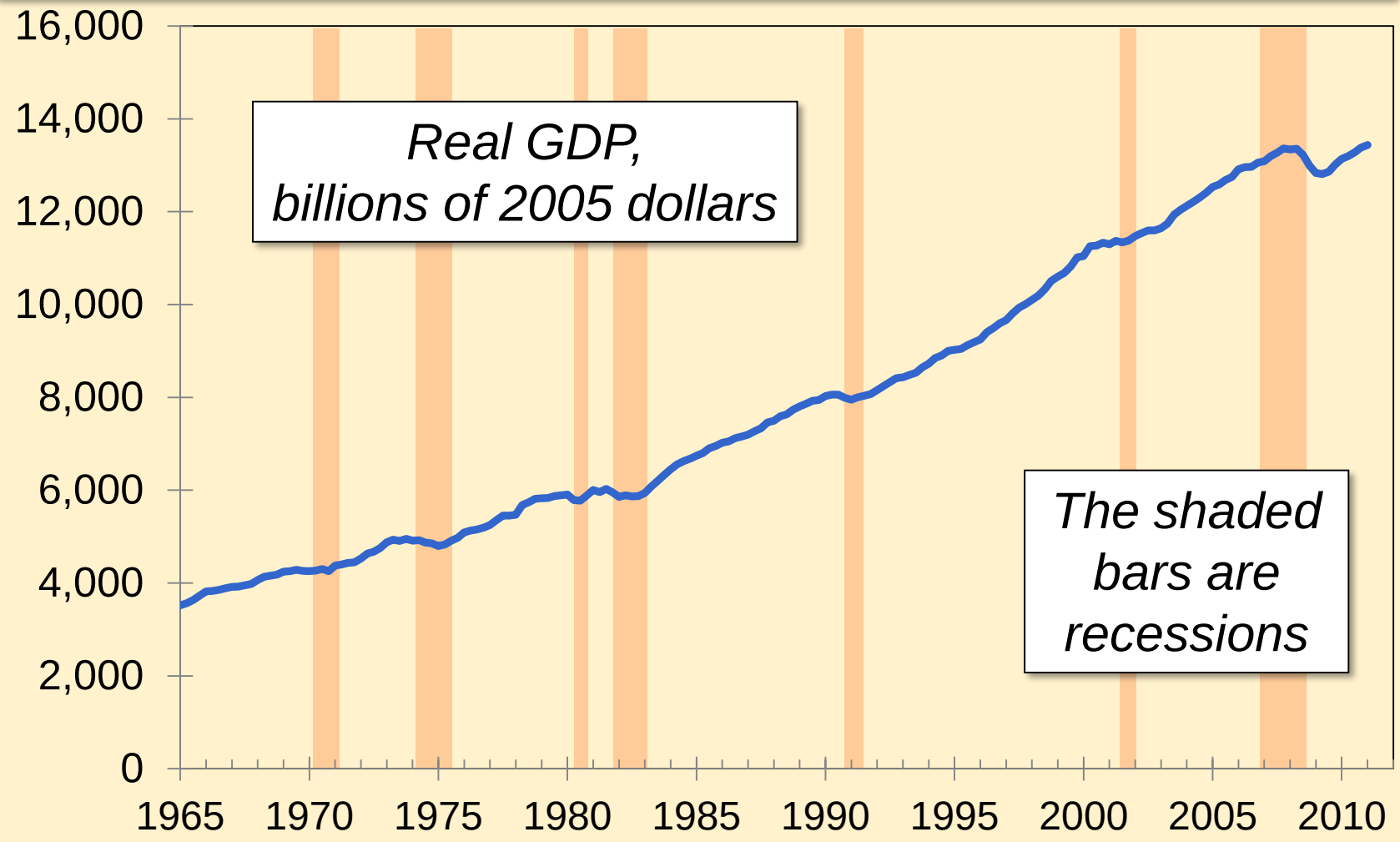
AGGREGATE DEMAND AND AGGREGATE SUPPLY

Introduction

- Over the long run, real GDP grows about 3% per year on average.
- In the short run, GDP fluctuates around its trend.
  - **Recessions**: periods of falling real incomes and rising unemployment
  - **Depressions**: severe recessions (rare)
- Short-run economic fluctuations are often called **business cycles**.

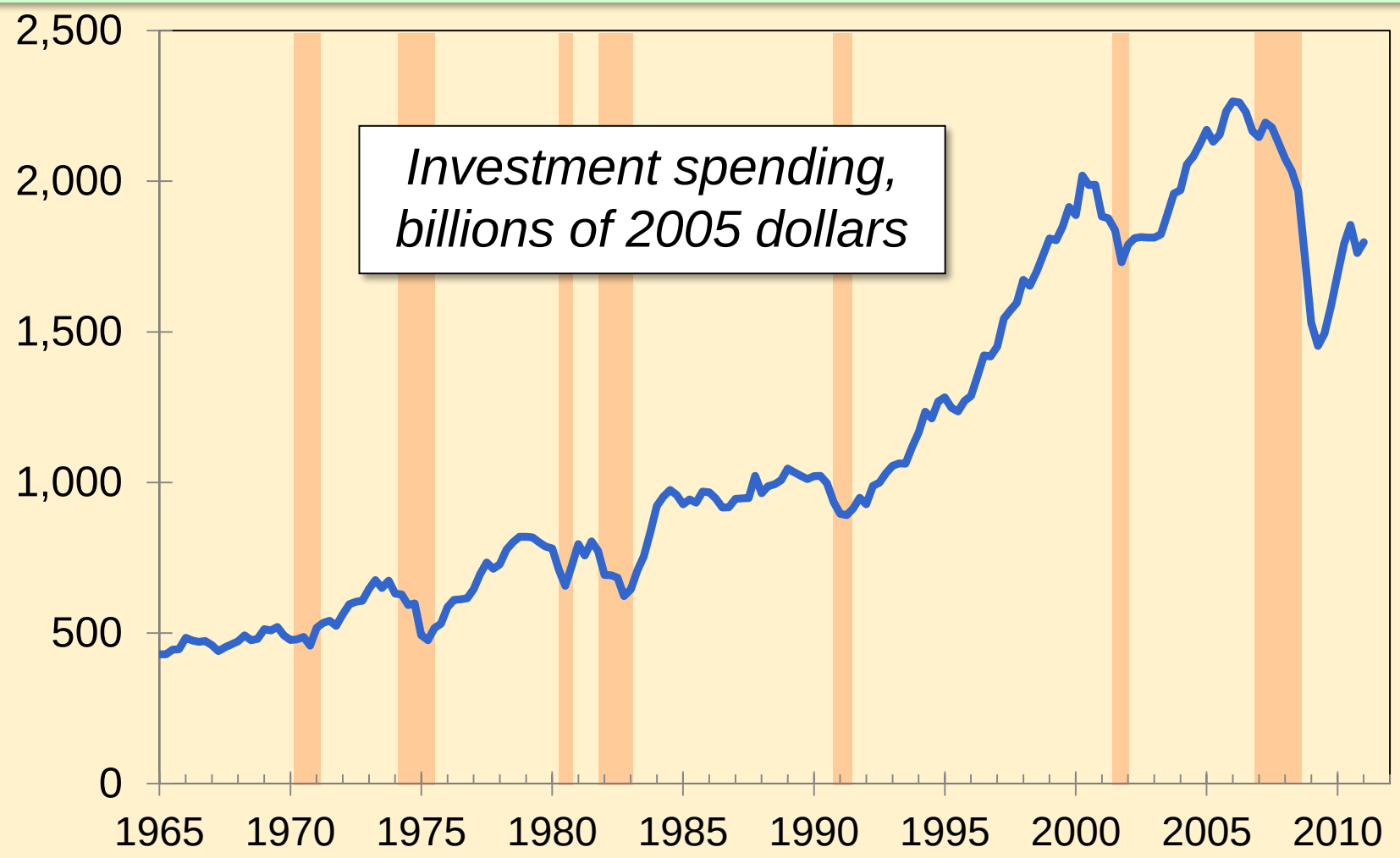
Three Facts About Economic Fluctuations

FACT 1: Economic fluctuations are irregular and unpredictable.



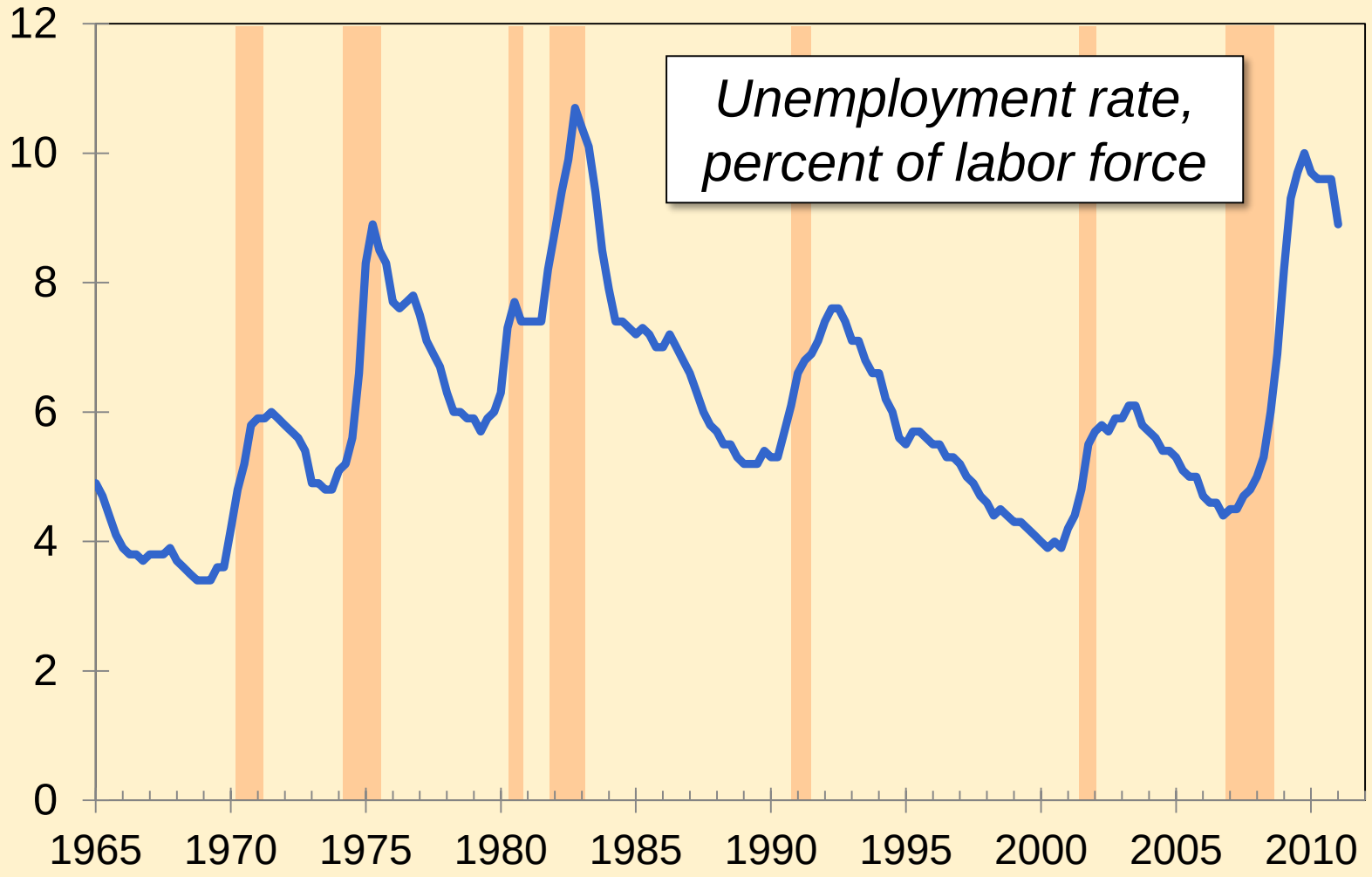
Three Facts About Economic Fluctuations

FACT 2: Most macroeconomic quantities fluctuate together.



Three Facts About Economic Fluctuations

FACT 3: As output falls, unemployment rises.



Introduction, *continued*

- Explaining these fluctuations is difficult, and the theory of economic fluctuations is controversial.

- Most economists use the **model of aggregate demand and aggregate supply** to study fluctuations.

- This model differs from the classical economic theories economists use to explain the long run.

Classical Economics

- 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

- Most economists believe 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 unemployment rate).

- To study the short run, we use a new model.

Time Horizons in Macroeconomics

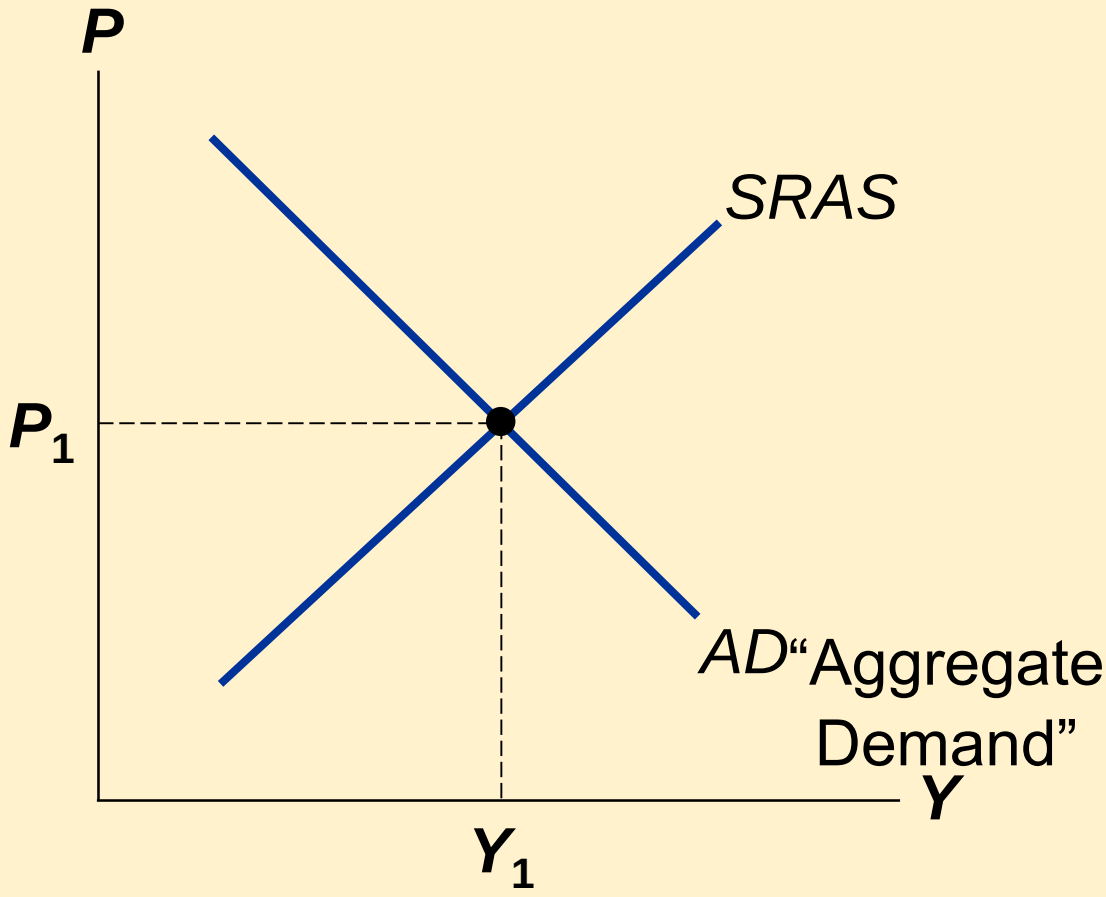
Classical macroeconomic theory applies to the long run but not to the short run–WHY?

The short run and long run differ in terms of the treatment of prices.
In the long run, prices are flexible and can respond to changes in supply or demand. In the short run, many prices are "sticky" at some predetermined level.

Because prices behave differently in the short run than in the long run, economic policies have different effects over different time horizons.

The Model of Aggregate Demand and Aggregate Supply

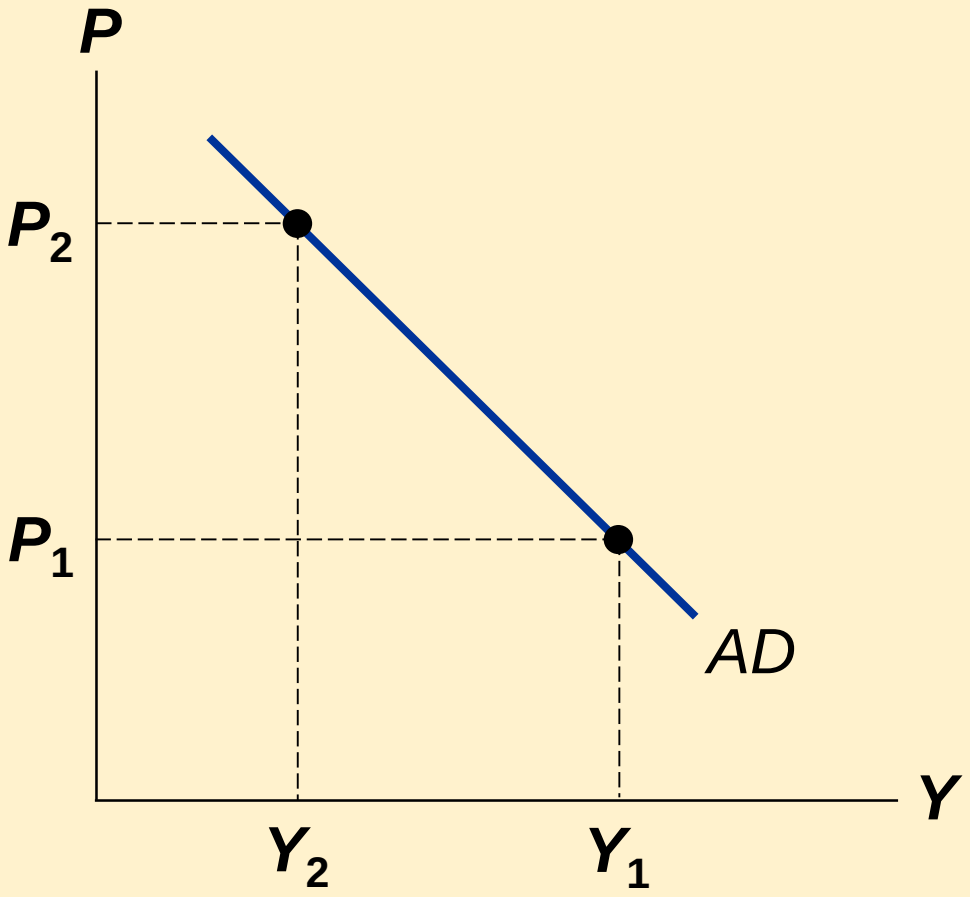
The model determines the eq'm price level



and eq'm output (real GDP).

The Aggregate-Demand (*AD*) Curve

The ***AD* curve** shows the quantity of all g&s demanded in the economy at any given price level.

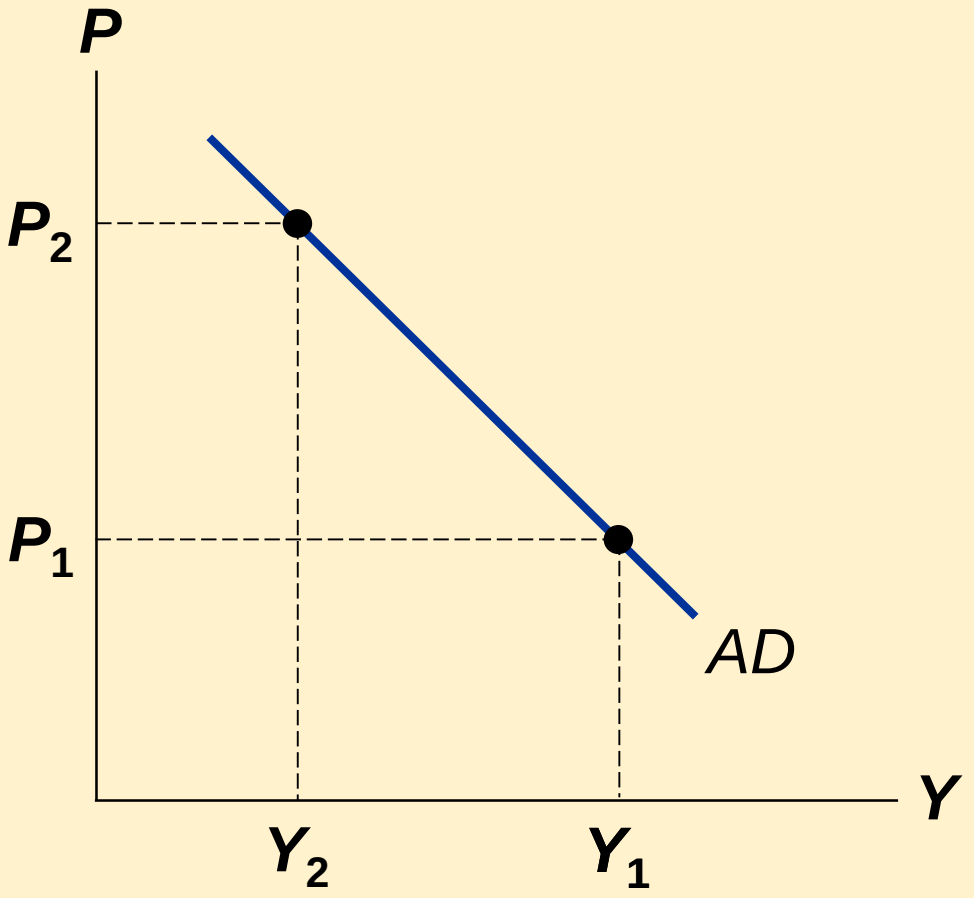


Why the *AD* Curve Slopes Downward

$Y = C + I + G + NX$

Assume ***G*** fixed by govt policy.

To understand the slope of *AD*, we must determine how a change in ***P*** affects ***C***, ***I***, and ***NX***.



The Wealth Effect (*P* and *C*)

Suppose ***P*** rises.

- The rupee people hold buy fewer g&s, so real wealth is lower.

- People feel poorer.

Result: ***C*** falls.

The Interest-Rate Effect (*P* and *I*)

Suppose ***P*** rises.

- Buying g&s requires more rupee.
- To get these rupee, people sell bonds or other assets.
- This drives up interest rates.

Result: ***I*** falls.
(Recall, ***I*** depends negatively on interest rates.)

The Exchange-Rate Effect (*P* and *NX*)

Suppose ***P*** rises.

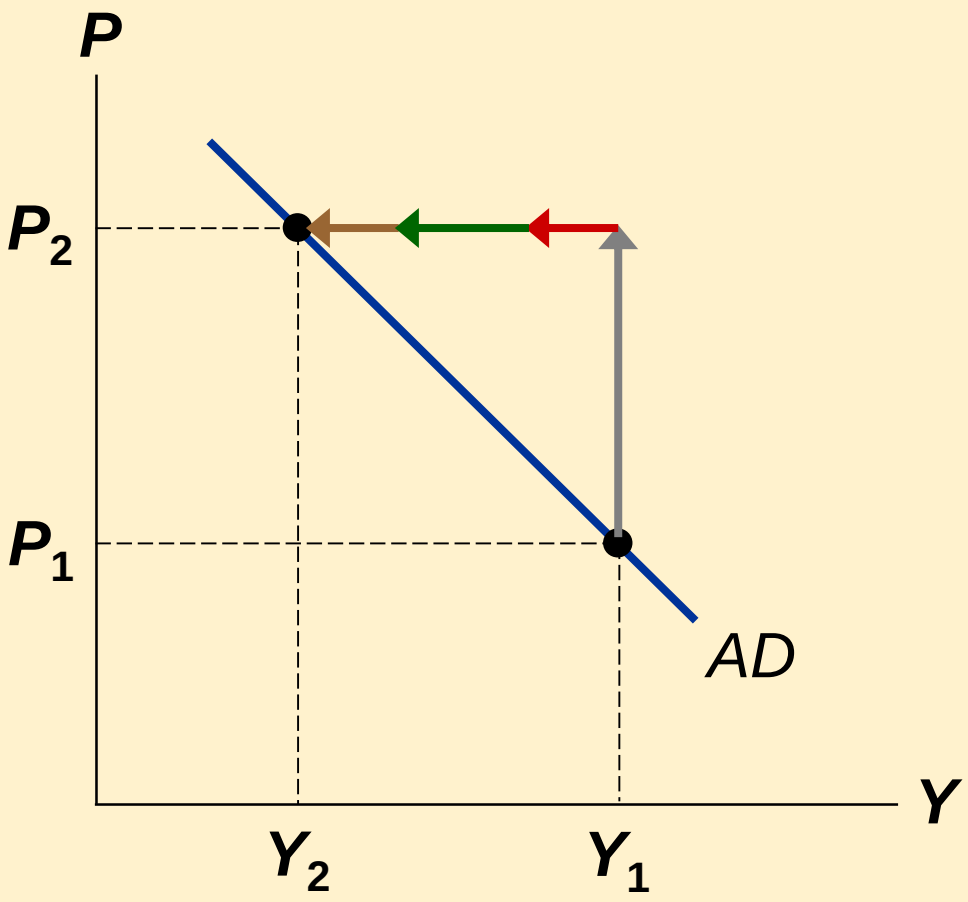
- India's interest rates rise
- Foreign investors desire more Indian bonds.
- Higher demand for Re in foreign exchange market.
- Re exchange rate appreciates.
- Indian exports more expensive to people abroad, imports cheaper to Indian residents.

Result: ***NX*** falls.

The Slope of the *AD* Curve: Summary

An increase in ***P*** reduces the quantity of g&s demanded because:

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



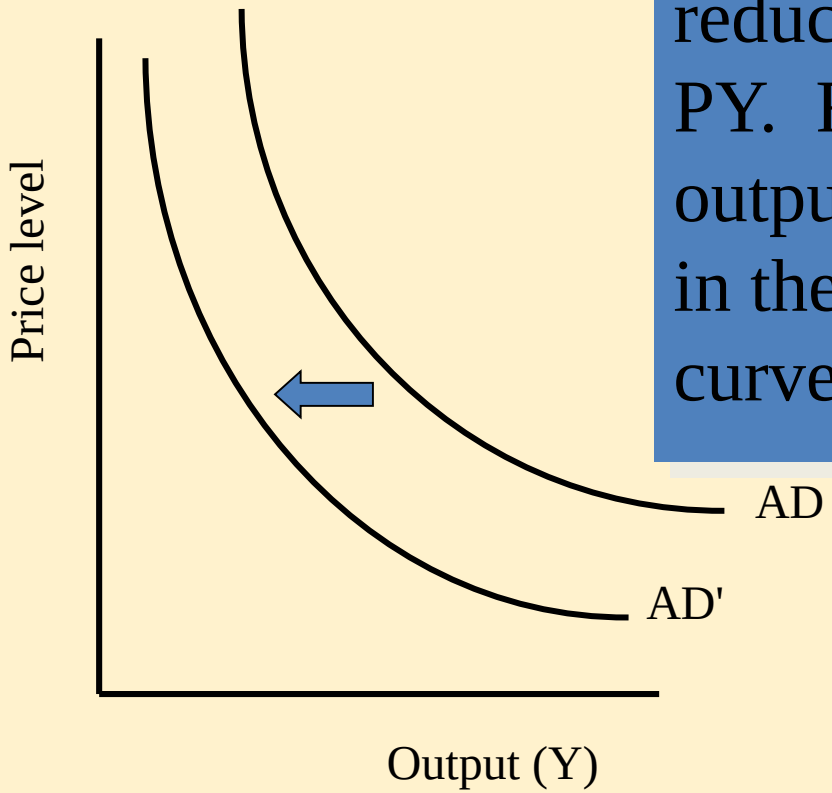
The Aggregate Demand Curve

The aggregate demand curve is drawn for a fixed value of the money supply. In other words, it tells us the possible combinations of P and Y for a given value of M.

If the RBI changes the money supply, then the possible combinations of P and Y change, which means the aggregate demand curve shifts.

Let’s see how.

Shifts in Aggregate Demand

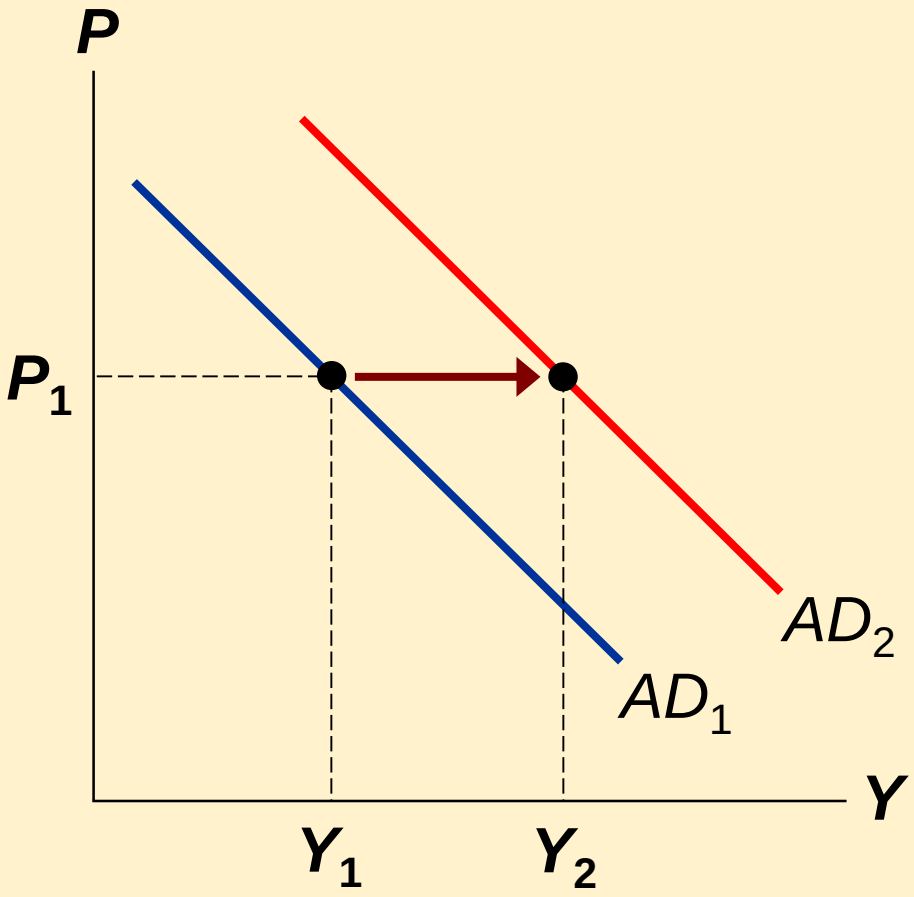


A decrease in the money supply M reduces the nominal value of output PY. For any given price level P, output Y is lower. Thus, a decrease in the money supply shifts the AD curve inward from AD to AD'.

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 re: consumption/saving tradeoff
  - Tax hikes/cuts
- Changes in ***I***
  - Firms buy new computers, equipment, factories
  - Expectations, optimism/pessimism “animal spirits”
  - Interest rates, monetary policy
  - Investment Tax Credit or other tax incentives

Why the *AD* Curve Might Shift

- Changes in ***G***
  - Government 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

The Aggregate-Demand curve

What happens to the *AD* curve if a ten-year-old investment tax credit expires.

A. The AD curve shifts to the right.

B. The AD curve shifts to the left.

C. The economy moves down the AD curve.

D. The economy moves up the AD curve.

QUESTION 2

What happens to the *AD* curve if the Indian exchange rate falls.

A. The AD curve shifts to the right.

B. The AD curve shifts to the left.

C. The economy moves down the AD curve.

D. The economy moves up the AD curve.

QUESTION 3

The Aggregate-Demand curve

What happens to the *AD* curve if a fall in prices increases the real value of consumers' wealth.

A. The AD curve shifts to the right.

B. The AD curve shifts to the left.

C. The economy moves down the AD curve.

D. The economy moves up the AD curve.

QUESTION 4

The Aggregate-Demand curve

What happens if State governments replace their sales taxes with new taxes on interest, dividends, and capital gains.

A. The AD curve shifts to the right.

B. The AD curve shifts to the left.

C. The economy moves down the AD curve.

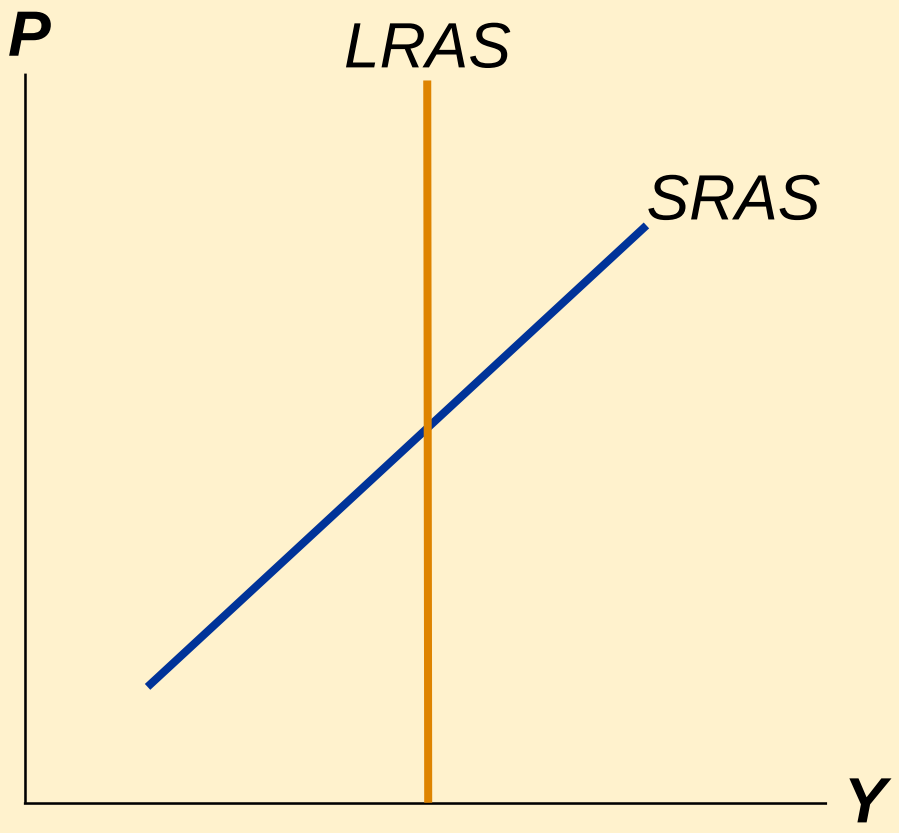
D. The economy moves up the AD curve.

The Aggregate-Supply (*AS*) Curves

The ***AS* curve** shows the total quantity of g&s 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

Because the classical model describes how the economy behaves in the long run, we can derive the long-run aggregate supply curve from the classical model.

Recall the amount of output produced depends on the fixed amounts of capital and labor and on the available technology.

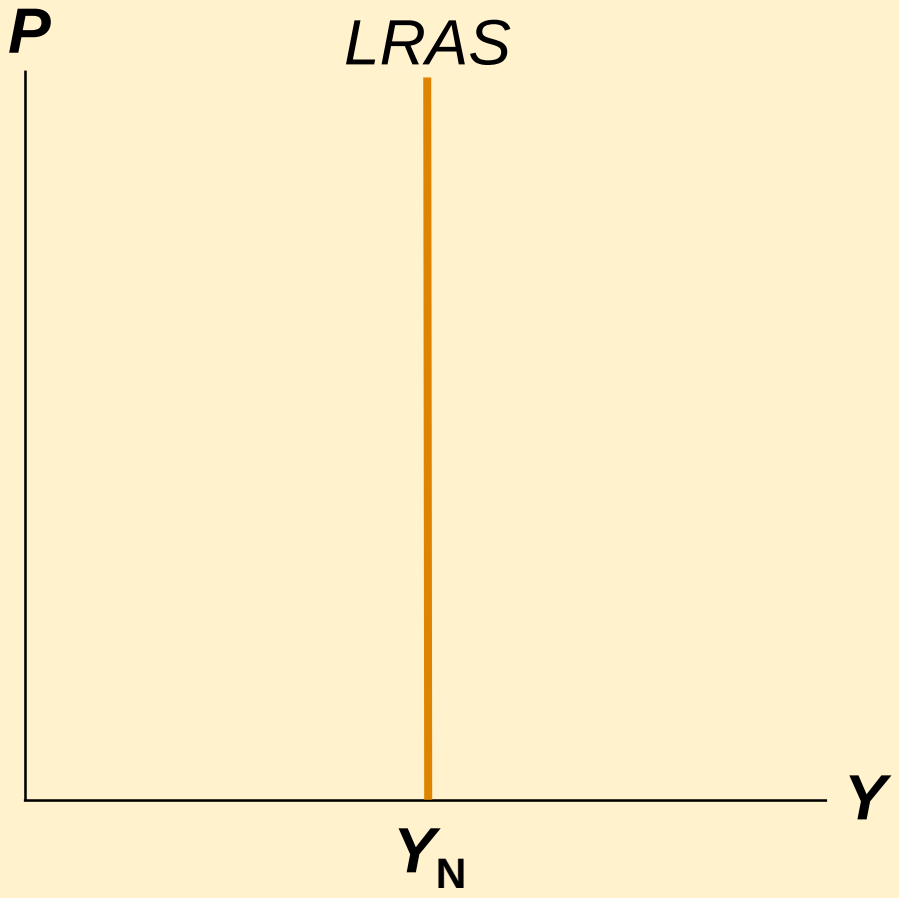
To show this, we write $\bar{Y} = F(\bar{K}, \bar{L}) = Y$

According the classical model, output does not depend on the price level.

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.

Y_N is also called **potential output** or **full-employment output**.

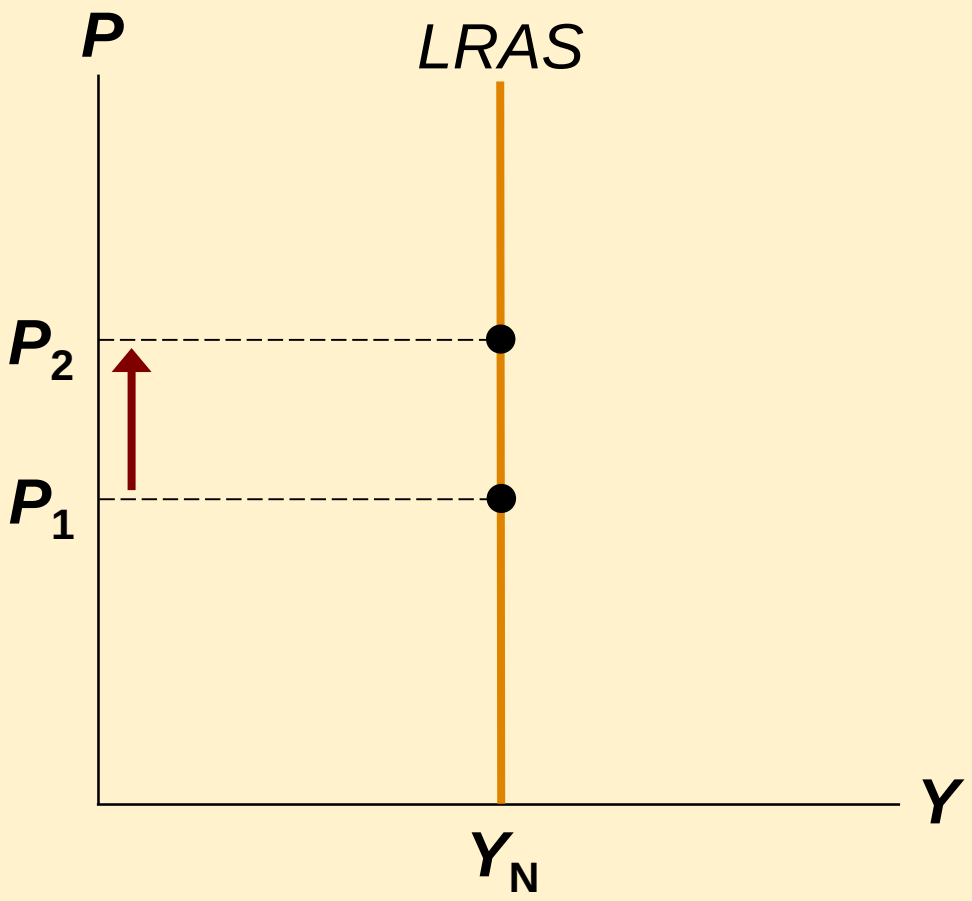


Why *LRAS* Is Vertical

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

An increase in ***P*** does not affect any of these, so it does not affect Y_N.

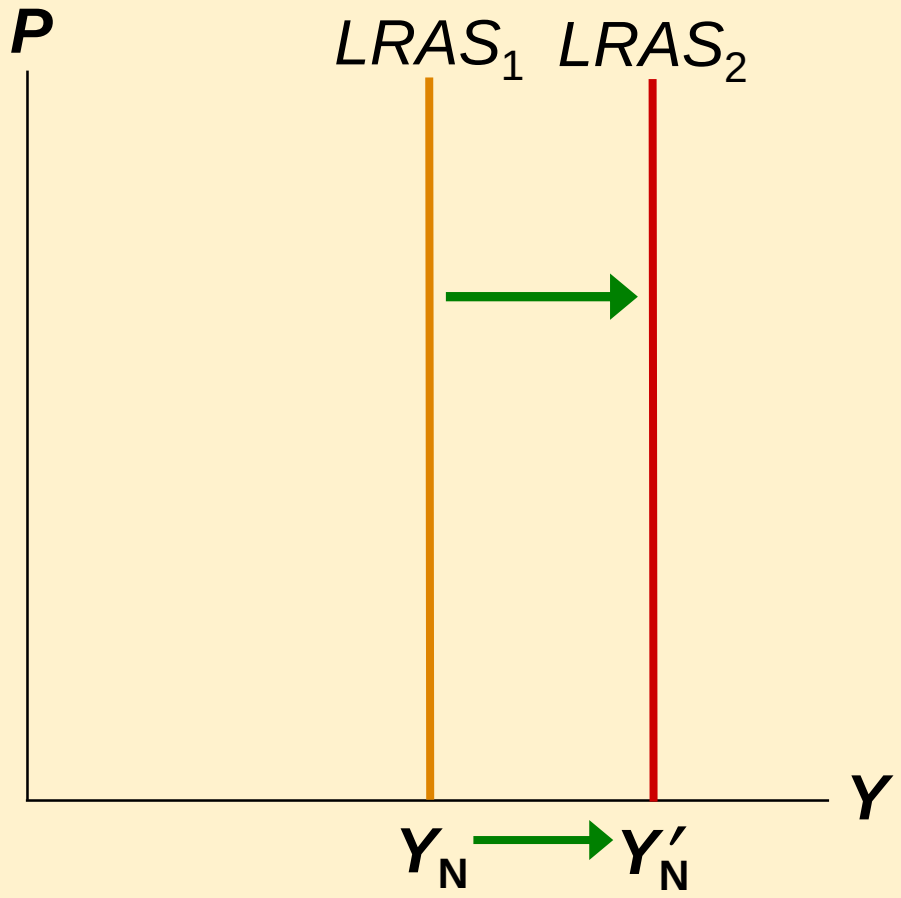
(Classical dichotomy)



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 natural resources (**N**)
  - Discovery of new mineral deposits
  - Reduction in supply of imported oil
  - Changing weather patterns that affect agricultural production

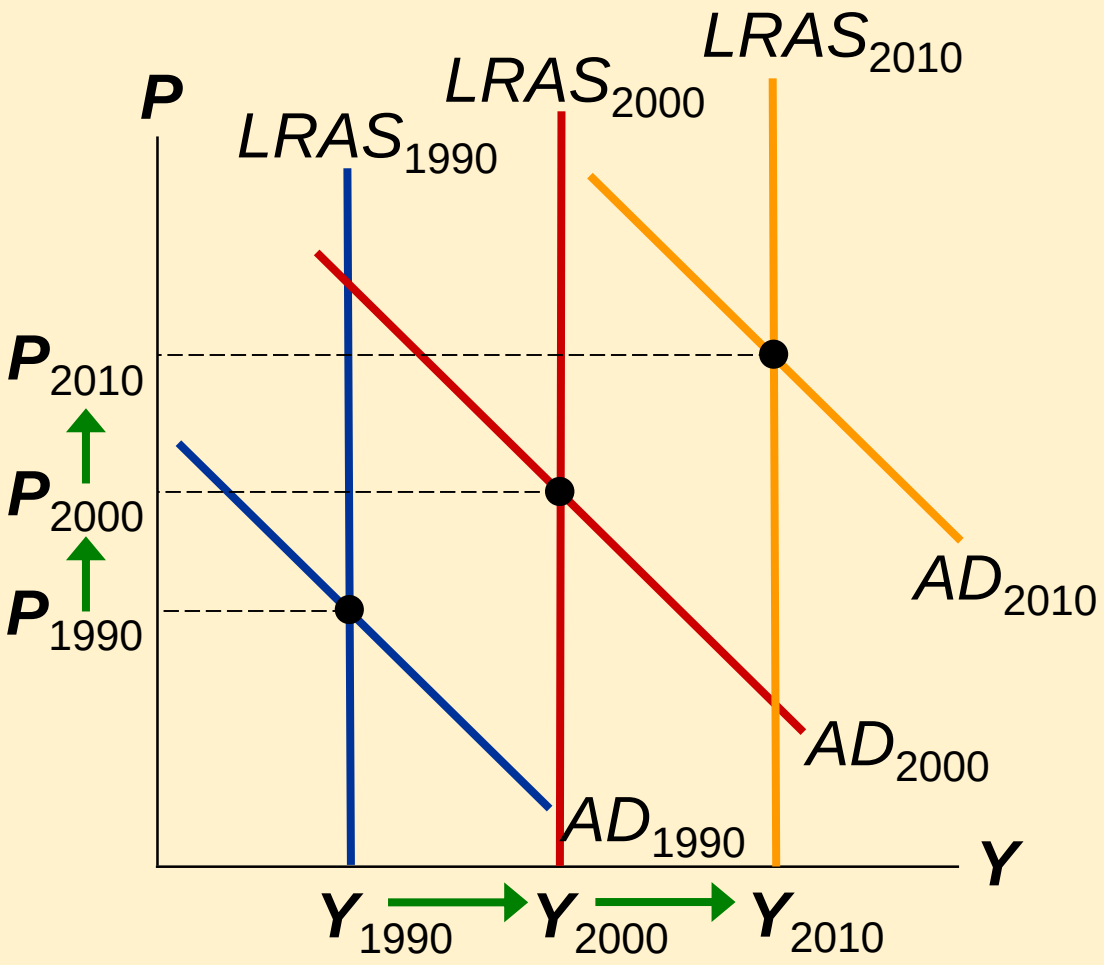
- Changes in technology (**A**)
  - Productivity improvements from technological progress

Using *AD* & *AS* to Depict Long-Run Growth and Inflation

Over the long run, tech. progress shifts *LRAS* to the right

and growth in the money supply shifts *AD* to the right.

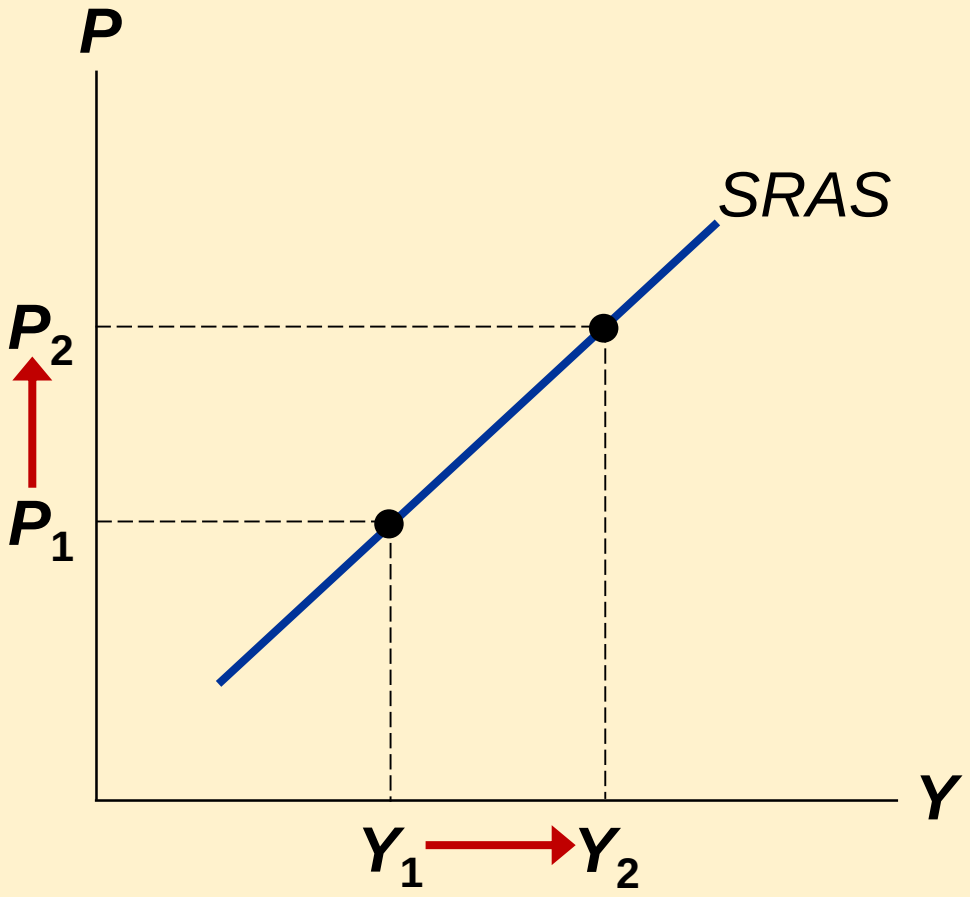
Result:
ongoing inflation and growth in output.



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 g & s supplied.

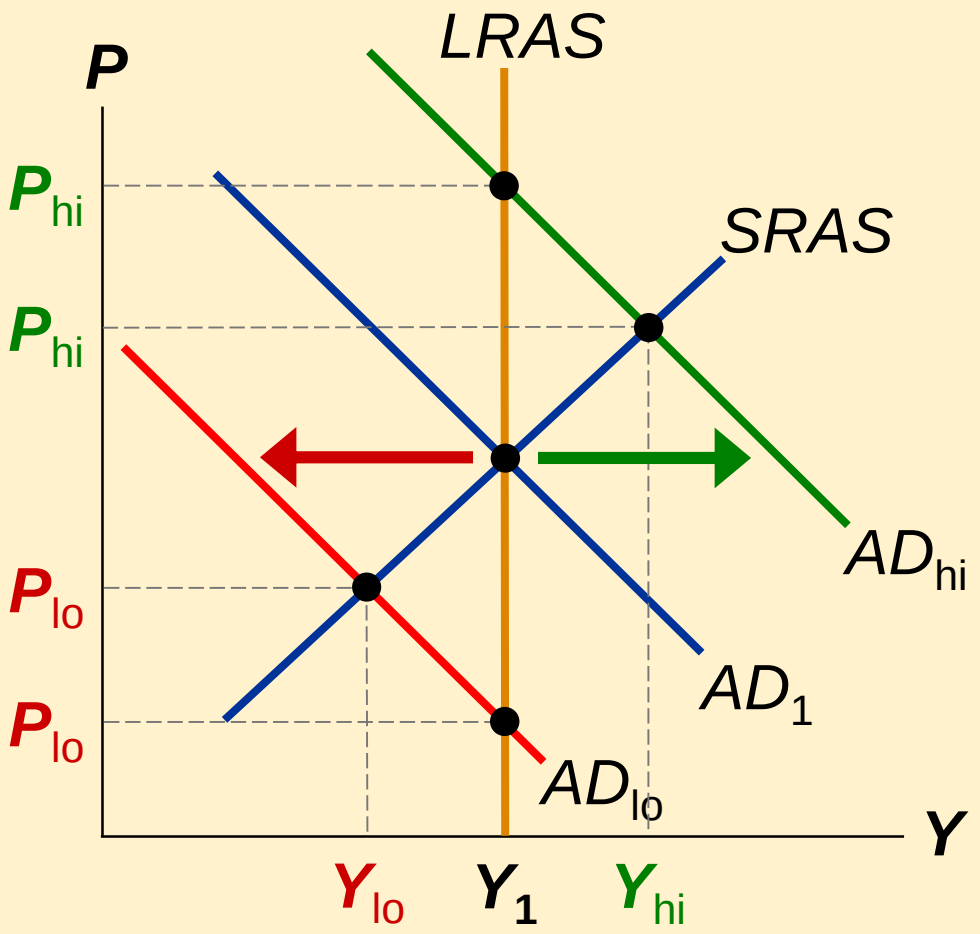


The positive slope of the SRAS is the key to understanding short-run fluctuations.

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*

In each,

- some type of market imperfection

- result:
  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 $\boldsymbol{P_E}$, the price level they expect to prevail.

1. The Sticky-Wage Theory

- If $P > P_E$,
  revenue is higher, but labor cost is not – wages take time to adjust.

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 $\boldsymbol{P_E}$.

2. The Sticky-Price Theory

- Suppose the RBI 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. Meanwhile, their prices are relatively low, which increases demand for their products, so they 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 $\boldsymbol{P_E}$, 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)

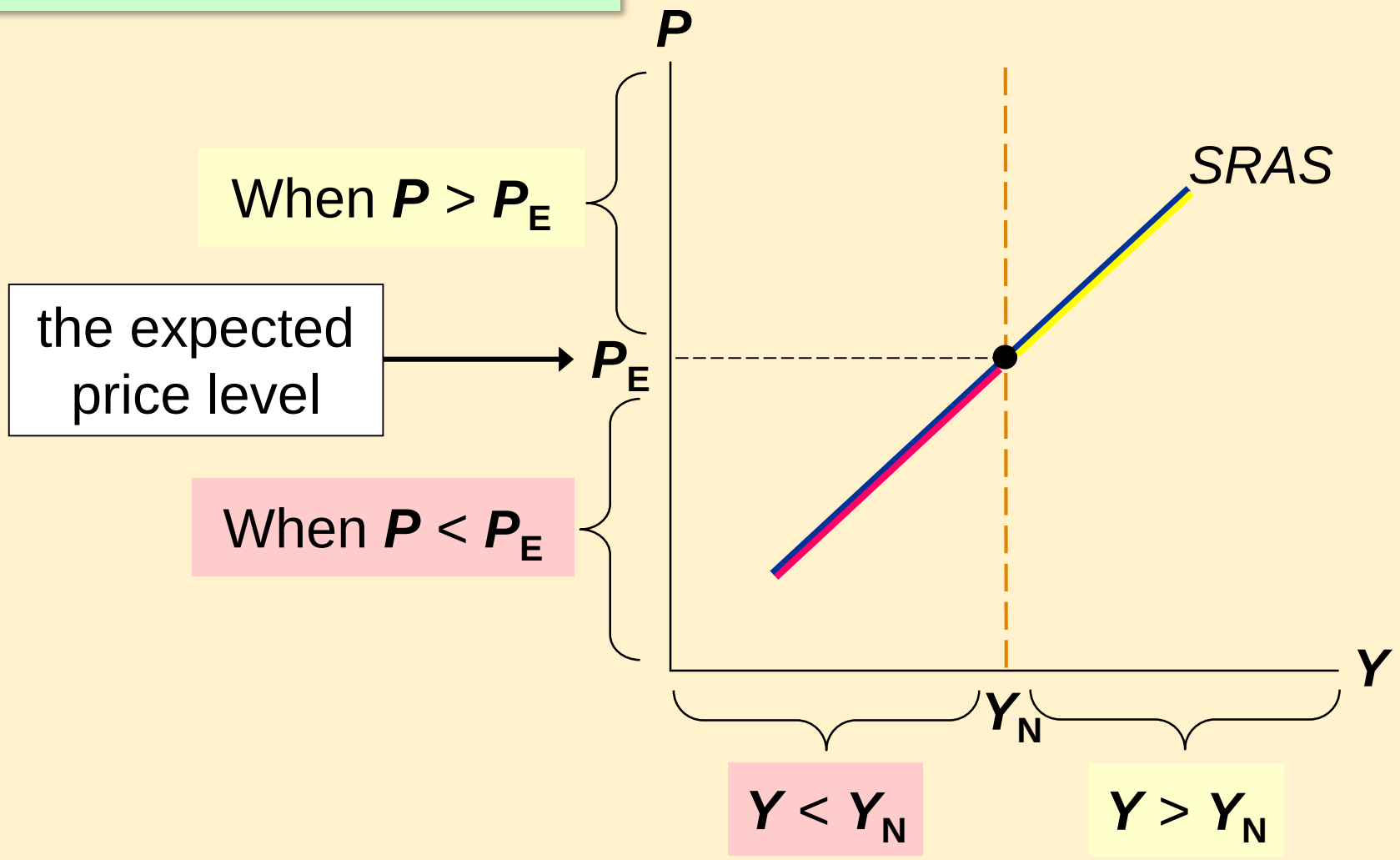
$a > 0$, measures how much Y responds to unexpected changes in P

Actual price level

Expected price level

What the 3 Theories Have in Common:

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



SRAS and *LRAS*

- The imperfections in these theories are temporary. Over time,
  - sticky wages and prices become flexible
  - misperceptions are corrected
- In the LR,
  - $\boldsymbol{P_E = P}$
  - *AS* curve is vertical

SRAS and *LRAS*

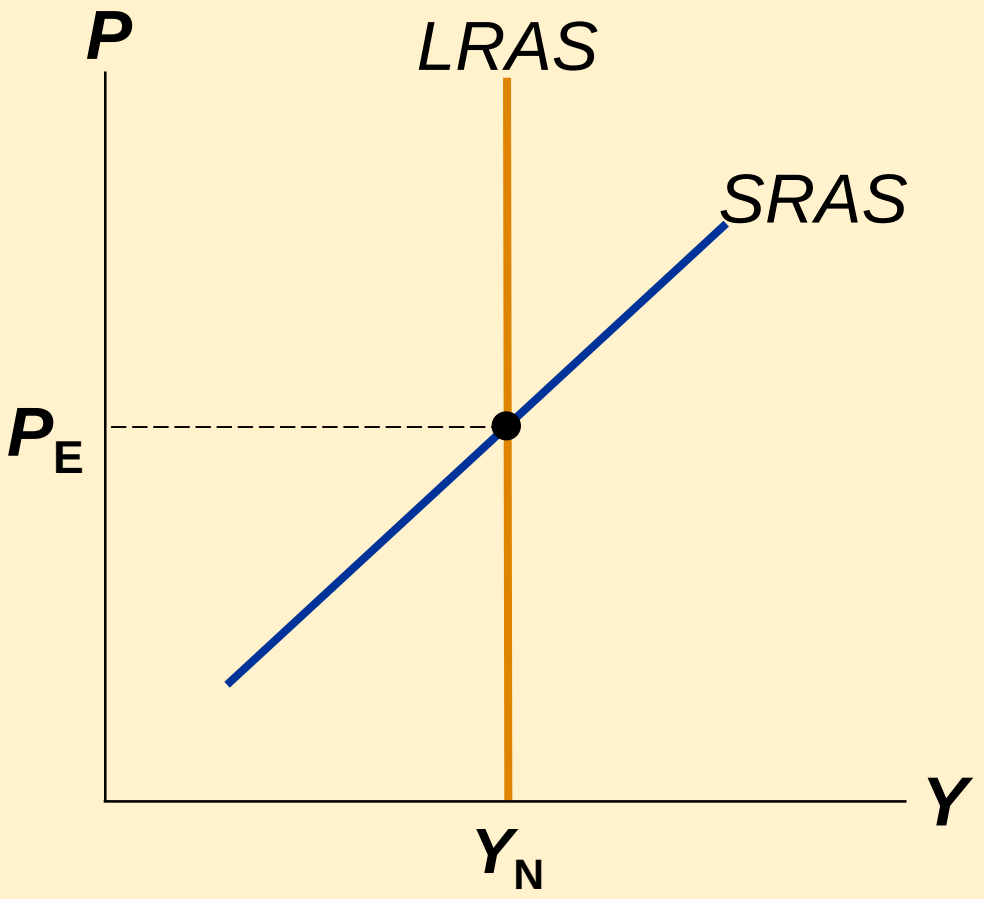
$$Y = Y_N + a(P - P_E)$$

In the long run,

$P_E = P$

and

$Y = Y_N$.



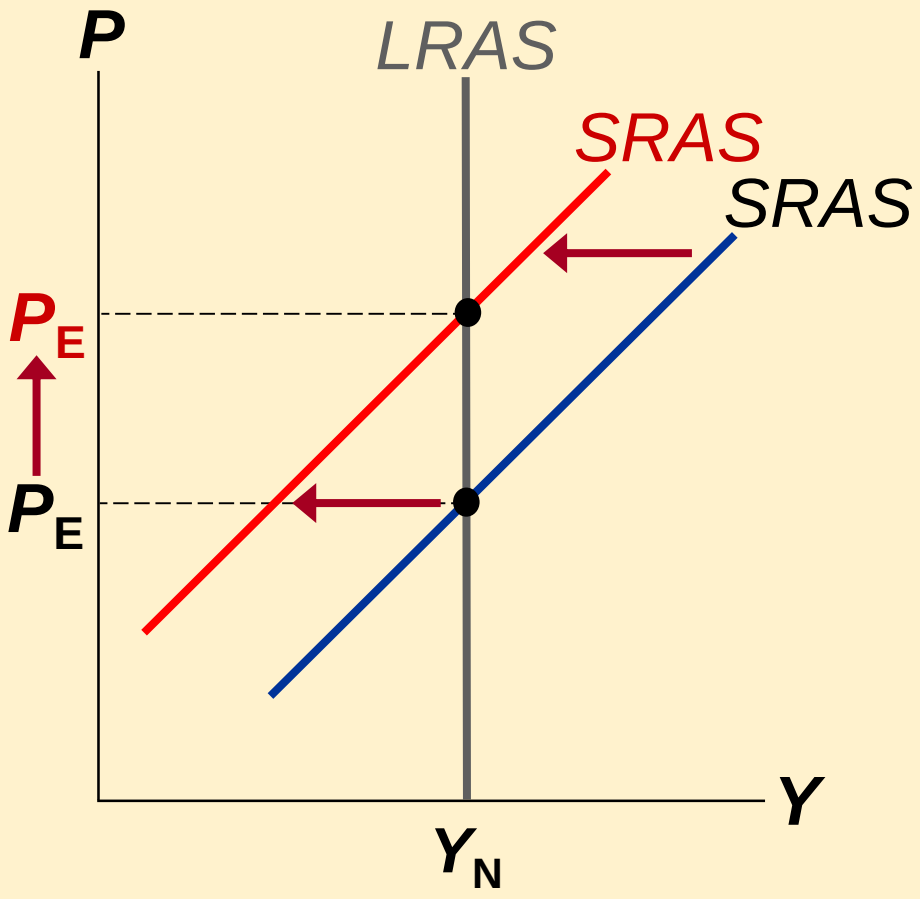
Why the *SRAS* Curve Might Shift

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.



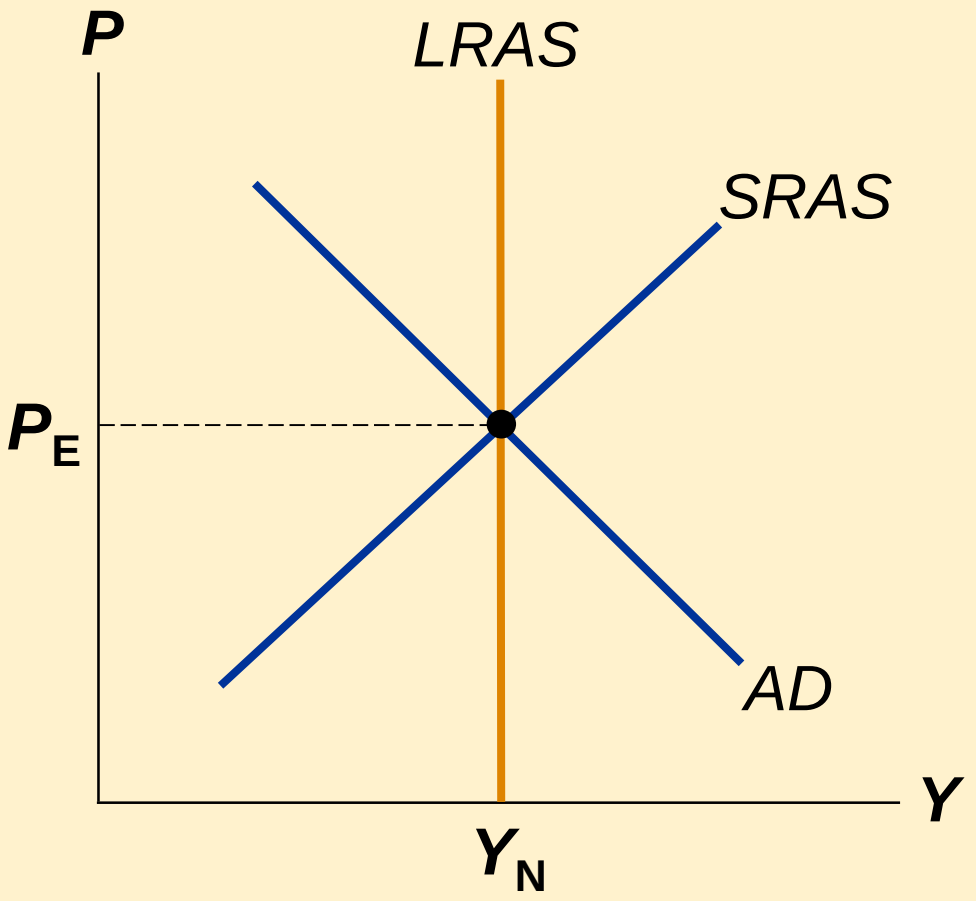
The Long-Run Equilibrium

In the long-run equilibrium,

$P_E = P$,

$Y = Y_N$,

and unemployment is at its natural rate.



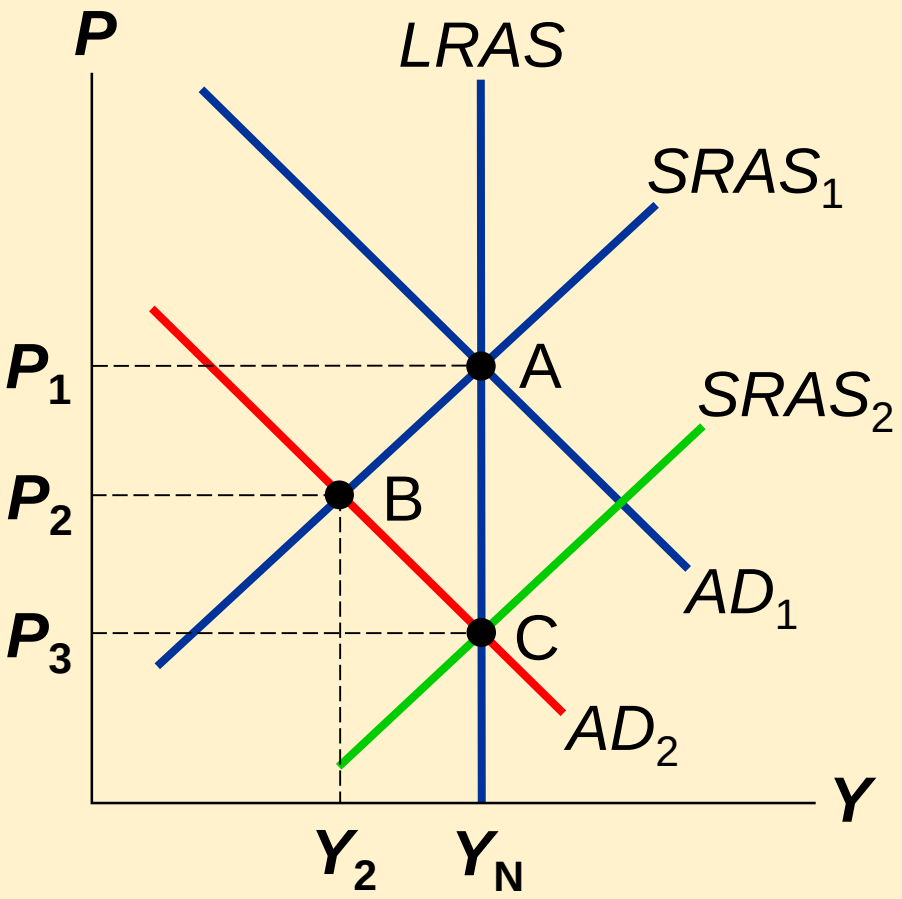
Economic Fluctuations

- Caused by events that shift the *AD* and/or *AS* curves.
- 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 eq'm to new LR eq'm.

The Effects of a Shift in *AD*

Event: Stock market crash

1. Affects ***C***, *AD* curve
2. ***C*** falls, so *AD* shifts left
3. SR eq'm at B.
   P and ***Y*** lower,
   unemp higher
4. Over time, $\boldsymbol{P_E}$ falls,
   SRAS shifts right,
   until LR eq'm at C.
   Y and unemp back
   at initial levels.

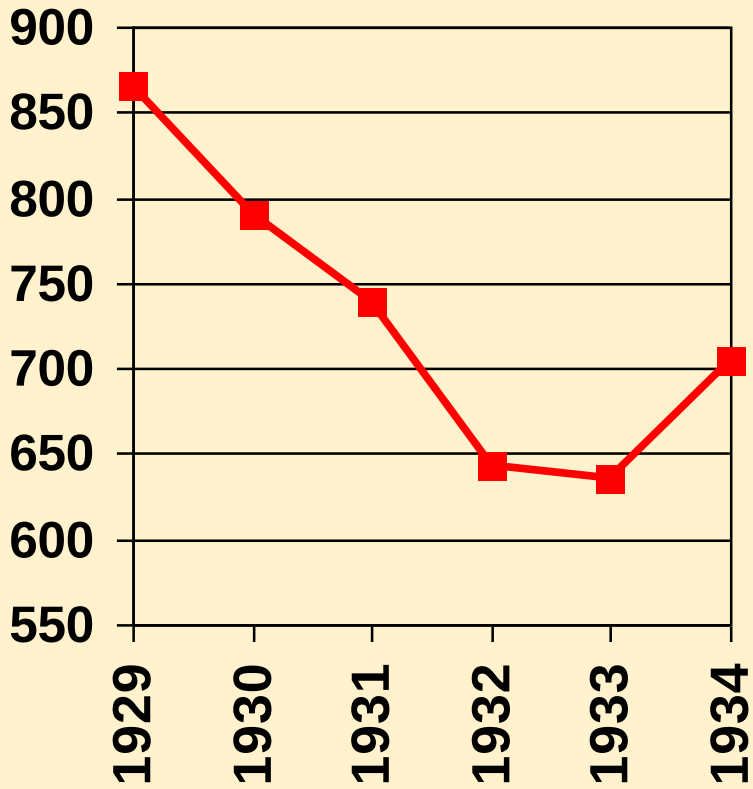


Two Big *AD* Shifts:
1. The Great Depression

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%
- u-rate rose from 3% to 25%

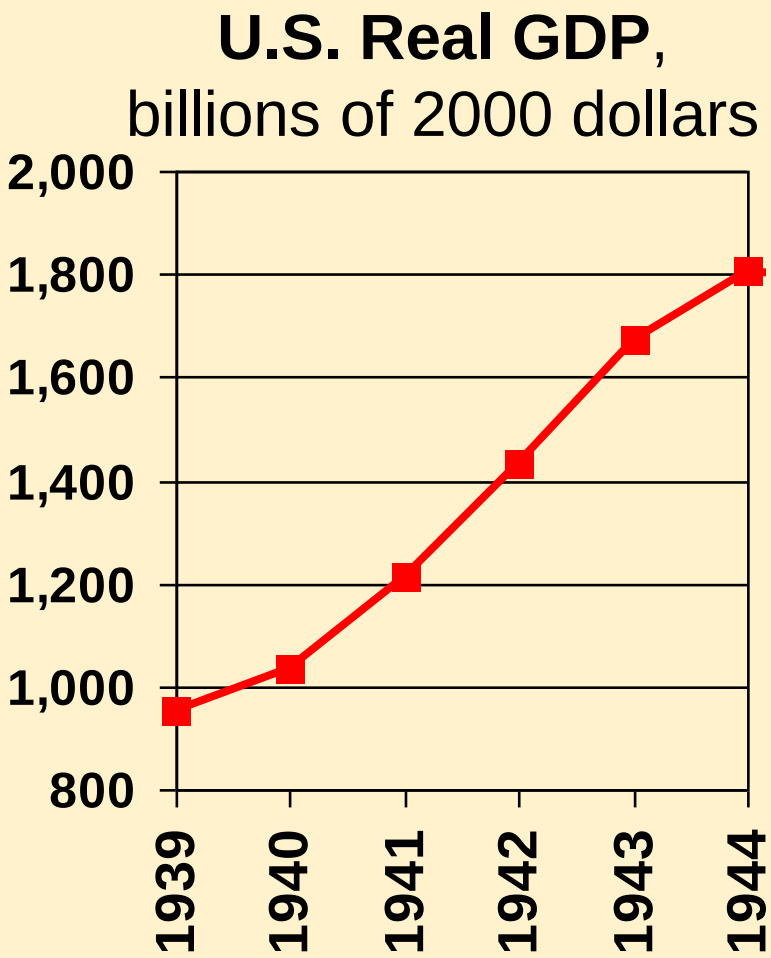
U.S. Real GDP, billions of 2000 dollars



Two Big *AD* Shifts:
2. The World War II Boom

From 1939–1944,

- govt outlays rose from $9.1 billion to $91.3 billion
- ***Y*** rose 90%
- ***P*** rose 20%
- unemp fell from 17% to 1%



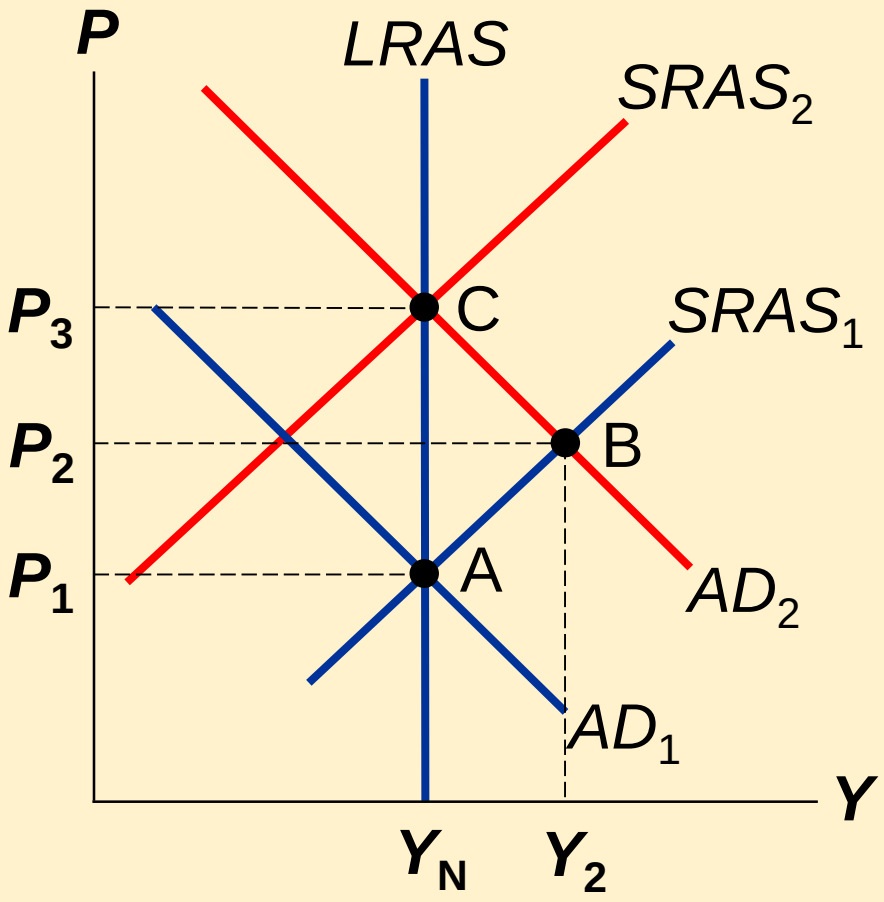
Working with the model

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

Answers

Event: Boom in Canada

1. Affects ***NX***, *AD* curve
2. Shifts *AD* right
3. SR eq'm at point B. ***P*** and ***Y*** higher, unemp lower
4. Over time, $\boldsymbol{P_E}$ rises, *SRAS* shifts left, until LR eq'm at C. ***Y*** and unemp back at initial levels.



CASE STUDY:
The 2008–2009 Recession

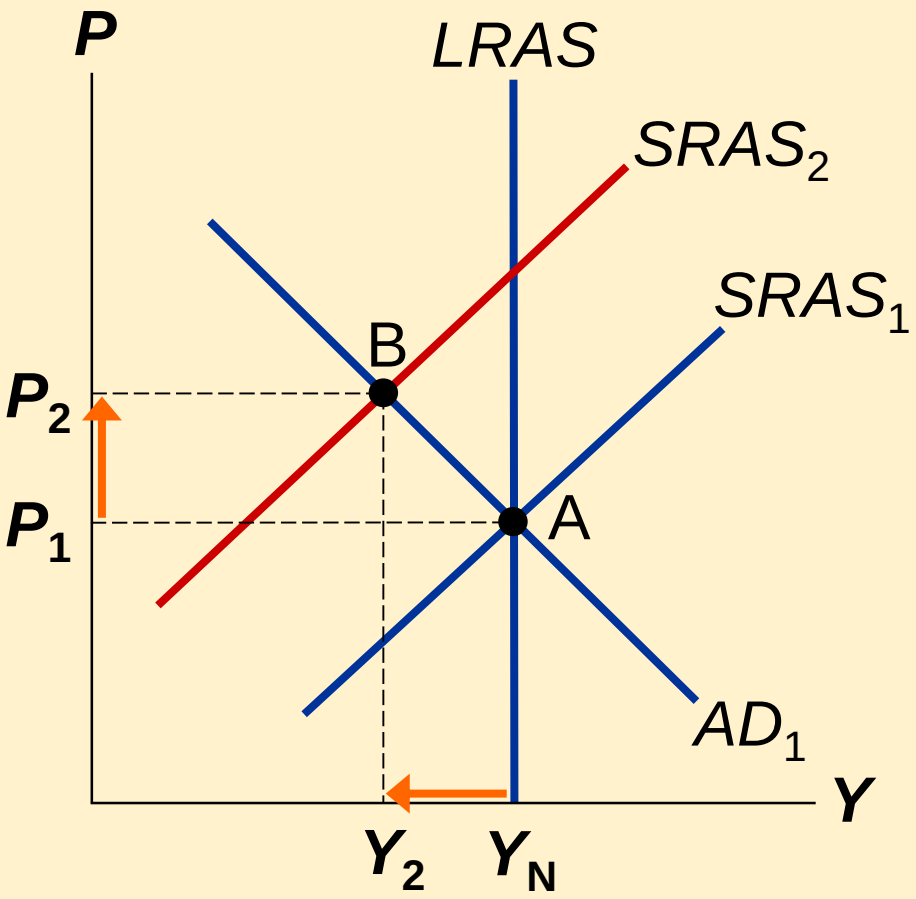
- From 12/2007 to 6/2009, real GDP fell about 4%
- Unemployment rose from 4.4% in 5/2007 to 10.1% in 10/2009
- The housing market played a central role in this recession…

The Effects of a Shift in *SRAS*

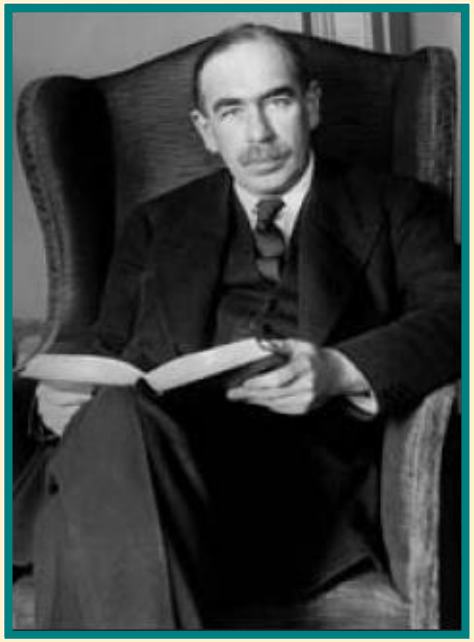
Event: Oil prices rise

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

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



John Maynard Keynes, 1883–1946



- *The General Theory of Employment, Interest, and Money*, 1936
- Argued recessions and depressions can result from inadequate demand; policymakers should shift *AD*.
- Famous critique of classical theory:

  The long run is a misleading guide to current affairs. In the long run, we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us when the storm is long past, the ocean will be flat.