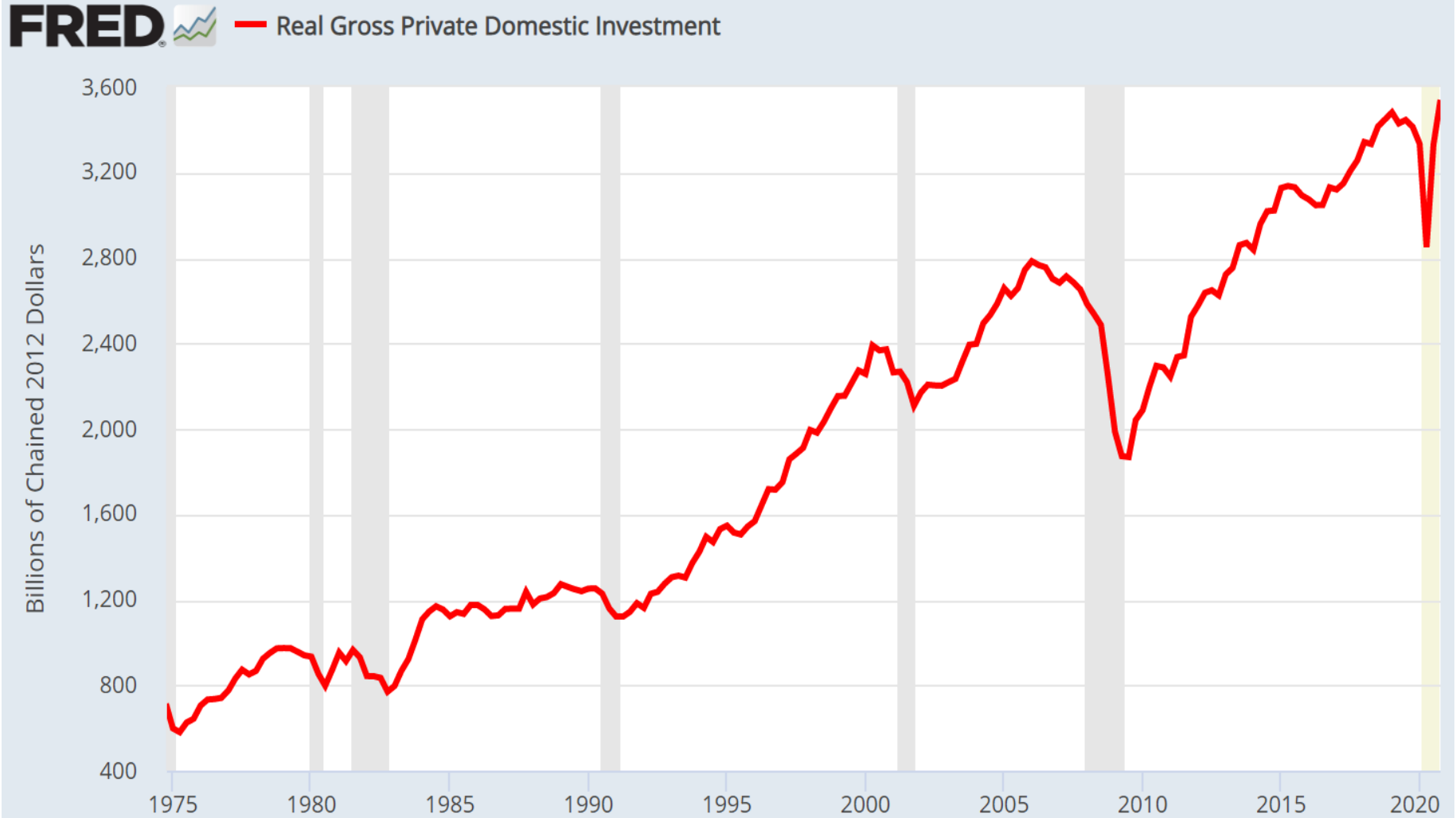
FACT 1: Economic fluctuations are irregular and unpredictable

THREE FACTS ABOUT ECONOMIC FLUCTUATIONS



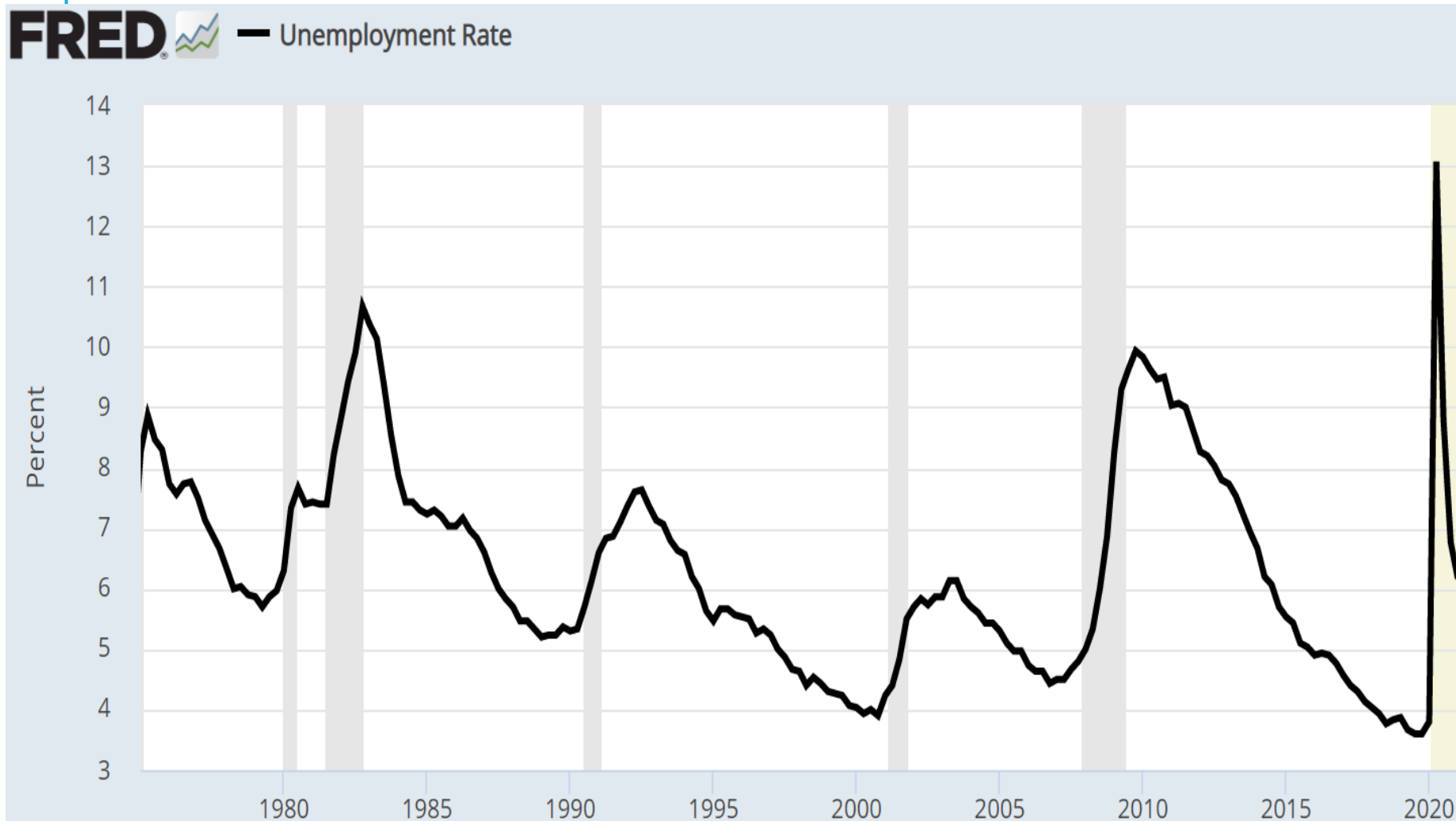
FACT 2: Most macroeconomic quantities fluctuate together.

THREE FACTS ABOUT ECONOMIC FLUCTUATIONS



FACT 3: As output falls, unemployment rises.

THREE FACTS ABOUT ECONOMIC FLUCTUATIONS



CLASSICAL ECONOMICS—A RECAP

The Classical Dichotomy:

the separation of variables into two groups:

- Real – quantities, relative prices
- Nominal – measured in terms of money

The neutrality of money:

Changes in the money supply affect nominal but not real variables

CLASSICAL ECONOMICS—A RECAP

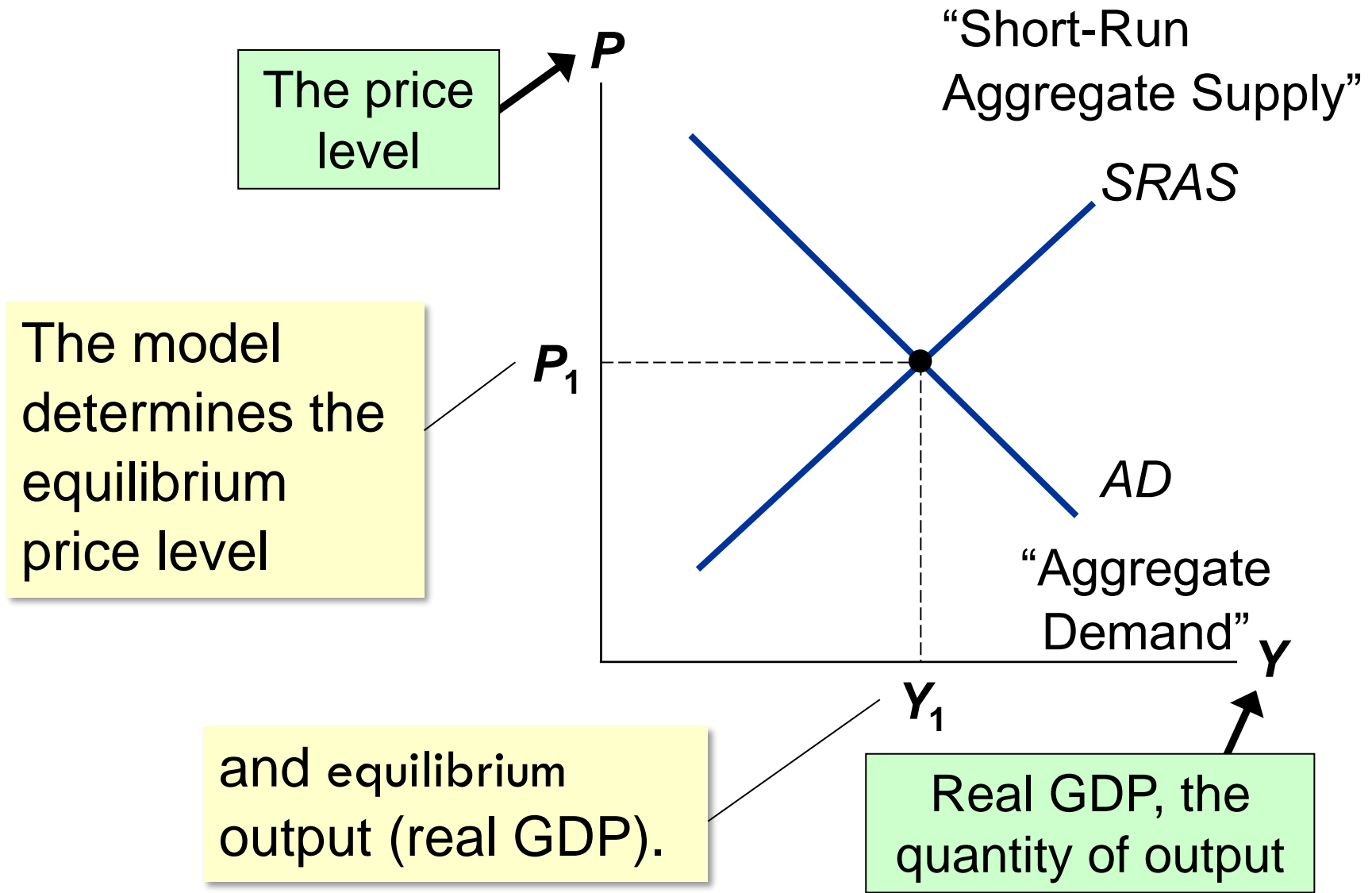
Classical theory

- Describes the world in the long run, but not the short run

In the short run

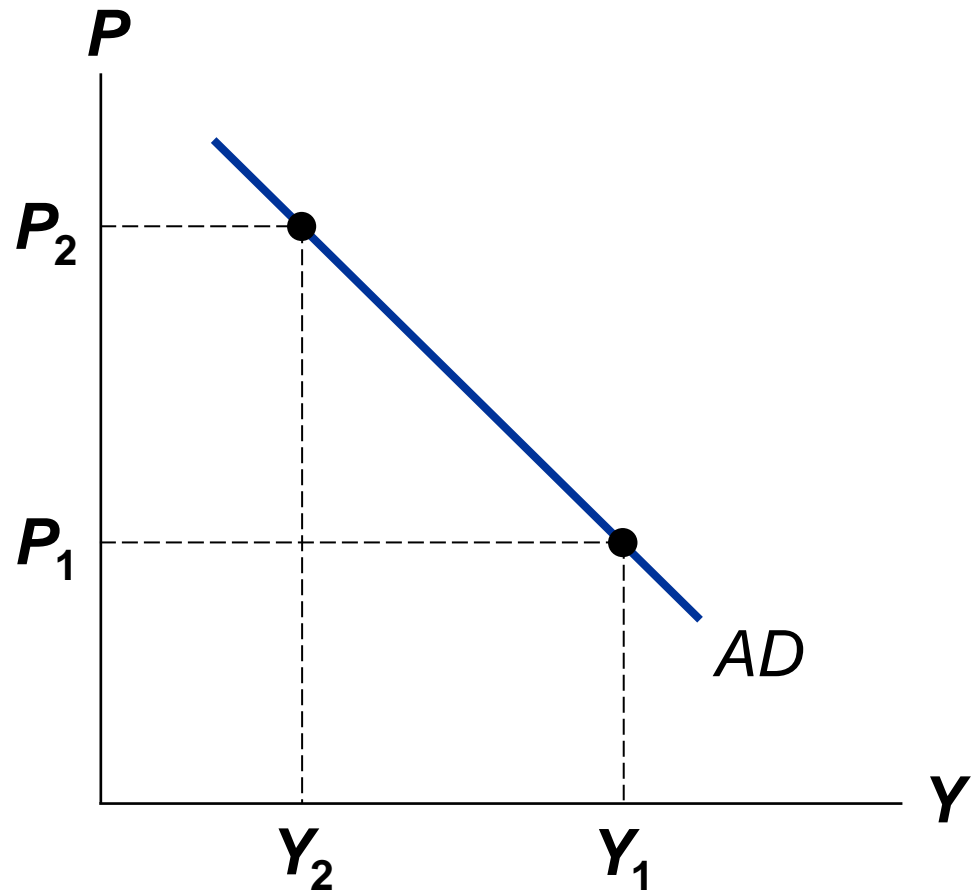
- Changes in nominal variables (like the money supply or P) can affect real variables (like Y or the u -rate).
- We use a new model...

MODEL OF AGGREGATE DEMAND AND AGGREGATE SUPPLY



THE AGGREGATE-DEMAND (AD) CURVE

The **AD curve** shows the quantity of all goods and services demanded in the economy at any given price level.



WHY THE *AD* CURVE SLOPES DOWNWARD

$$Y = C + I + G + NX$$

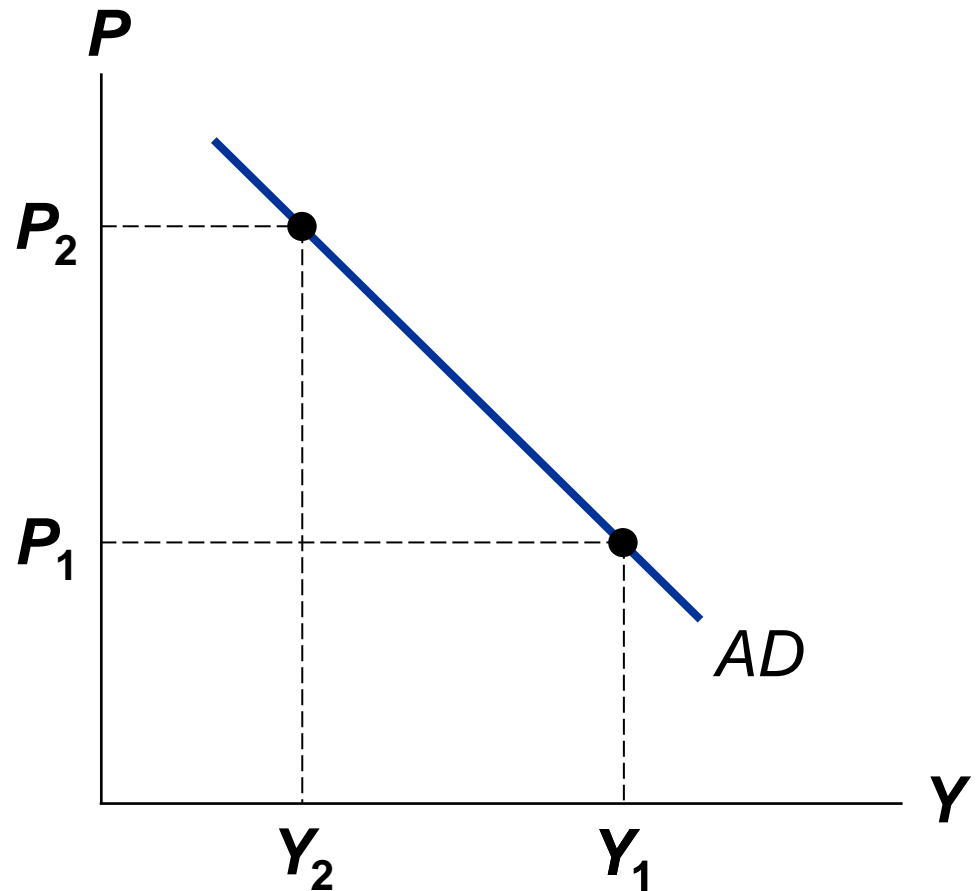
Assume **G** is fixed

by government policy.

To understand the slope

of *AD*, must determine

how a change in **P**
affects **C**, **I**, and **NX**.



THE WEALTH EFFECT (P AND C)

Suppose the price level, P , declines

- Increase in the real value of money
- Consumers are wealthier
- Increase in consumer spending, C
- Increase in quantity demanded of goods and services

$\downarrow P \rightarrow \uparrow \text{real money value} \rightarrow \uparrow \text{Consumption}$

THE INTEREST-RATE EFFECT (P AND I)

Suppose the price level, P , declines

- Buying goods and services requires fewer dollars
 - People buy bonds and other assets
- Decrease in the interest rate
- Increase spending on investment goods, I
- Increase in quantity demanded of goods and services

$\downarrow P \rightarrow \downarrow \textit{interest rate} \rightarrow \uparrow \textit{Investment}$

THE EXCHANGE-RATE EFFECT (P AND NX)

Suppose the U.S. price level, P , declines

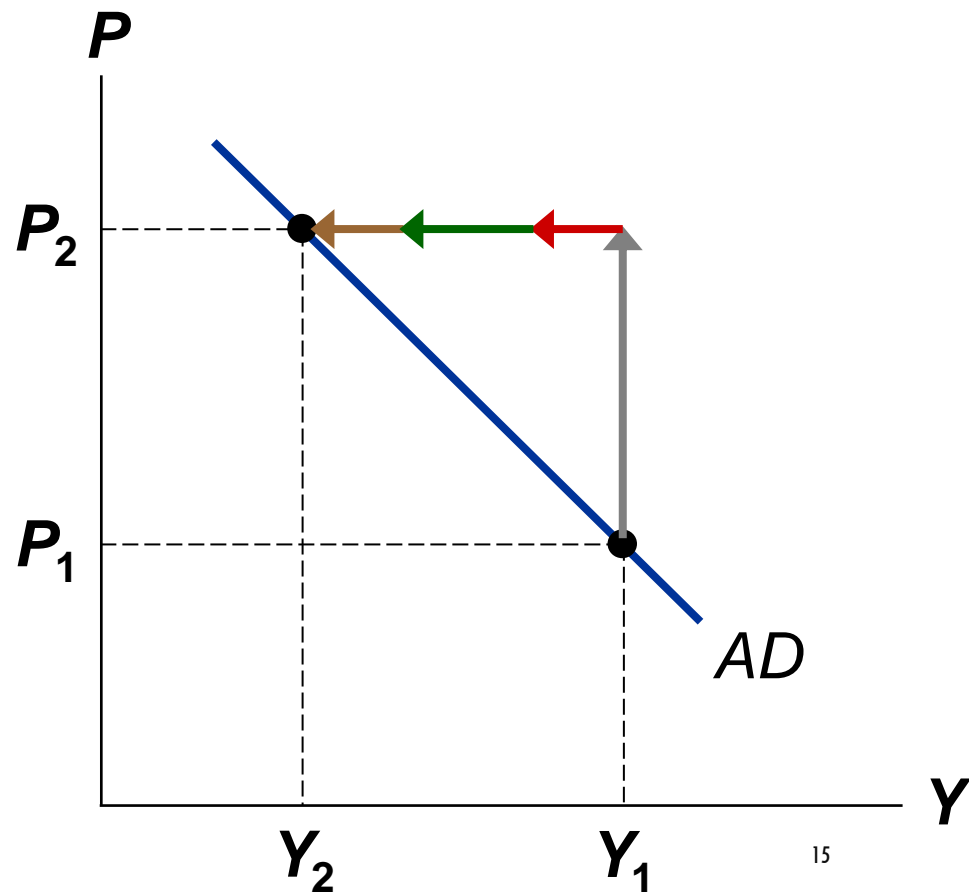
- Decrease in the interest rate
- Savers buy assets abroad (higher i^*)
- U.S. dollar depreciates
- Stimulates U.S. net exports, NX
- Increase in quantity demanded of goods and services

$\downarrow P \rightarrow \downarrow \text{interest rate} \rightarrow \uparrow \text{Net Export}$

THE SLOPE OF THE *AD* CURVE: SUMMARY

An increase in P reduces the quantity of goods and services demanded because:

- the wealth effect (C falls)
- the interest-rate effect (I falls)
- the exchange-rate effect (NX falls)

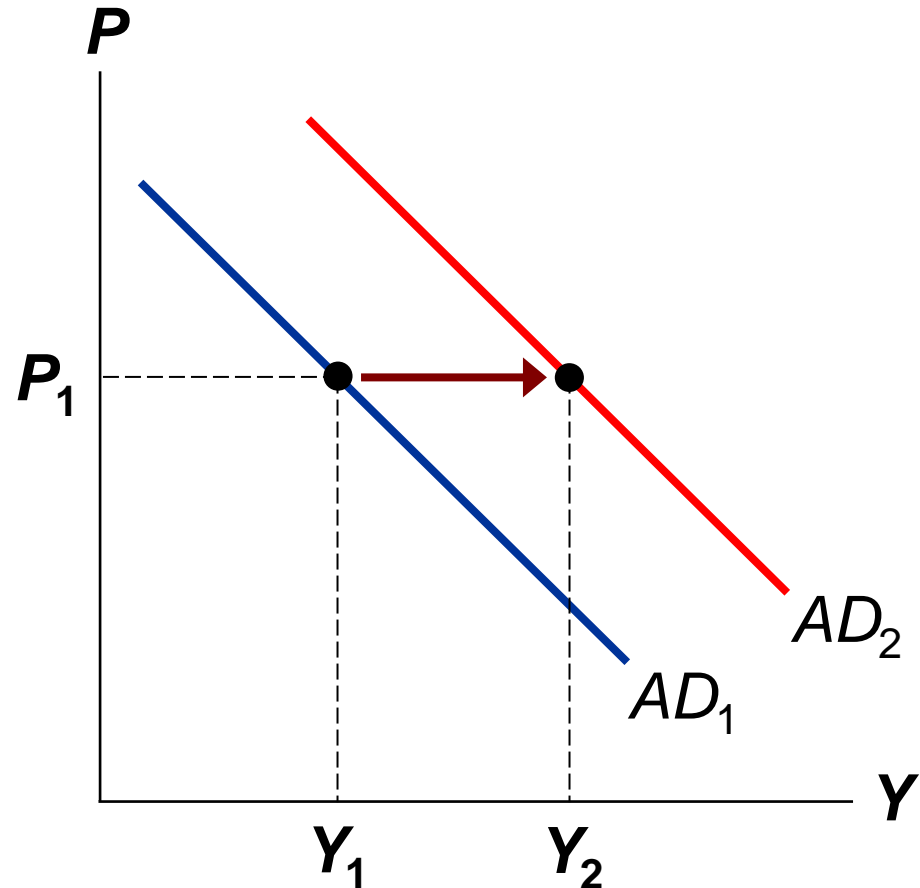


WHY THE AD CURVE MIGHT SHIFT

Any event that changes C , I , G , or NX —except a change in P —will shift the AD curve.

Example:

A stock market boom makes households feel wealthier, C rises, the AD curve shifts right.



WHY THE AD CURVE MIGHT SHIFT

Changes in C

- Stock market boom/crash
- Preferences: consumption/saving tradeoff
- Tax hikes/cuts

Changes in I

- Firms buy new computers, equipment, factories
- Expectations, optimism/pessimism
- Interest rates,
- Monetary policy,
- Investment Tax Credit or other tax incentives

WHY THE AD CURVE MIGHT SHIFT

Changes in G

- Federal spending, e.g., defense
- State & local spending, e.g., roads, schools

Changes in NX

- Booms/recessions in countries that buy our exports
- Appreciation/depreciation resulting from international speculation in foreign exchange market

What happens to the AD curve in each of the following scenarios?

- A. A ten-year-old investment tax credit expires.
- B. The U.S. exchange rate falls.
- C. A fall in prices increases the real value of consumers' wealth.
- D. State governments replace their sales taxes with new taxes on interest, dividends, and capital gains.

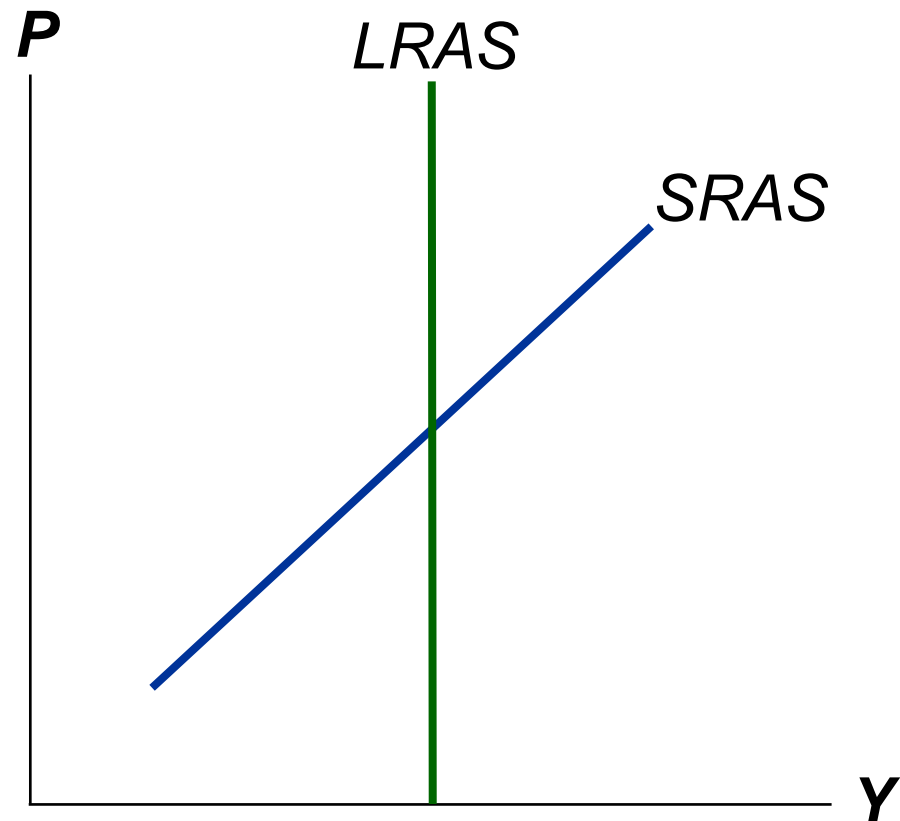
- A.** A ten-year-old investment tax credit expires.
- I falls, AD curve shifts left.
- B.** The U.S. exchange rate falls.
- NX rises, AD curve shifts right.
- C.** A fall in prices increases the real value of consumers' wealth.
- Move down along AD curve (wealth-effect).
- D.** State governments replace their sales taxes with new taxes on interest, dividends, and capital gains.
- C rises, AD shifts right.

THE AGGREGATE-SUPPLY (*AS*) CURVES

The **AS curve** shows the total quantity of goods and services firms produce and sell at any given price level.

AS is:

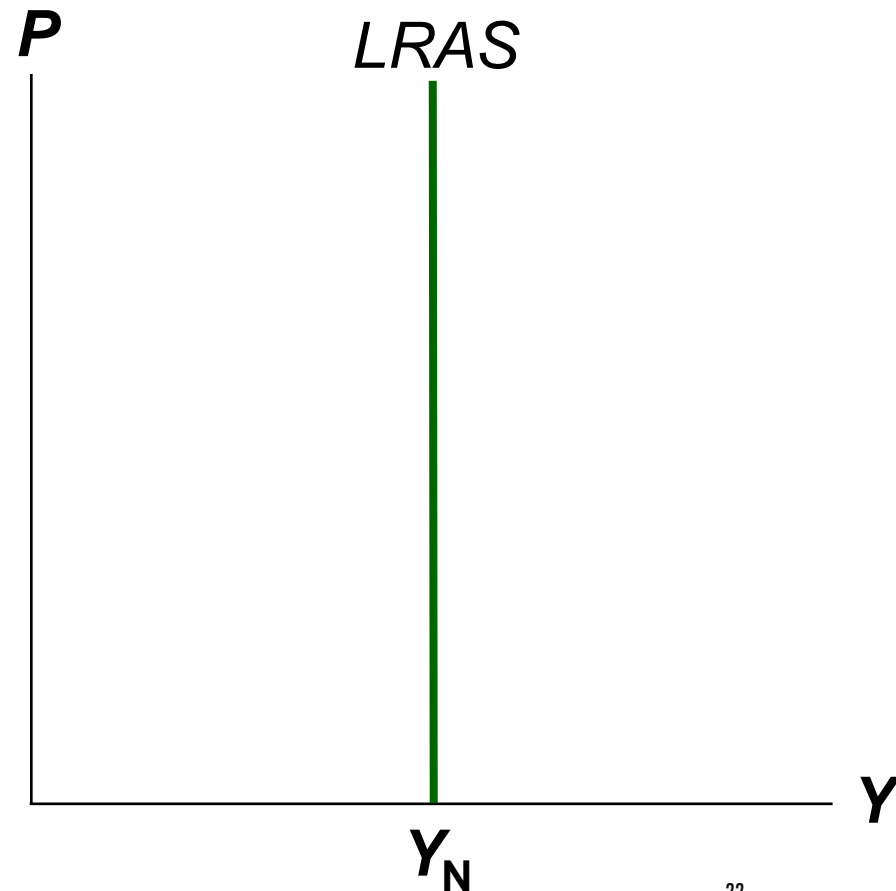
- upward-sloping in short run
- vertical in long run



THE LONG-RUN AGGREGATE-SUPPLY CURVE (*LRAS*)

The **natural rate of output** (Y_N) is the amount of output the economy produces when unemployment is at its natural rate.

Also called **potential output**
or
full-employment output.



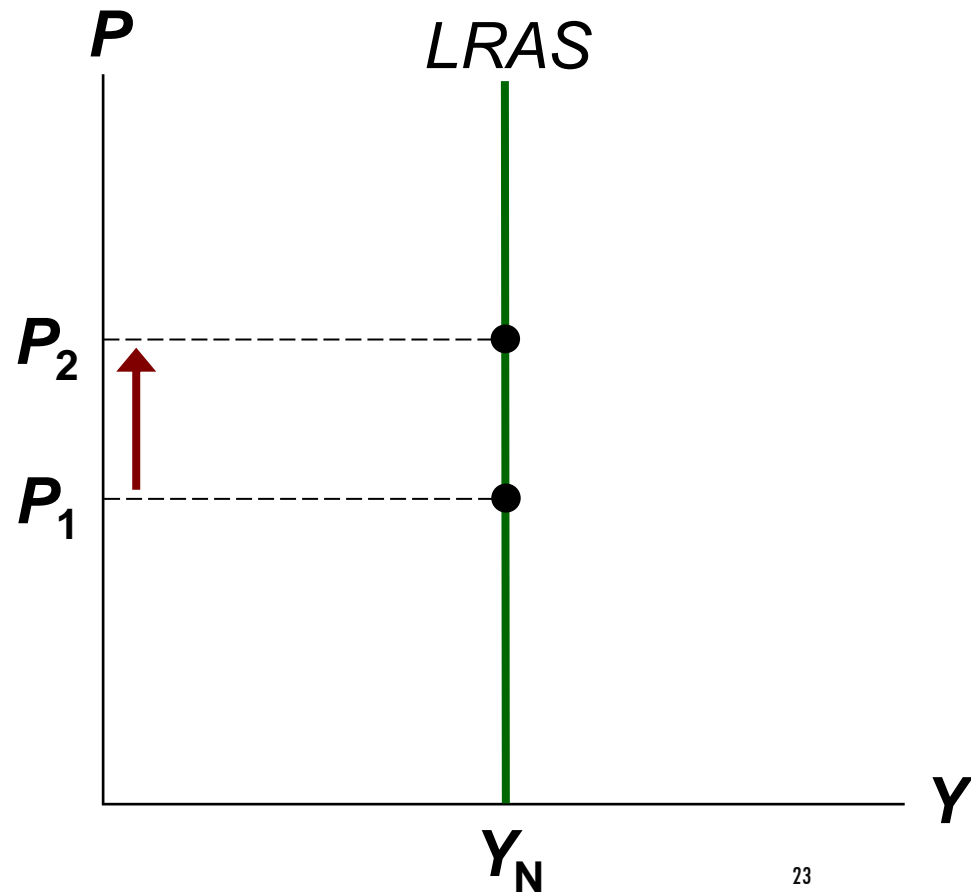
WHY *LRAS* IS VERTICAL

Y_N determined by the economy's stocks of labor, capital, and natural resources, and the level of technology.

An increase in P

does not affect any of these, so it does not affect Y_N .

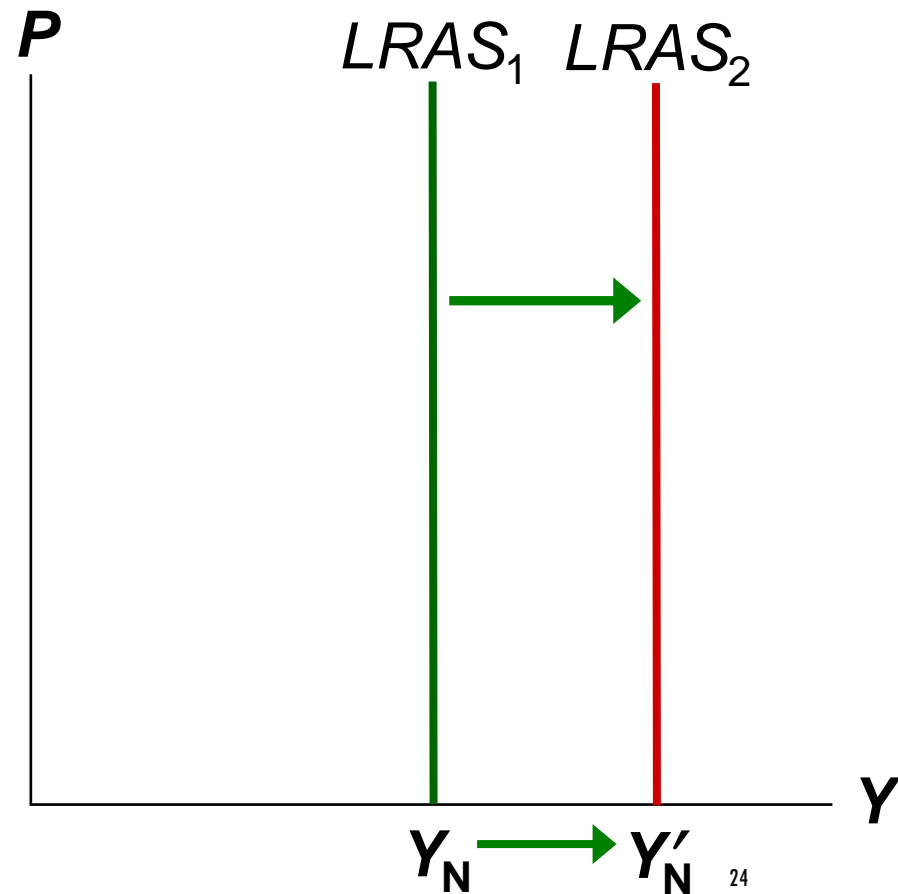
(Classical dichotomy)



WHY THE *LRAS* CURVE MIGHT SHIFT

Any event that changes any of the determinants of Y_N will shift *LRAS*.

Example: Immigration increases L , causing Y_N to rise.



WHY THE LRAS CURVE MIGHT SHIFT

Changes in L or natural rate of unemployment

- Immigration
- Baby-boomers retire
- Government policies reduce natural u-rate

Changes in K or H

- Investment in factories, equipment
- More people get college degrees
- Factories destroyed by a hurricane

WHY THE LRAS CURVE MIGHT SHIFT

Changes in natural resources

- Discovery of new mineral deposits
- Reduction in supply of imported oil
- Changing weather patterns that affect agricultural production

Changes in technology

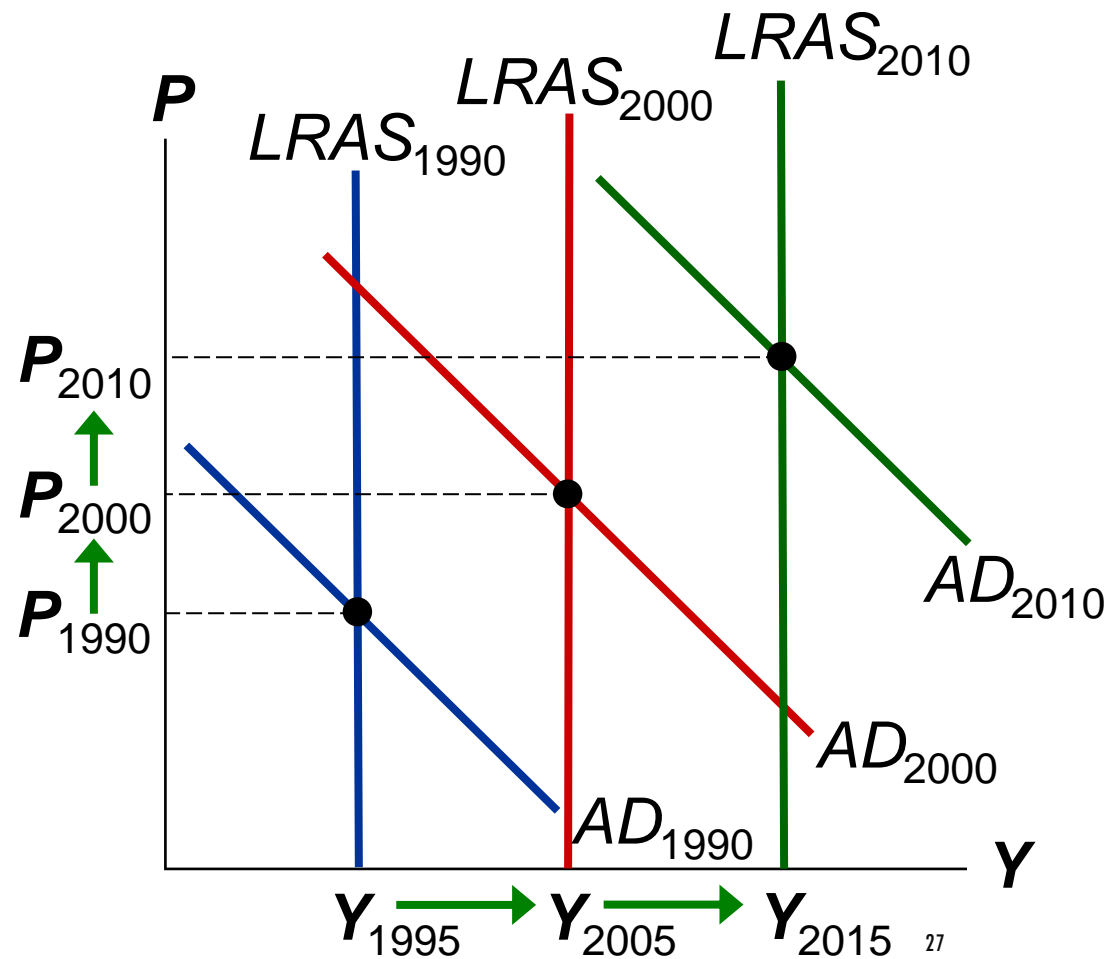
- Productivity improvements from technological progress

USING *AD* & *AS* TO DEPICT LONG-RUN GROWTH & INFLATION

Over the long run, tech. progress shifts *LRAS* to the right and growth in the money supply shifts *AD* to the right.

Result:

ongoing inflation and growth in output.

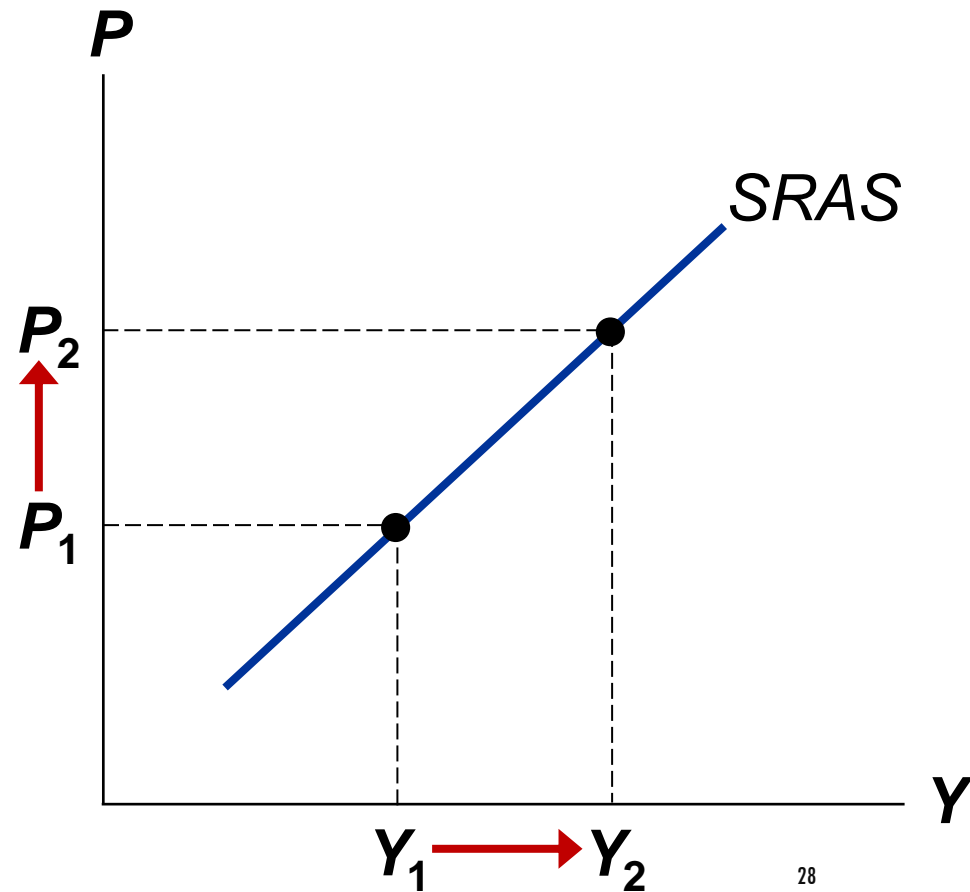


SHORT RUN AGGREGATE SUPPLY (*SRAS*)

The *SRAS* curve is upward sloping:

Over the period of 1–2 years, an increase in P

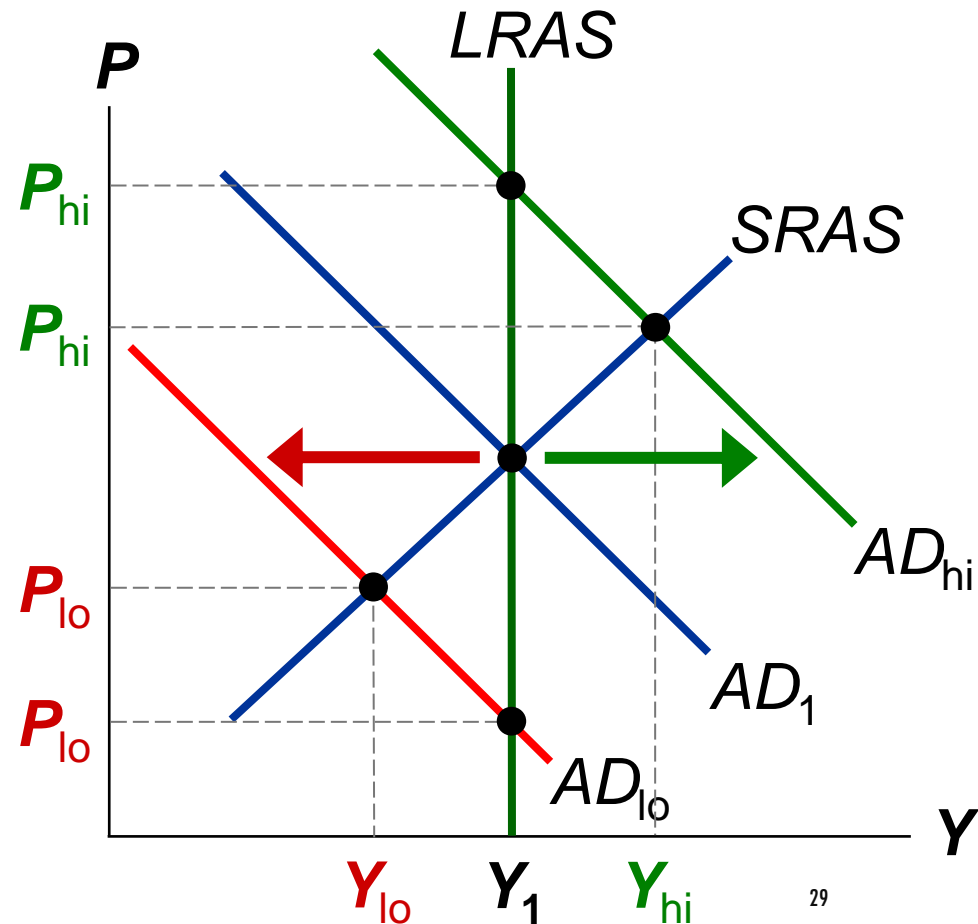
causes an increase in the quantity of goods and services supplied.



WHY THE SLOPE OF *SRAS* MATTERS

If *AS* is vertical, fluctuations in *AD* do not cause fluctuations in output or employment.

If *AS* slopes up, then shifts in *AD* do affect output and employment.



THREE THEORIES OF SRAS

Theories that explain why the AS curve slopes upward in short-run:

- Sticky-wage theory
- Sticky-price theory
- Misperceptions theory

In each, some type of market imperfection:

Output deviates from its natural rate when the actual price level deviates from the price level people expected.

1. THE STICKY-WAGE THEORY

Imperfection:

- Nominal wages are sticky in the short run, they adjust sluggishly.
 - Due to labor contracts, social norms
 - Firms and workers set the nominal wage in advance based on P_E , the price level they expect to prevail.

1. THE STICKY-WAGE THEORY

If $P > P_E$,

- Revenue is higher, but labor cost is not.
- Production is more profitable, so firms increase output and employment.

Hence, higher P causes higher Y , so the SRAS curve slopes upward.

2. THE STICKY-PRICE THEORY

Imperfection:

- Many prices are sticky in the short run.
 - Due to menu costs, the costs of adjusting prices.
 - Examples: cost of printing new menus, the time required to change price tags
- Firms set sticky prices in advance based on P_E

2. THE STICKY-PRICE THEORY

Suppose the Fed increases the money supply unexpectedly

- In the long run, P will rise
- In the short run:
 - Firms without menu costs can raise their prices immediately
 - Firms with menu costs wait to raise prices. With relatively low prices: increase demand for their products: increase output and employment

Hence, higher P is associated with higher Y , so the SRAS curve slopes upward.

3. THE MISPERCEPTIONS THEORY

Imperfection:

- Firms may confuse changes in P with changes in the relative price of the products they sell.

If P rises above P_E

- A firm sees its price rise before realizing all prices are rising.
 - The firm may believe its relative price is rising, and may increase output and employment.

So, an increase in P can cause an increase in Y , making the SRAS curve upward-sloping.

WHAT THE 3 THEORIES HAVE IN COMMON:

In all 3 theories, Y deviates from Y_N when P deviates from P_E .

$$Y = Y_N + a(P - P_E)$$

Output

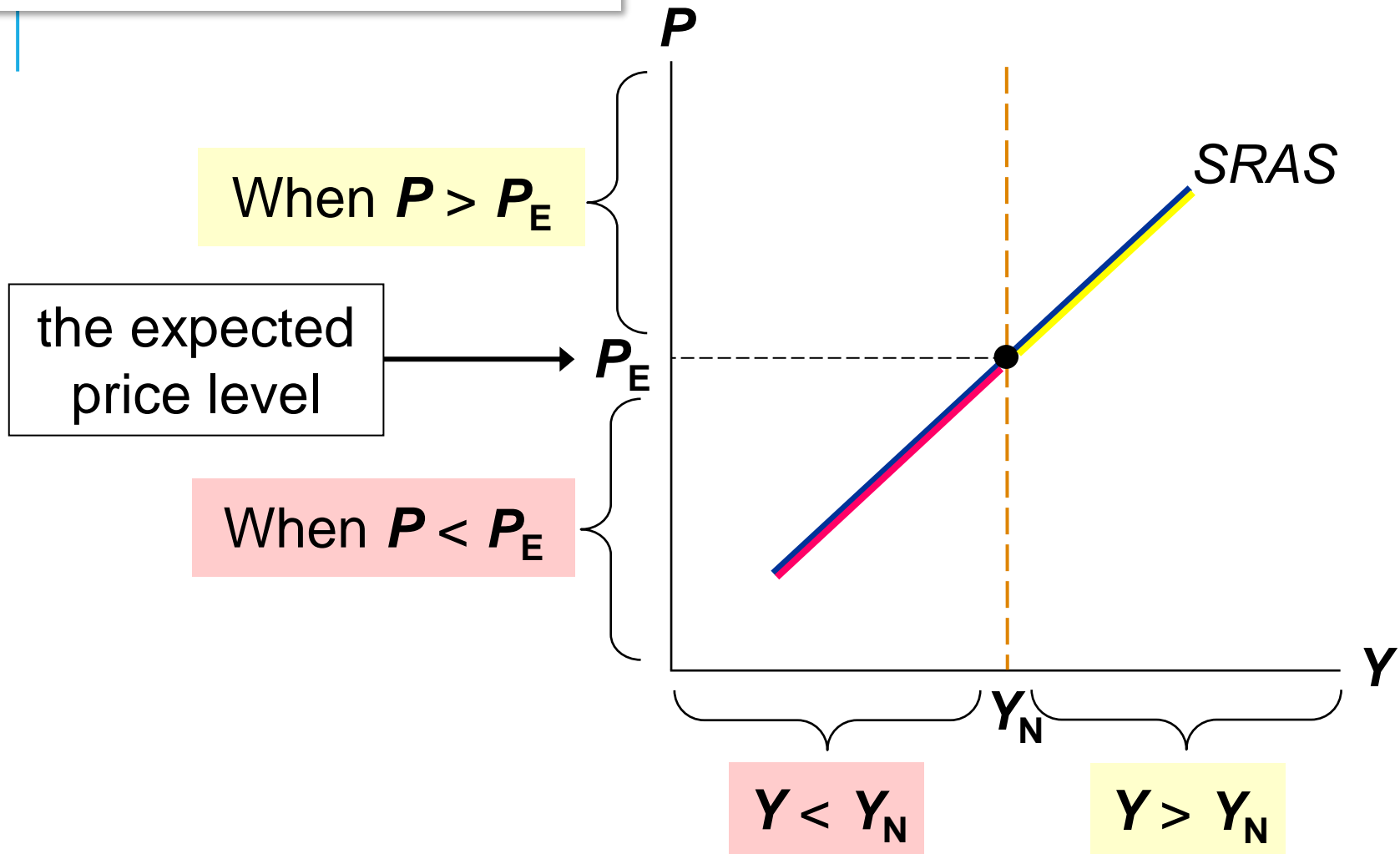
Natural rate
of output
(long-run)

$a > 0$, measures
how much Y
responds to
unexpected
changes in P

Expected
price level

Actual
price level

$$Y = Y_N + a(P - P_E)$$



SRAS AND LRAS

The imperfections in these theories are temporary.

Over time,

- Sticky wages and prices become flexible
- Misperceptions are corrected

In the LR,

- $P_E = P$
- AS curve is vertical

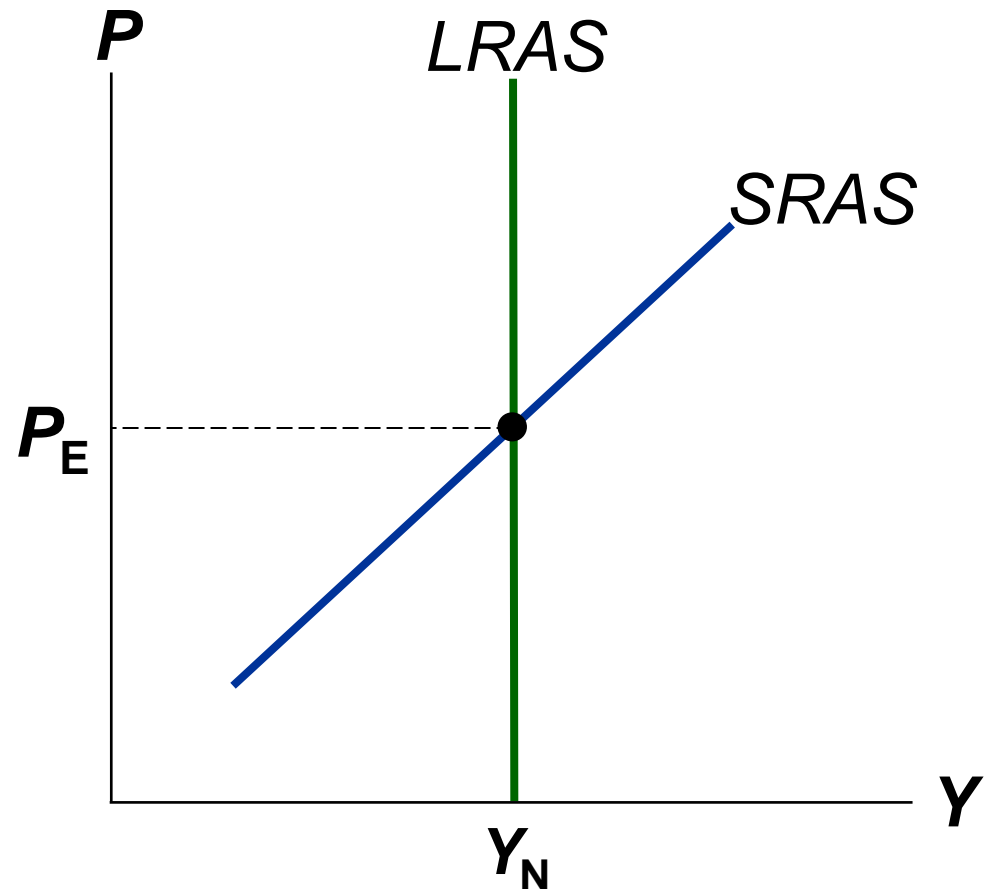
$$Y = Y_N + a(P - P_E)$$

In the long run,

$$P_E = P$$

and

$$Y = Y_N.$$



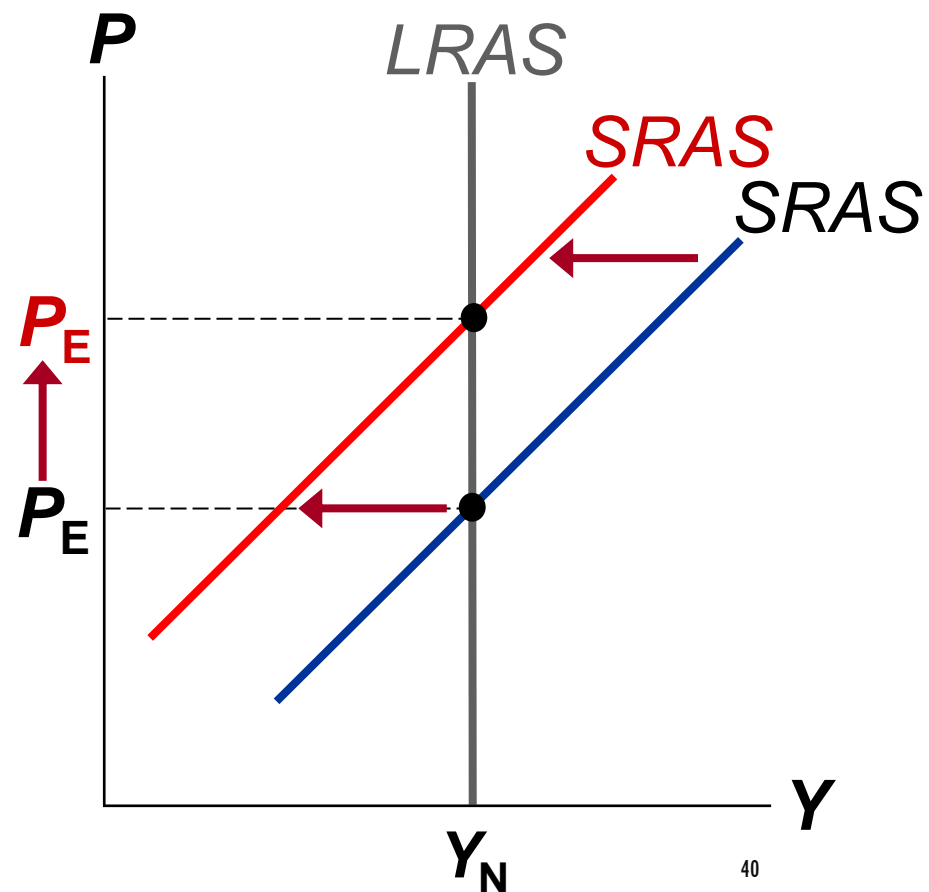
WHY THE *SRAS* CURVE MIGHT SHIFT

Everything that shifts *LRAS* shifts *SRAS*, too.

Also, P_E shifts *SRAS*:

If P_E rises, workers & firms set higher wages.

At each P , production is less profitable, Y falls, *SRAS* shifts left.



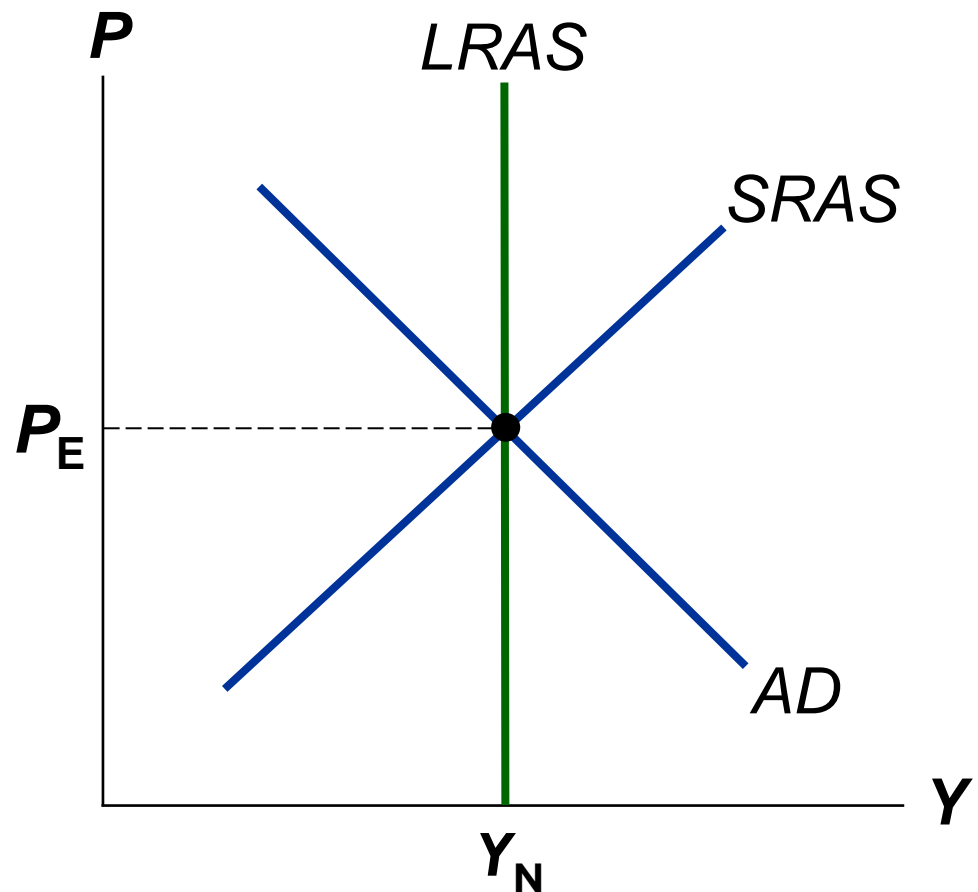
THE LONG-RUN EQUILIBRIUM

In the long-run equilibrium,

$$P_E = P,$$

$$Y = Y_N,$$

and unemployment is at its natural rate.



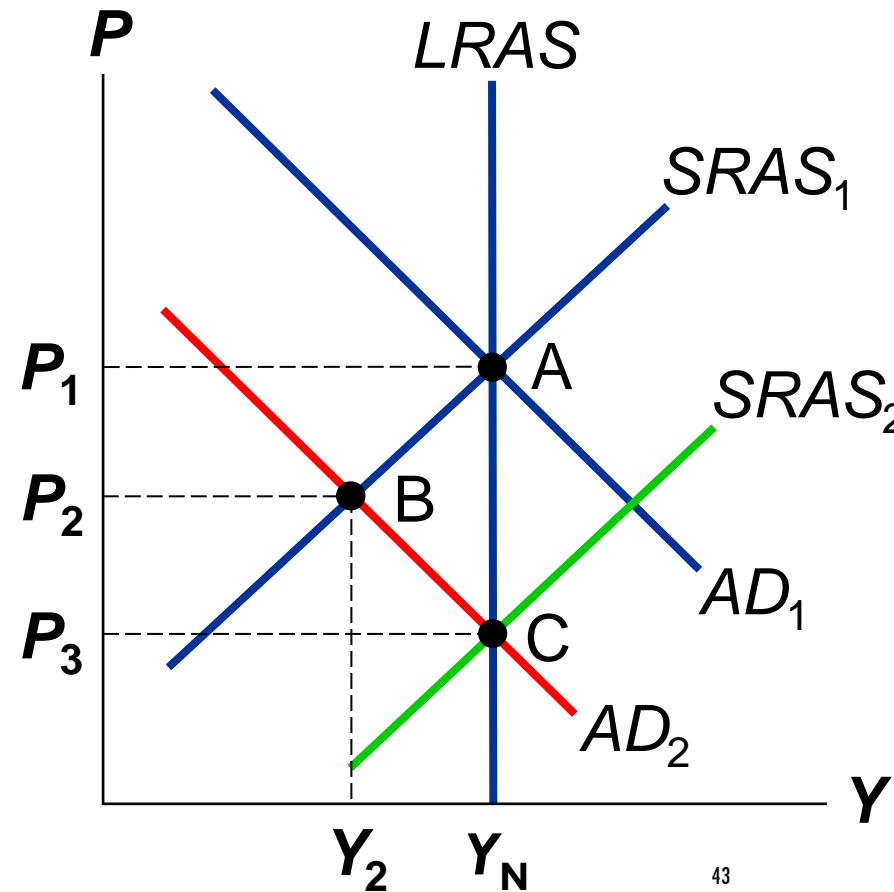
ECONOMIC FLUCTUATIONS

Four steps to analyzing economic fluctuations

1. Determine whether the event shifts AD or AS.
2. Determine whether curve shifts left or right.
3. Use AD–AS diagram to see how the shift changes Y and P in the short run.
4. Use AD–AS diagram to see how economy moves from new SR equilibrium to new LR equilibrium.

Event: Stock market crash

1. Affects C , AD curve
2. C falls, so AD shifts left
3. SR equilibrium at B.
 P and Y lower,
unemployment higher
4. Over time, P_E falls,
 $SRAS$ shifts right,
until LR equilibrium at C. Y
and unemployment back
at initial levels.



TWO BIG AD SHIFTS: 1. THE GREAT DEPRESSION

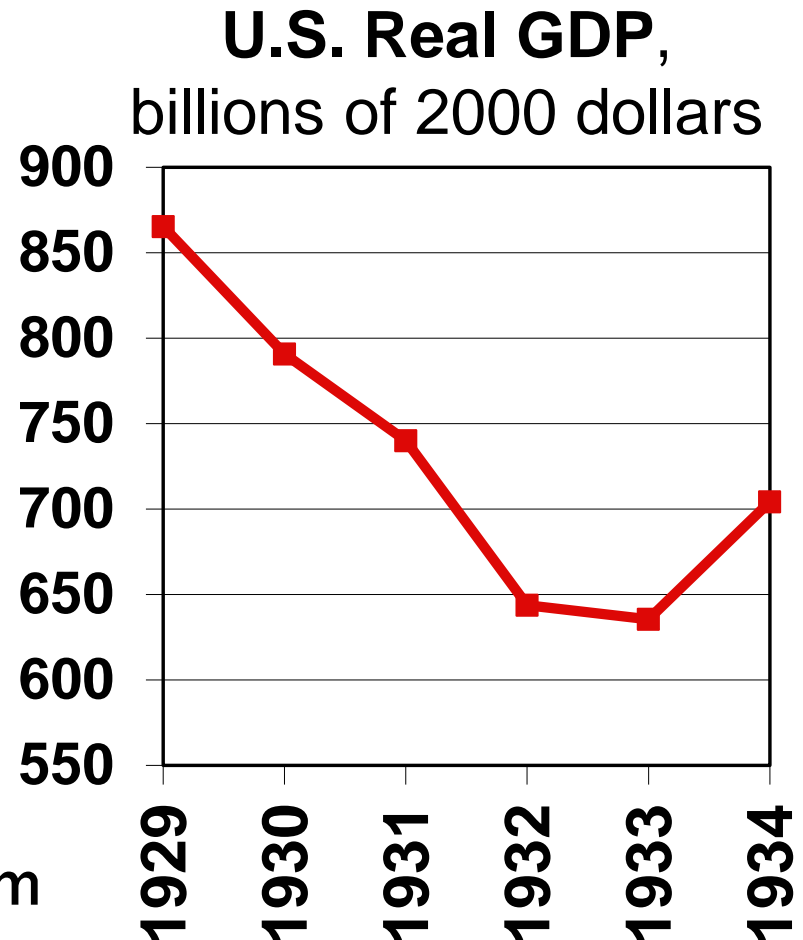
From 1929–1933, money supply fell 28% due to problems in banking system

stock prices fell 90%, reducing C and I

Y fell 27%

P fell 22%

Unemployment rate rose from 3% to 25%



TWO BIG AD SHIFTS: 2.THE WORLD WAR II BOOM

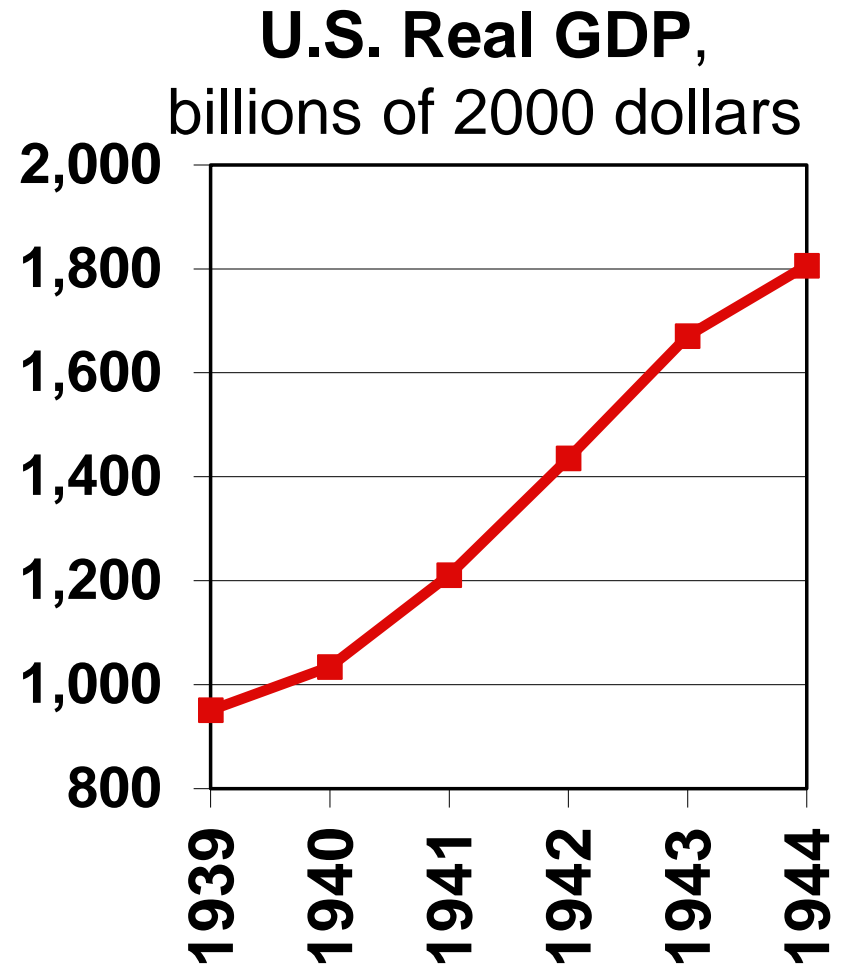
From 1939–1944,

government outlays rose
from \$9.1 billion
to \$91.3 billion

Y rose 90%

P rose 20%

Unemployment fell
from 17% to 1%



Draw the AD-SRAS-LRAS diagram for the U.S. economy starting in a long-run equilibrium.

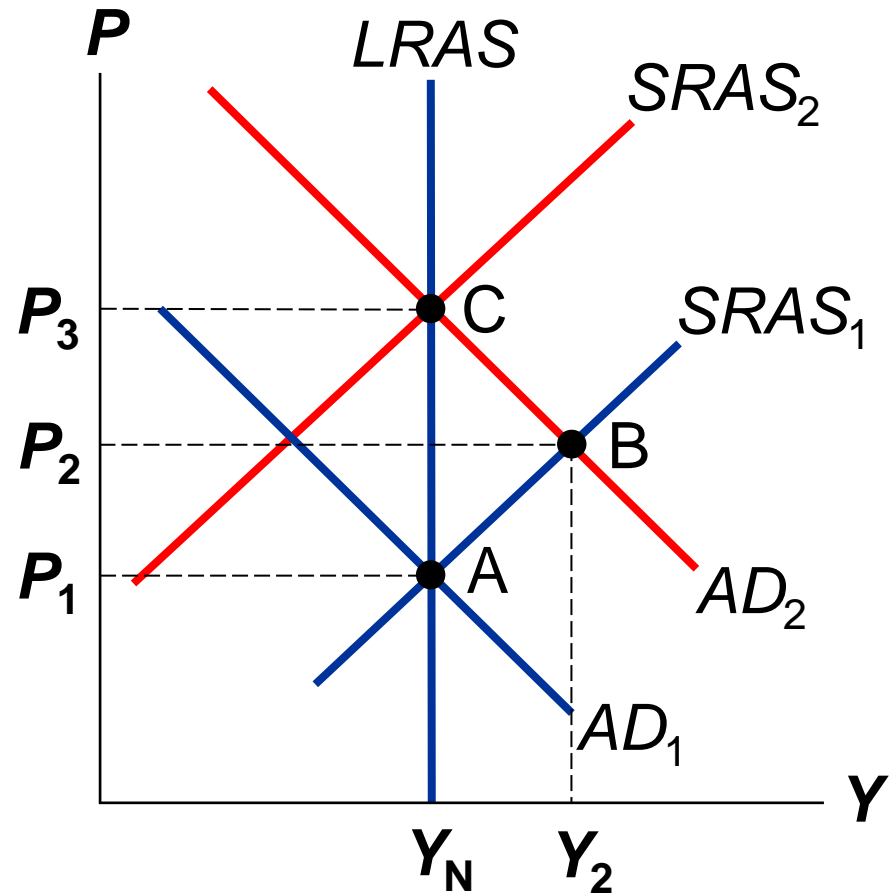
A boom occurs in Canada. Use your diagram to determine the SR and LR effects on U.S. GDP, the price level, and unemployment.

ACTIVE LEARNING 2

ANSWERS

Event: Boom in Canada

1. Affects NX, AD curve
2. Shifts AD right
3. SR equilibrium at point B. P and Y higher, unemployment lower
4. Over time, P_E rises, SRAS shifts left, until LR equilibrium at C. Y and unemployment back at initial levels.

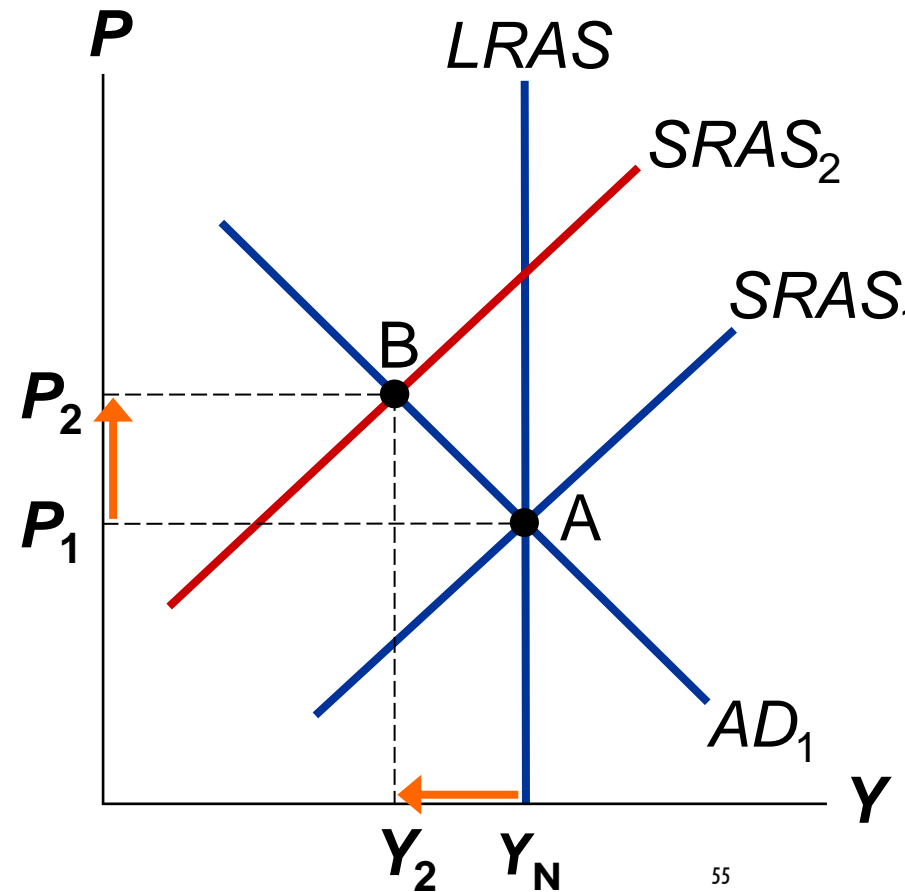


THE EFFECTS OF A SHIFT IN *SRAS*

Event: Oil prices rise

1. Increases costs, shifts *SRAS* (assume *LRAS* constant)
2. *SRAS* shifts left
3. SR equilibrium at point B. P higher, Y lower, unemployment higher

From A to B, **stagflation**, a period of falling output and rising prices.



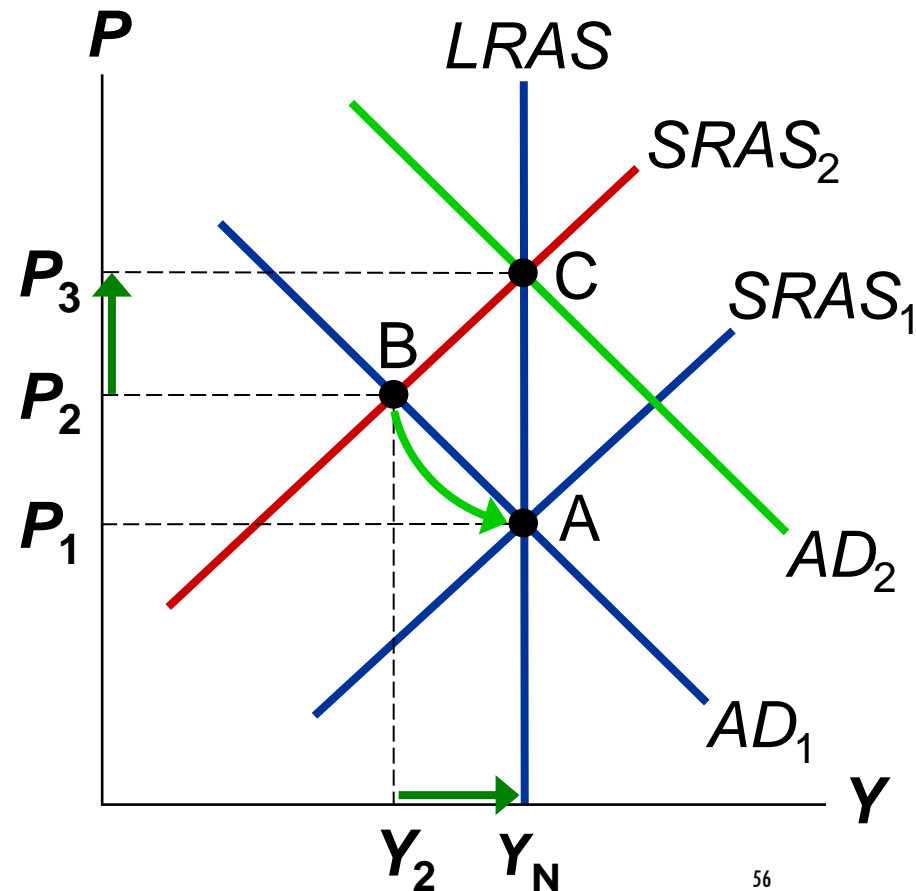
ACCOMMODATING AN ADVERSE SHIFT IN *SRAS*

If policymakers do nothing,

4. Low employment causes wages to fall, *SRAS* shifts right, until LR equilibrium at A.

Or, policymakers could use fiscal or monetary policy to increase *AD* and accommodate the *AS* shift:

Y back to Y_N , but P permanently higher.



THE 1970S OIL SHOCKS AND THEIR EFFECTS

	1973–75	1978–80
Real oil prices	+ 138%	+ 99%
CPI	+ 21%	+ 26%
Real GDP	– 0.7%	+ 2.9%
# of unemployed persons	+ 3.5 million	+ 1.4 million

CONCLUSION

This chapter has introduced the model of aggregate demand and aggregate supply

- Helps explain economic fluctuations.

Keep in mind:

- These fluctuations are deviations from the long-run trends explained by the models we learned in previous chapters.

SUMMARY

Short-run economic fluctuations around long-run trends

- Are irregular and largely unpredictable.
- When recessions occur, real GDP and other measures of income, spending, and production fall, while unemployment rises.

Classical economic theory assumption: nominal variables such as the money supply and the price level do not influence real variables such as output and employment.

- Accurate in the long run but not in the short run

SUMMARY

Model of aggregate demand and aggregate supply

- The output of goods and services and the overall level of prices adjust to balance aggregate demand and aggregate supply.

The aggregate-demand curve slopes downward:

- The wealth effect
- The interest-rate effect
- The exchange-rate effect

Any event or policy that raises consumption, investment, government purchases, or net exports at a given price level increases aggregate demand.

SUMMARY

Any event or policy that reduces consumption, investment, government purchases, or net exports at a given price level decreases aggregate demand.

The long-run aggregate-supply curve is vertical.

- The quantity of goods and services supplied depends on the economy's labor, capital, natural resources, and technology but not on the overall level of prices.

Three theories explain the upward slope of the short-run aggregate-supply curve.

SUMMARY

- Sticky-wage theory
- Sticky-price theory
- Misperceptions theory

All three theories imply that output deviates from its natural level when the actual price level deviates from the price level that people expected.

Shifts of short-run aggregate supply curve

- Events that alter the economy's ability to produce output

Causes of economic fluctuations

- Shift in aggregate demand and aggregate supply