

ECON 105 – Principles of Macroeconomics

Chapter 14

Aggregate Demand and Aggregate Supply

Economic Fluctuations

Economic fluctuations (business cycles): **expansions and contractions in economic activities, such as output and employment.**

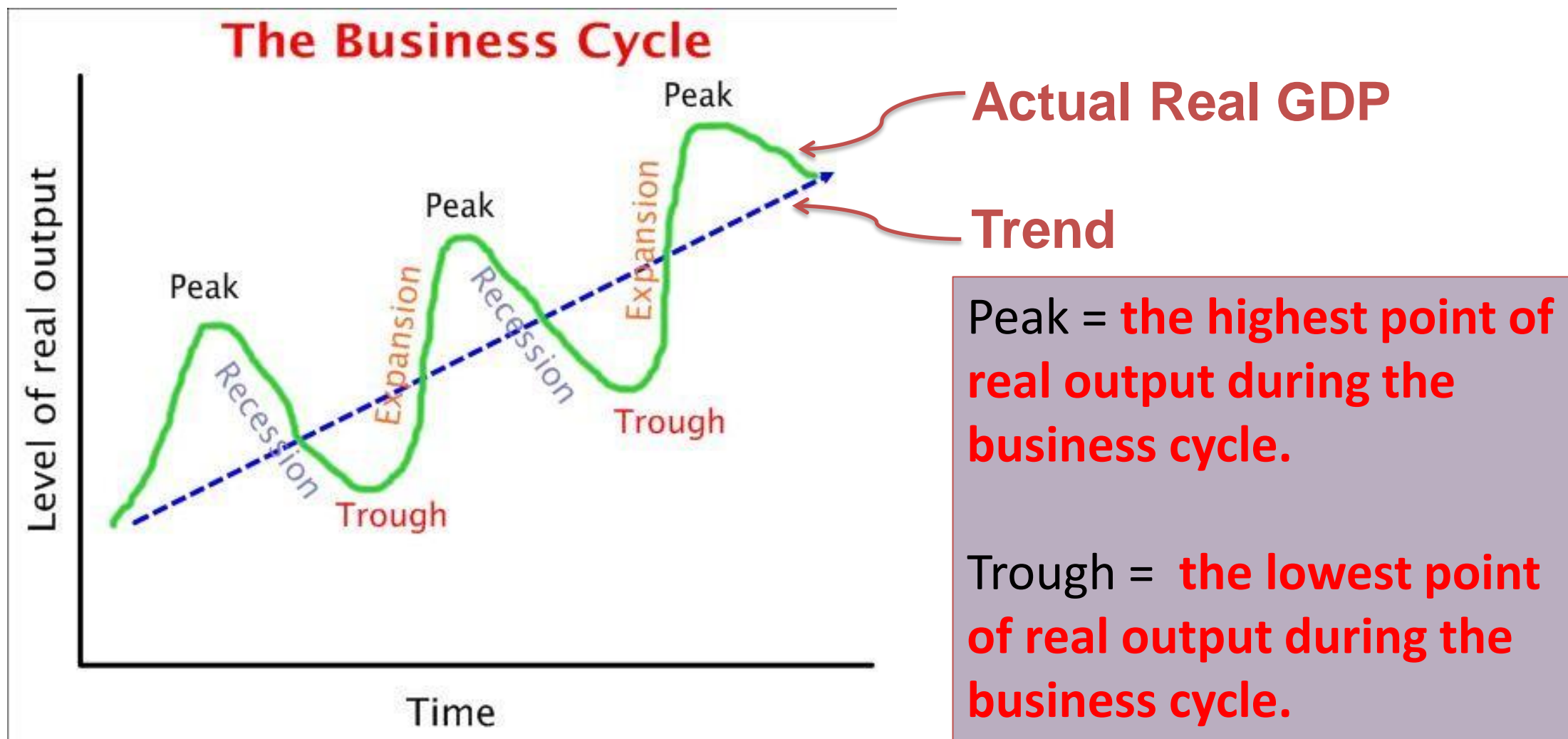
Expansions (or booms) are periods of economic **upturns when output and employment are rising.**

Recessions (or contractions) are periods of economic **downturns when output and employment are falling.**

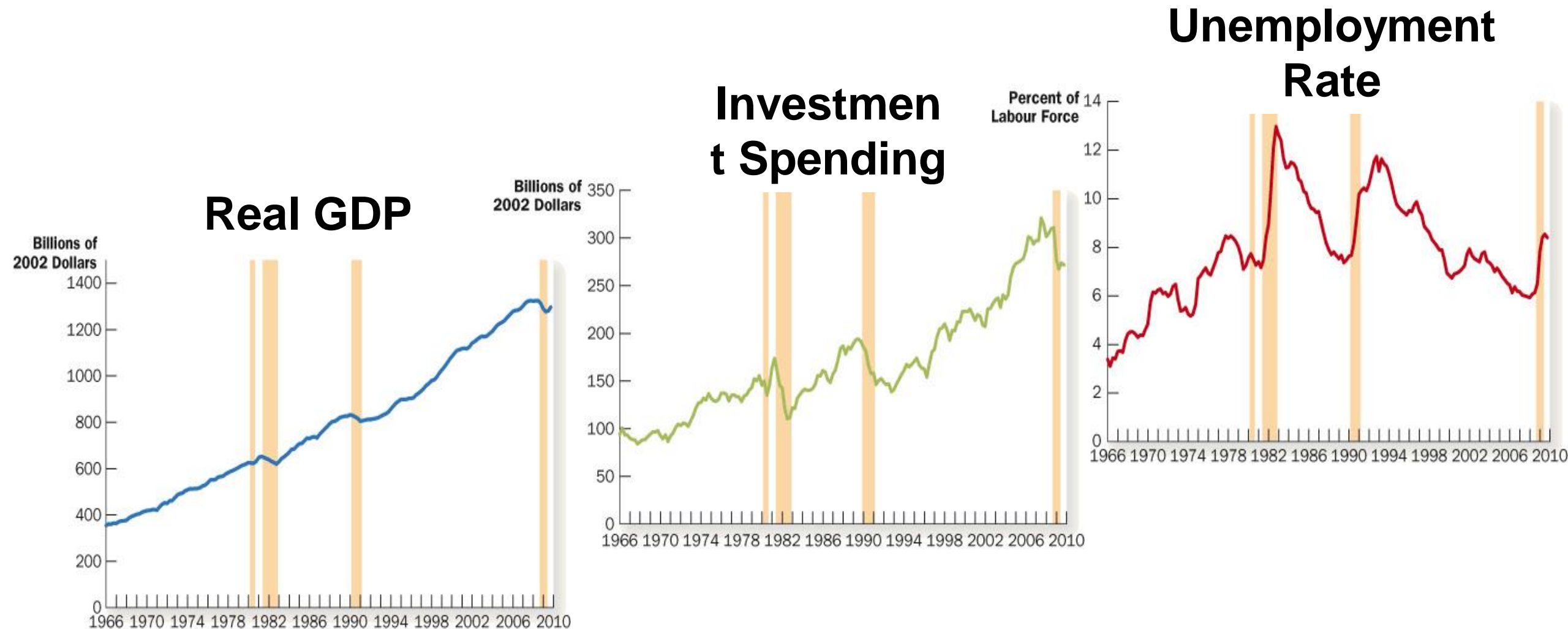
A **depression** is a very deep and prolonged economic downturn.



Economic Fluctuations



A Look at Short-Run Economic Fluctuations



Three Key Facts about Economic Fluctuations

- 1) Economic fluctuations are irregular and unpredictable.
- 2) Most macroeconomic variables fluctuate together.

When an economy enters a recession **Y, C, and I all decrease.**

- 3) As output falls, unemployment **increases.**

To help explain economic fluctuations economists use an

Aggregate Demand Aggregate Supply model.

This model differs from the *Classical Theory of money neutrality* (Ch 11) which is a *long run* concept.

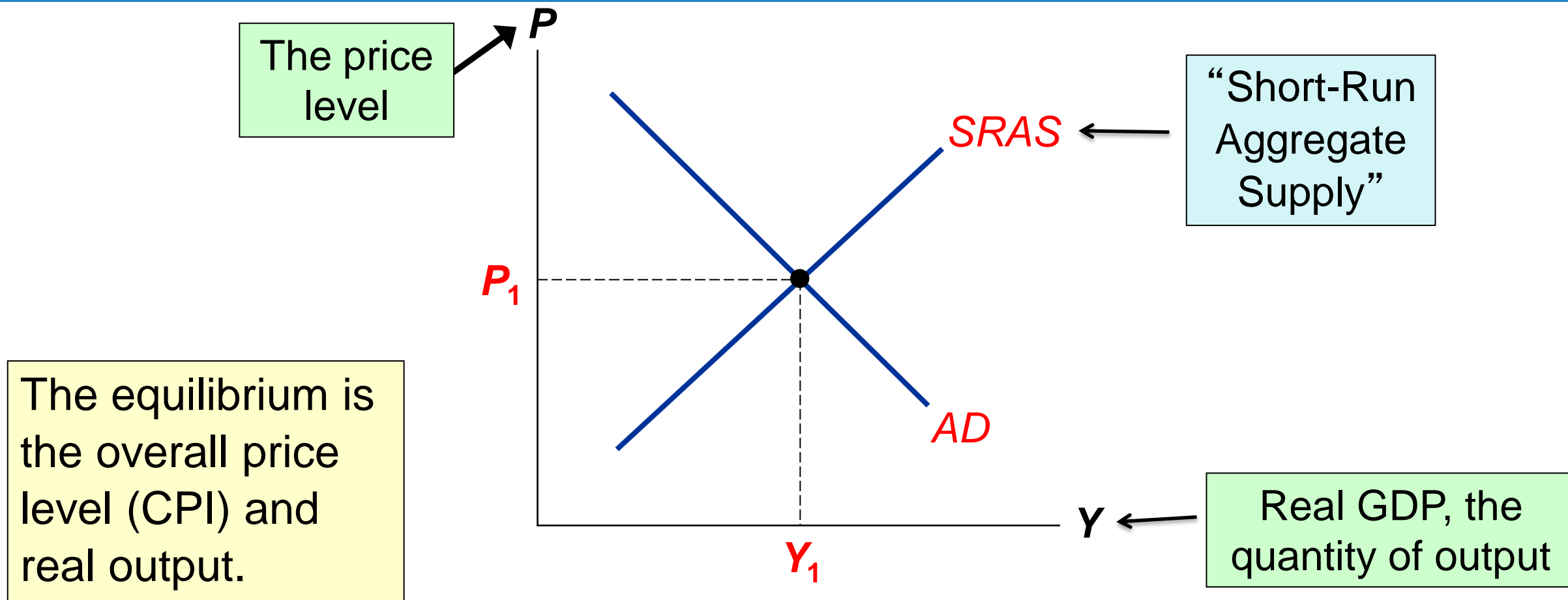
In the *short run*, changes in nominal variables (like the money supply or the price level) can affect real variables (like the output or the unemployment).

Model of Aggregate Demand and Aggregate Supply

Aggregate demand (AD) = **quantity of G&S that households, firms, and the government want to buy at each price level.**

Aggregate supply (AS) = **quantity of G&S that firms choose to produce and sell at each price level.**

Model of Aggregate Demand and Aggregate Supply



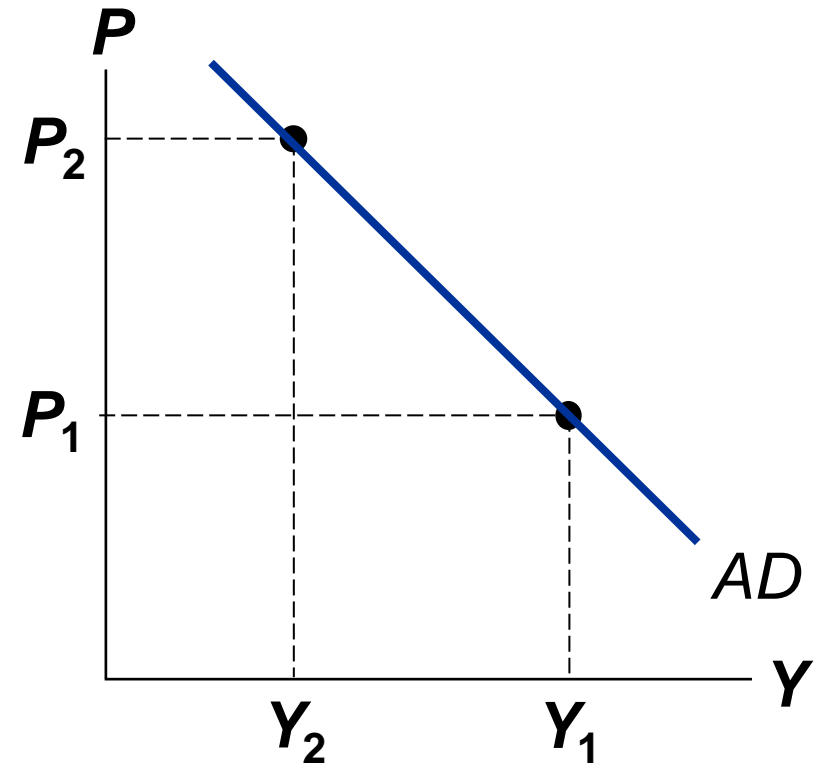
Aggregate Demand (AD)

Recall that GDP is the sum of C, I, G, and NX. Each of these components contribute to the aggregate demand for goods and services → **$AD = C + I + G + NX$**

The price level and the quantity of G&S demanded are negatively related. Why?

Three reasons:

- 1) The wealth effect
- 2) The interest rate effect
- 3) The real exchange rate effect



The Price Level and Consumption: The Wealth Effect

$$AD = C + I + G + NX$$

A *decrease* in the price level increases the value of money and makes consumers wealthier. As a result **C ↑ and Q^{AD} ↑**.

An *increase* in the price level reduces the value of money and makes consumers poorer. As a result **C ↓ and Q^{AD} ↓**.



The Price Level and Investment: The Interest Rate Effect

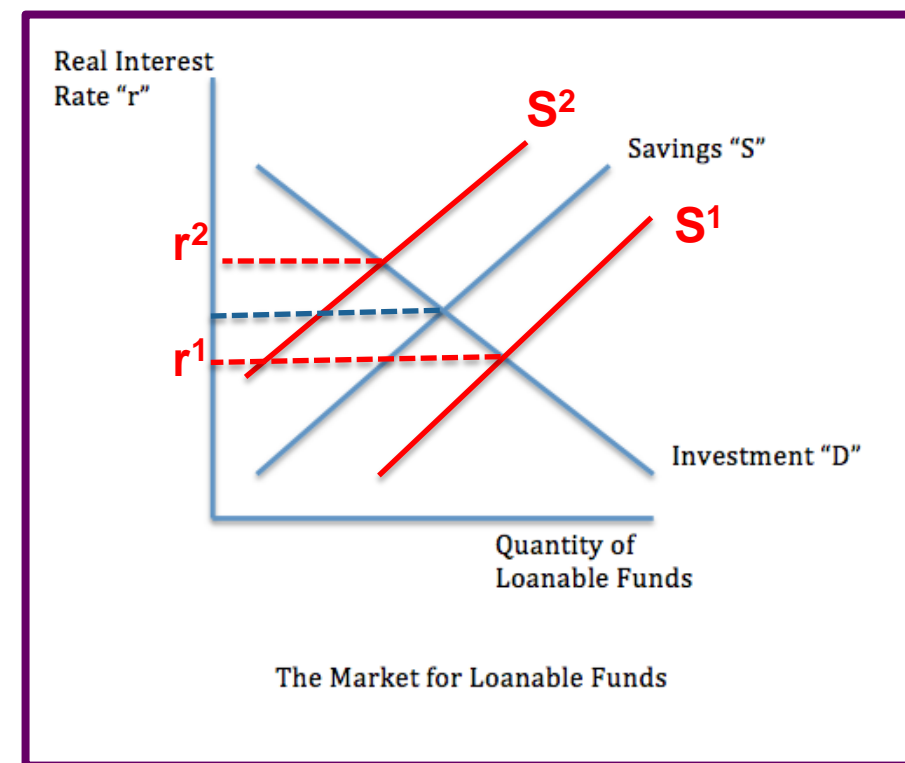
$$AD = C + I + G + NX$$

As the price level falls households do not need as much money. They buy assets (stocks and bonds).

- As a result, the **supply of loanable funds** \uparrow and r \downarrow and I \uparrow and Q^{AD} \uparrow

As the price level rises households need more money. They sell assets.

- As a result, the **supply of loanable funds** \downarrow and r \uparrow and I \downarrow and Q^{AD} \downarrow



The Price Level and NX: The Real Exchange Rate Effect

$$AD = C + I + G + \mathbf{NX}$$

- For a given nominal exchange rate, a lower price level reduces the real exchange rate. Depreciation of domestic currency will **increase NX and Q^{AD} ↑**.
- An increase in price level causes the real exchange rate to appreciate. Appreciation of domestic currency will **decrease NX and Q^{AD} ↓**.

$$e = \frac{EP}{P^*}$$

How about Government Spending?

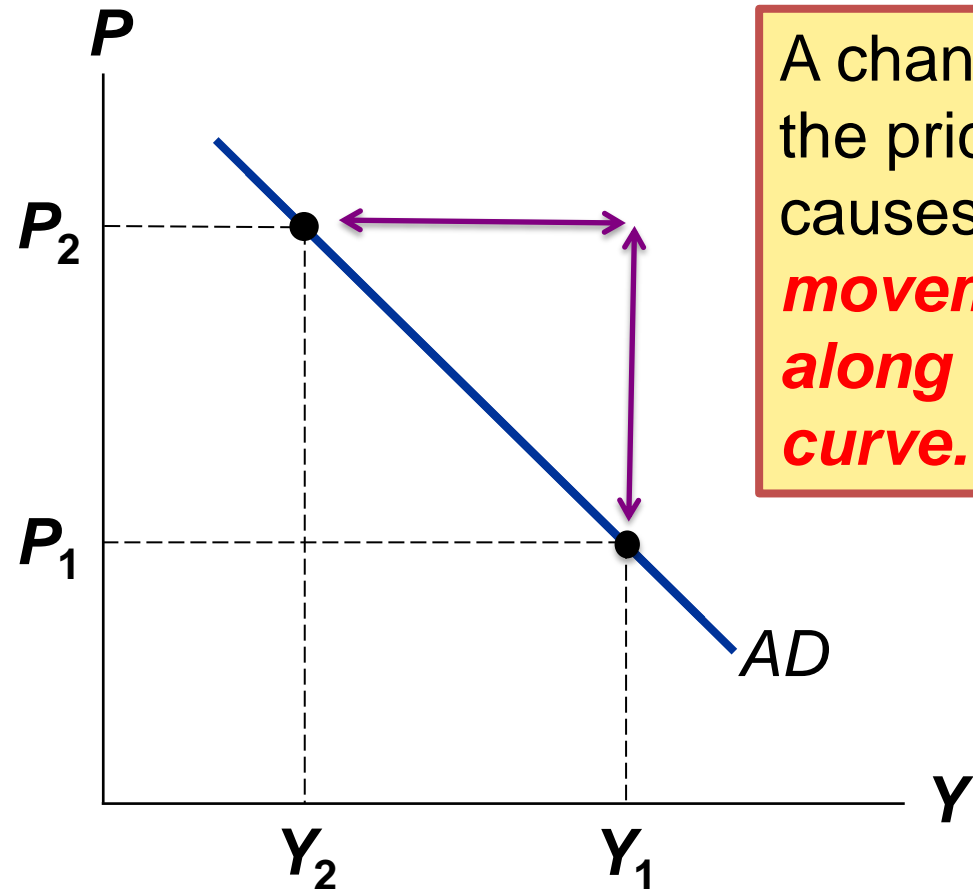
$$AD = C + I + \mathbf{G} + NX$$

The level of government purchases (G) is fixed by the government and changes for political reasons. At this moment, we assume G is constant. We will learn about fiscal policy in Chapter 15.

The Aggregate Demand (AD) Curve

Summary

- As the price level falls
 $C \uparrow$ and $I \uparrow$ and $NX \uparrow$
therefore **$Q^{AD} \uparrow$** .
- As the price level rises
 $C \downarrow$ and $I \downarrow$ and $NX \downarrow$
therefore **$Q^{AD} \downarrow$** .



A change in the price level causes a **movement along the AD curve**.

AD Shifters

1) Consumption: Changes in confidence, wealth, saving preferences, or taxes

E.g. As consumer confidence falls, people reduce current consumption. AD shifts to the **left**.

E.g. A stock market boom makes people wealthier and consumer spending rises. AD shifts to the **right**.

2) Investment: Changes in productivity, confidence, or tax incentives (see Ch 8)

E.g. An investment tax credit increases the quantity of investment at any given interest rate. AD shifts to the **right**.

AD Shifters

3) Government purchases

As government purchases increase, AD shifts to the **right**.

As government reduces purchases, AD shifts to the **left**.

4) Net exports: Changes in domestic and foreign consumer preferences and income, relative prices, exchange rates, transportation costs, or trade policies. (see Ch 12)

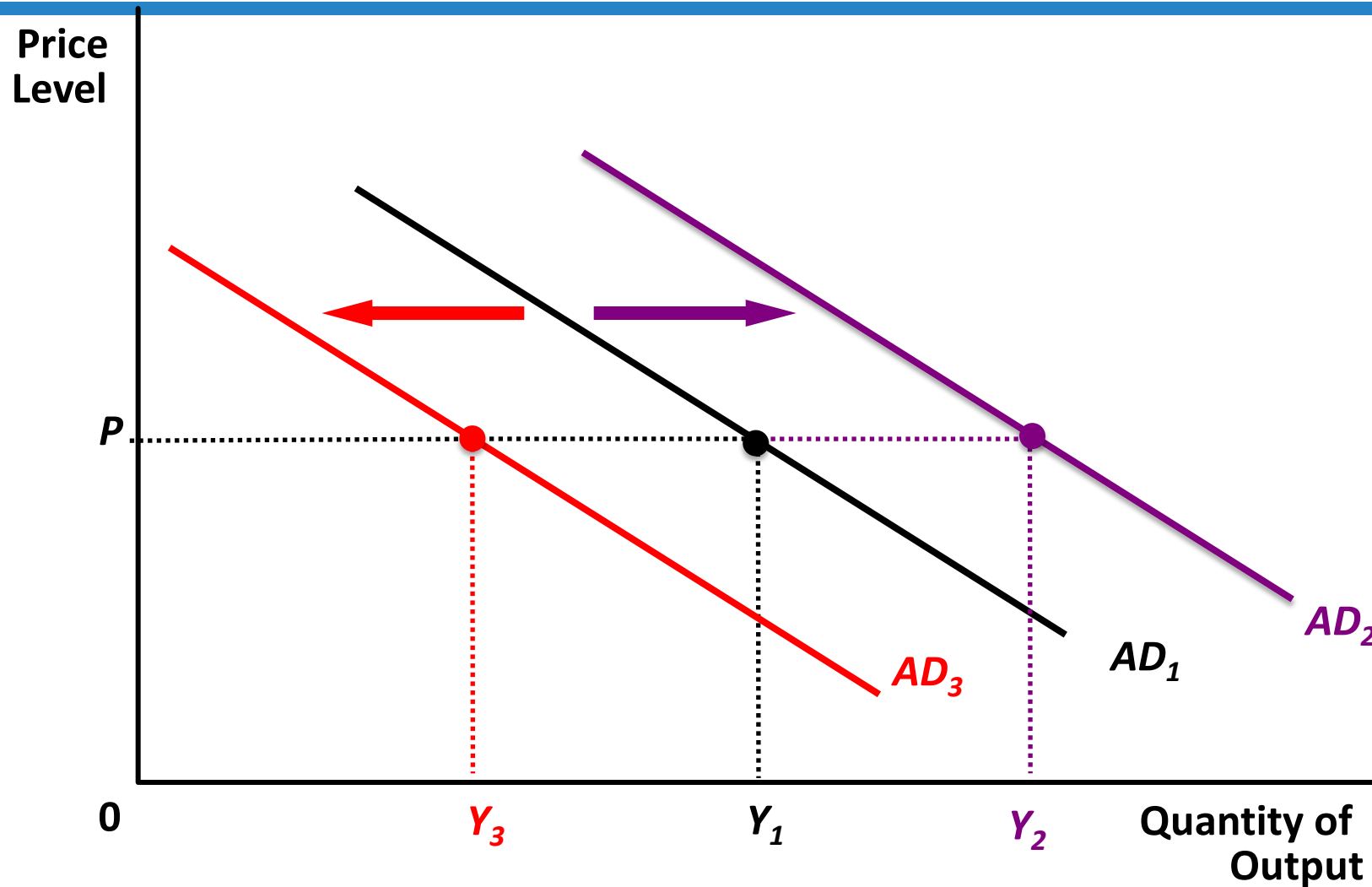
E.g. A foreign recession leads to a decrease in domestic NX.

AD shifts to the **left**.

E.g. A foreign boom leads to an increase in domestic NX.

AD shifts to the **right**.

Increase or Decrease in AD

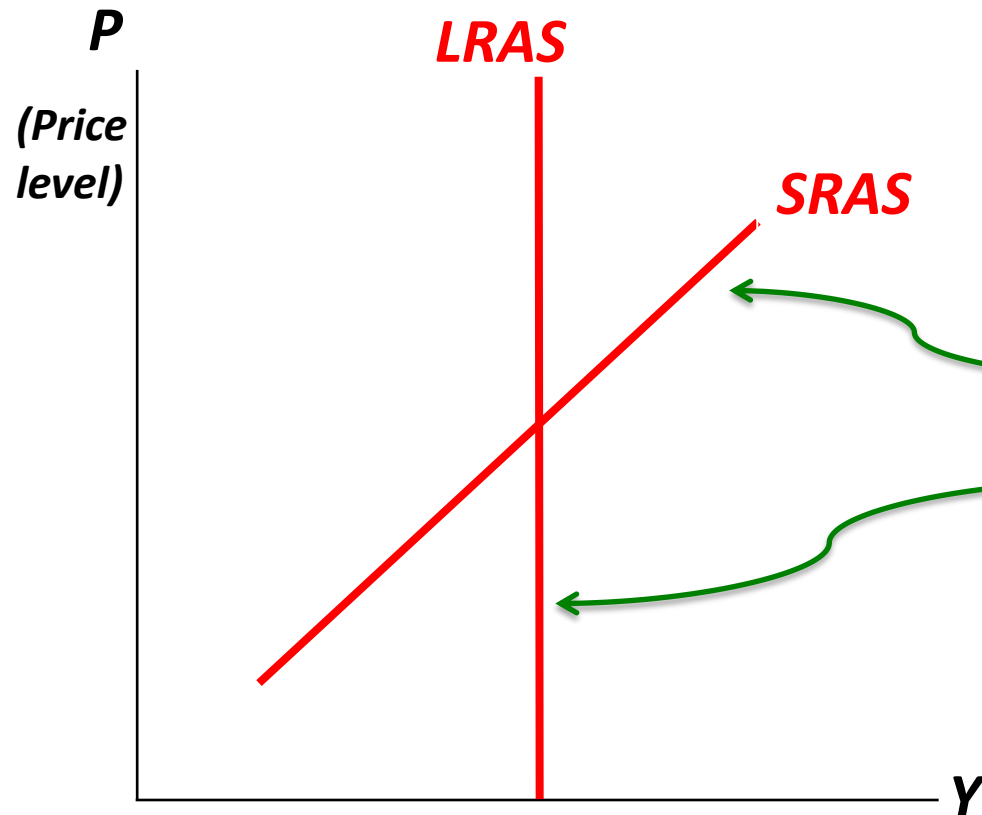


What happens to the AD curve in each of the following scenarios?

- 1) A ten-year-old investment tax credit expires.
- 2) The Canadian exchange rate falls.
- 3) A fall in prices increases the real value of consumers' wealth.
- 4) Provincial governments replace their sales taxes with new taxes on interest, dividends, and capital gains.

Aggregate Supply (AS)

The AS curve shows the **total quantity of G&S that firms produce and sell at any given price level.**



Aggregate supply is

- 1) upward-sloping in the short run
- 2) vertical in the long run

Long Run Aggregate Supply

In the long run, an economy's production of goods and services depends on its **supplies of labour, capital, natural resources, and available technology.**

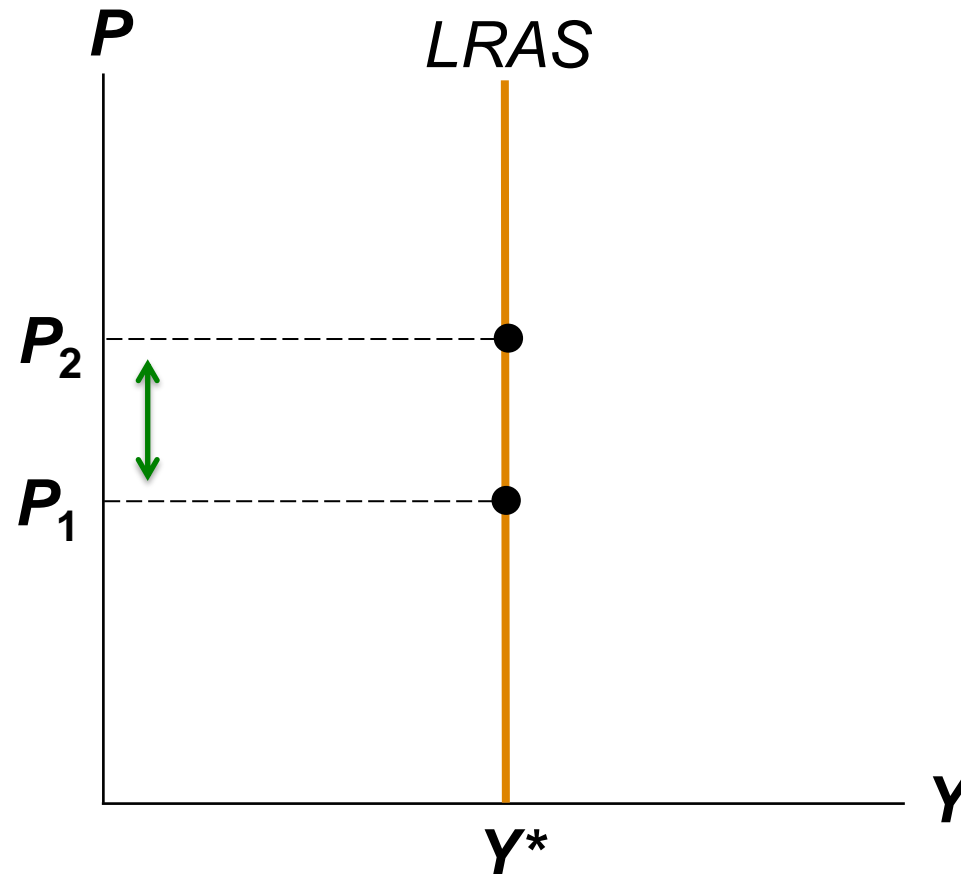
Because the price level does not affect these long-run determinants of real GDP, the LRAS is **vertical.**

The long-run level of production is called the **full-employment output, potential output, or natural rate of output.**

Natural rate of output (Y^*) = the production of G&S that an economy achieves in the LR when unemployment is at its natural rate

Long Run Aggregate Supply

Technology and the factors of production are not affected by the price level, so Y^* is fixed.



Natural rate of output

LRAS Shifters

1) Labour: immigration, demographics, changes in the natural unemployment rate

E.g. More labour will shift LRAS to the **right**.

E.g. As a “baby boom” generation begins to retire LRAS will shift **left**.

2) Capital: investment, war or natural disasters

E.g. More capital will shift LRAS to the **right**.

E.g. War will shift LRAS to the **left**.

LRAS Shifters

3) Natural resources: natural disasters or events

E.g. More natural resources will shift LRAS to the **right**.

A change in the availability of *imported* resources can also affect long-run aggregate supply.

4) Technological knowledge: R&D activities

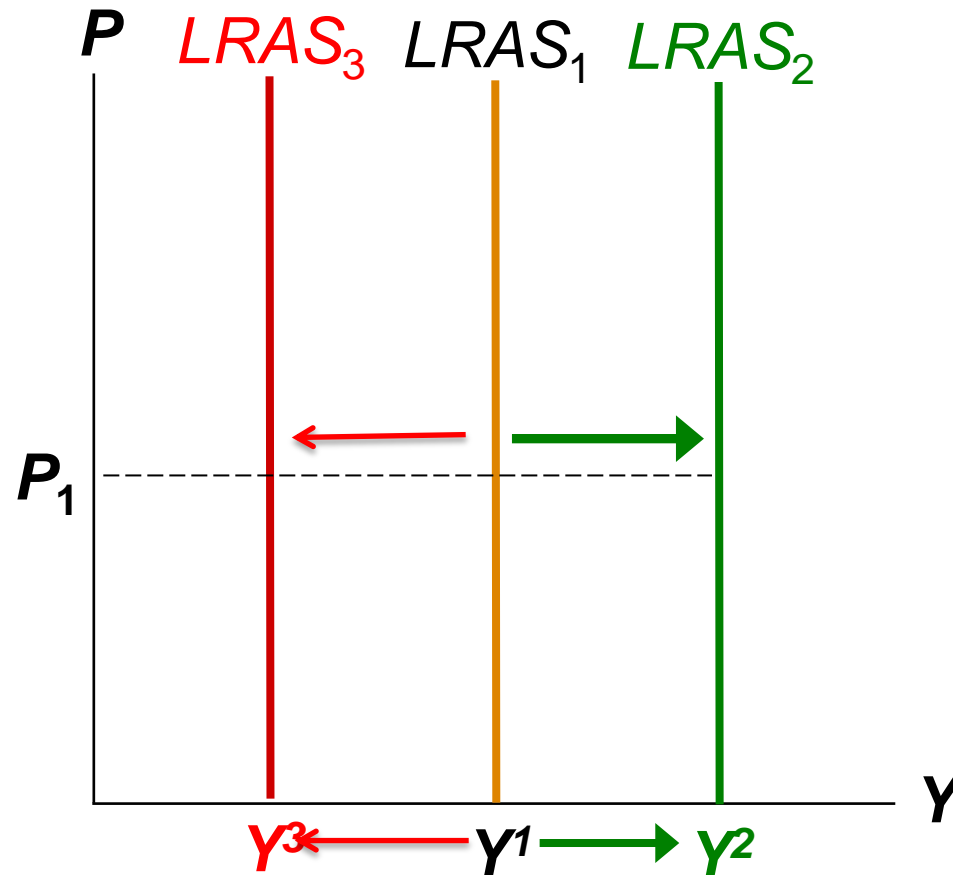
Technological progress will shift LRAS to the **right**.

5) Human capital: education, trainings

Improvement in human capital will shift LRAS to the **right**.

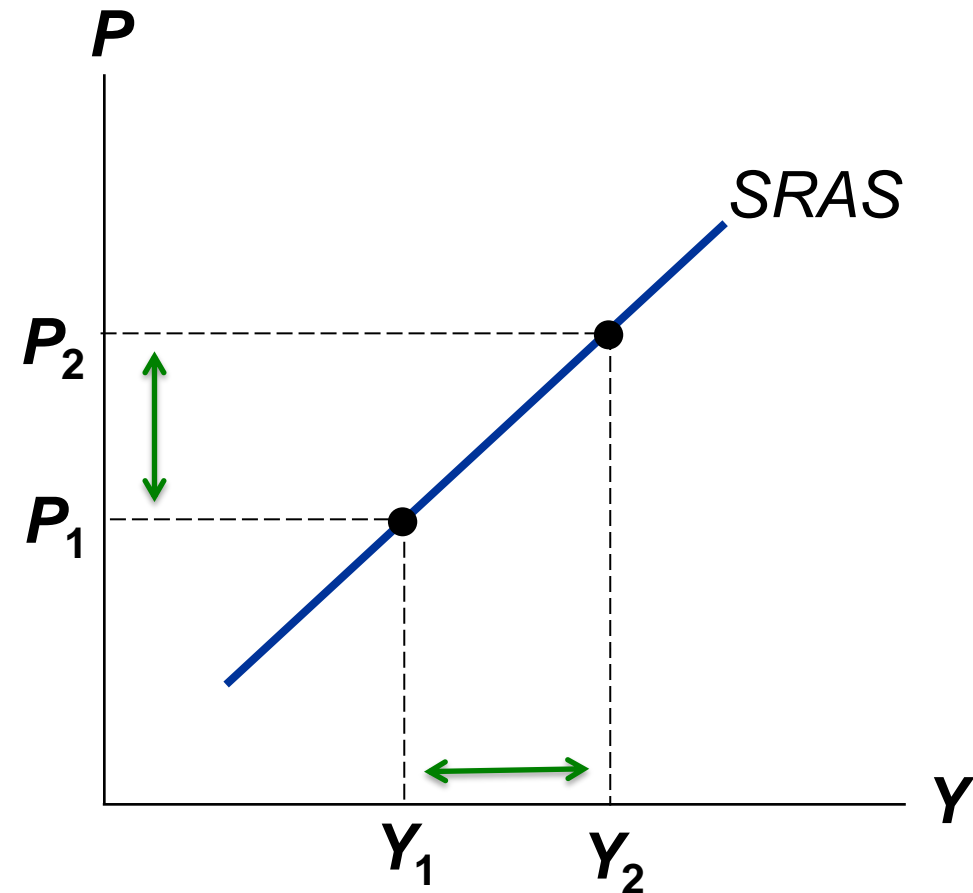
LRAS Shifters

At every price level the the natural rate of output changes.



Short Run Aggregate Supply

In the short run a change in the price level affects actual output, Y , (but not the natural rate of output, Y^*) and unemployment, so the SRAS curve is *upward sloping*.



Why P changes Y in the Short Run: Three Theories

1) The Sticky-Wage Theory

Nominal wages are not fully flexible to changes in the price level in the short run because of **employment contracts**.

An ***unexpected*** fall in the price level raises the real wage, which makes production less profitable → **firms hire fewer workers and reduce Q^{AS}** .

An ***unexpected*** increase in the price level lowers the real wage, which makes production more profitable → **firms hire more workers and increase Q^{AS}** .

$$\text{"Real wage"} = (\text{Nominal wage}) / (\text{Price level})$$

Why P changes Y in the Short Run: Three Theories

2) The Sticky-Price Theory

Specific prices are not fully flexible to changes in the *price level* in the short run because of **menu costs**.

An ***unexpected*** fall in the price level leaves some firms with higher-than-desired prices, so **sales ↓ and they reduce Q^{AS}** .

An ***unexpected*** increase in the price level leaves some firms with lower-than-desired prices, so **sales ↑ and they increase Q^{AS}** .

Why P changes Y in the Short Run: Three Theories

3) The Misperceptions Theory

Workers and firms do not have perfect information about macroeconomic variables.

An **unexpected** fall in the price level leads some firms to mistakenly believe that their *relative prices* have fallen, so they **decrease Q^{AS}** .

An **unexpected** increase in the price level leads some firms to mistakenly believe that their *relative prices* have increased, so they **increase Q^{AS}** .

Three Theories for an Upward Sloping SRAS

There are three alternative explanations for the upward slope of the SRAS: (1) sticky wages, (2) sticky prices, and (3) misperceptions.

All three theories suggest that **output (Y) deviates from its natural rate (Y^*) when the price level (P) deviates from the expected price level (P^e).**

So $Y \neq Y^*$
when $P \neq P^e$

Three Theories for an Upward Sloping SRAS

So $Y - Y^*$ is related to $P - P^e$

Or $Y - Y^* = \alpha(P - P^e)$

Or $Y = Y^* + \alpha(P - P^e)$

If $P = P^e$, $Y = Y^*$

If $P > P^e$, $Y > Y^*$

If $P < P^e$, $Y < Y^*$

Y = quantity of output supplied

Y^* = natural rate of output

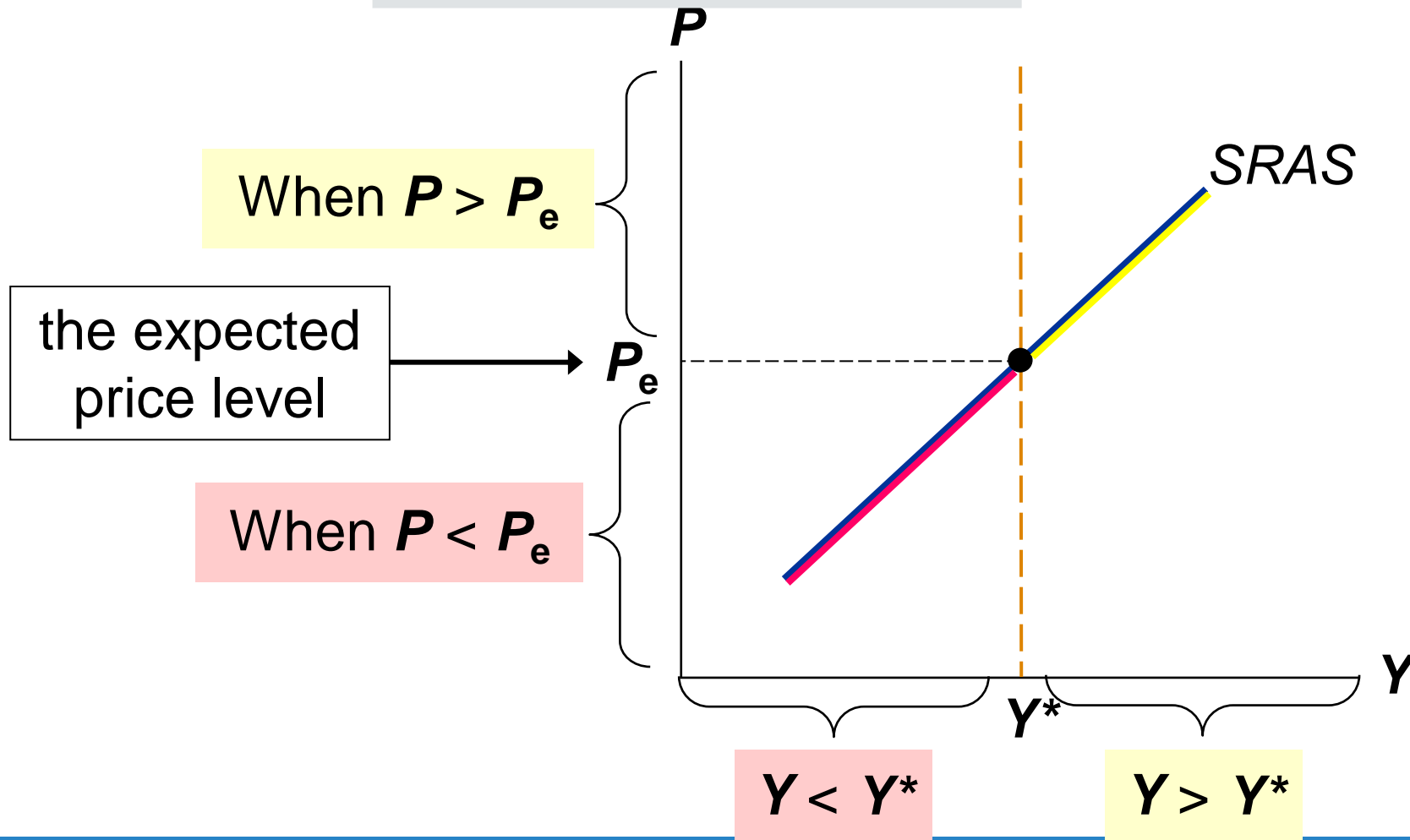
P = actual price level

P^e = expected price level

α = positive parameter that
determines how Y responds
to unexpected changes in P .

Three Theories for an Upward Sloping SRAS

$$Y = Y^* + a(P - P_e)$$



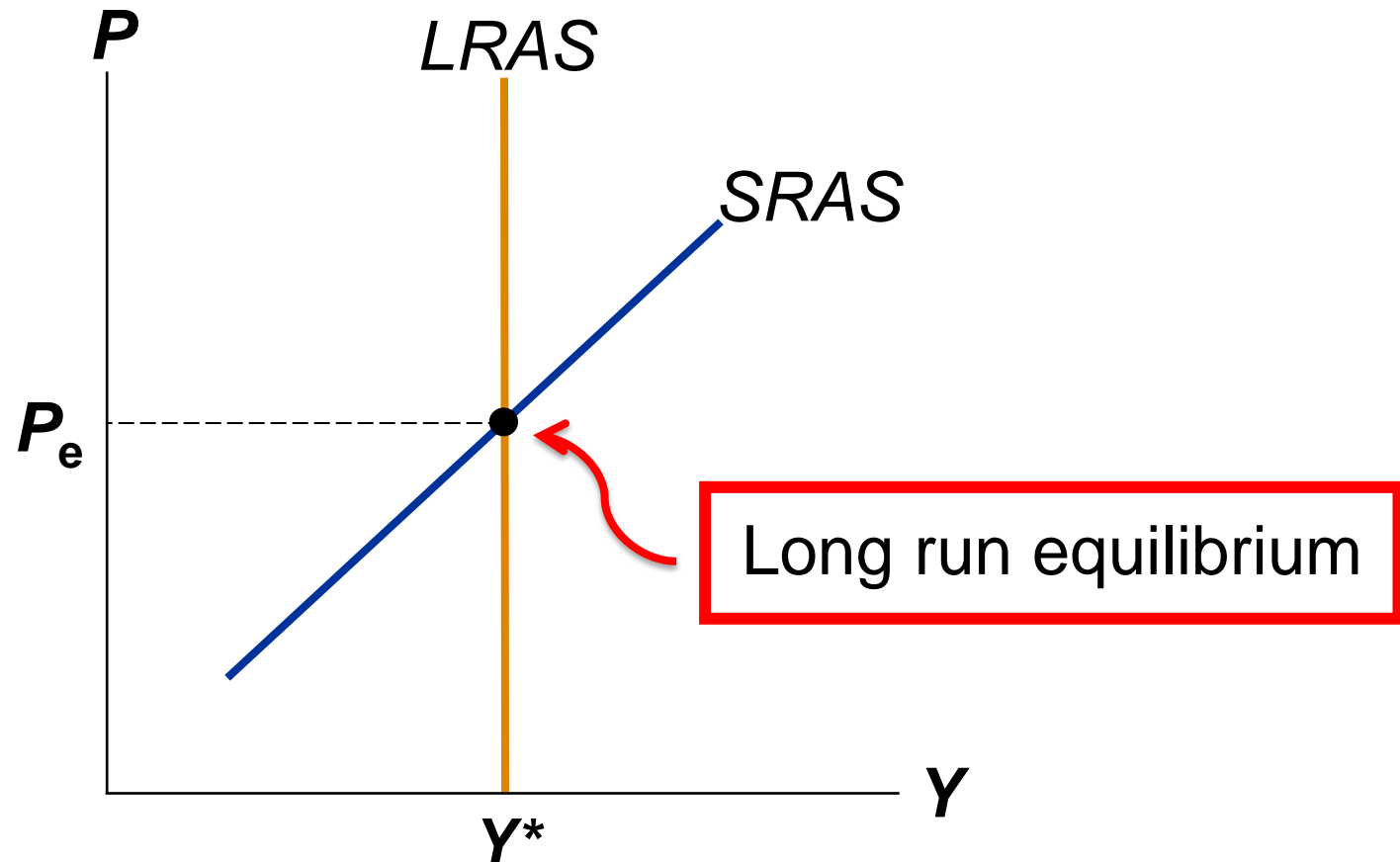
SRAS and LRAS

The imperfections in these theories are temporary. Over time, sticky wages and prices become flexible and misperceptions are corrected.

So in the long run,

$$P_e = P$$

$$\text{and } Y = Y^*.$$



Notes on the Short Run and the Long Run

The “short run” and “long run” used in macroeconomics are different from those used in microeconomics.

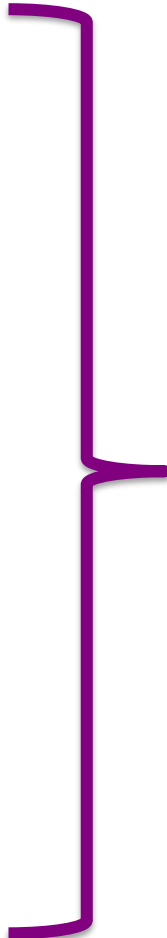
In ***microeconomics***, the short run is the time period in which some factors are variable and others are fixed, whereas the long run is the period in which all factors are variable.

In ***macroeconomics***, the short run is the time period in which wages, prices, and expectations ***may not fully adjust to the state of the economy.***

The long run is the time period in which these variables ***fully adjust to the state of the economy.***

SRAS Shifters

- 1) **Labour**
E.g. An increase in the amount of labour shifts SRAS to the **right**.
- 2) **Capital**
E.g. An increase in the amount of capital shifts SRAS to the **right**.
- 3) **Natural resources**
E.g. An increase in the availability of natural resources shifts SRAS to the **right**.
- 4) **Technology**
E.g. Technological progress shifts SRAS to the **right**.
- 5) **Human capital**
E.g. improvement in human capital shifts SRAS to the **right**.



Same as
LRAS shifters

SRAS Shifters

6) Expected price level

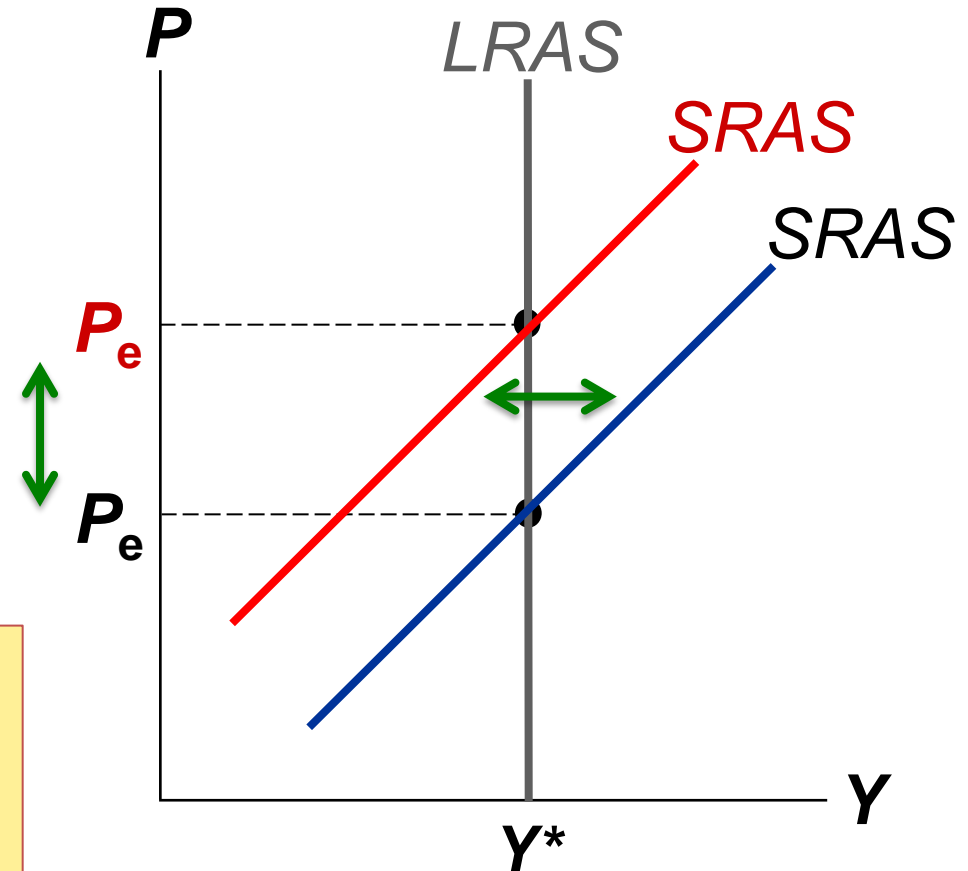
$$\text{Since } Y = Y^* + \alpha(P - P^e)$$

A decrease in P^e increases Y ,
and SRAS shifts **right**.

An increase in P^e decreases Y ,
and SRAS shifts **left**.

Example:

If P^e rises, workers & firms set higher wages. At each P , production is less profitable, Y falls, SRAS shifts left.



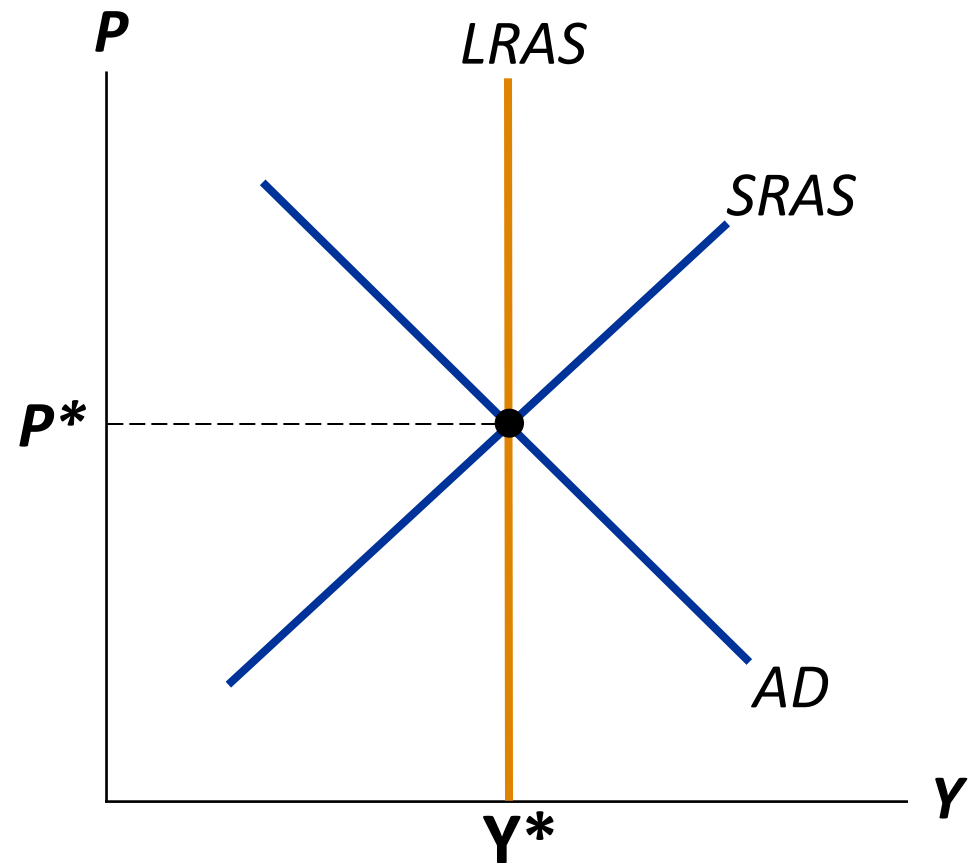
The Long-Run Equilibrium in the AD-AS Model

The long-run equilibrium:

Equilibrium price level = P^*
and $P^ = P = P^e$*

Equilibrium output = Y^*
and $Y = Y^$*

Unemployment is *at its natural rate*, $U = U^*$



Explaining Economic Fluctuations

Fluctuations are caused by events that **shift the *AD* and/or *AS* curves.**

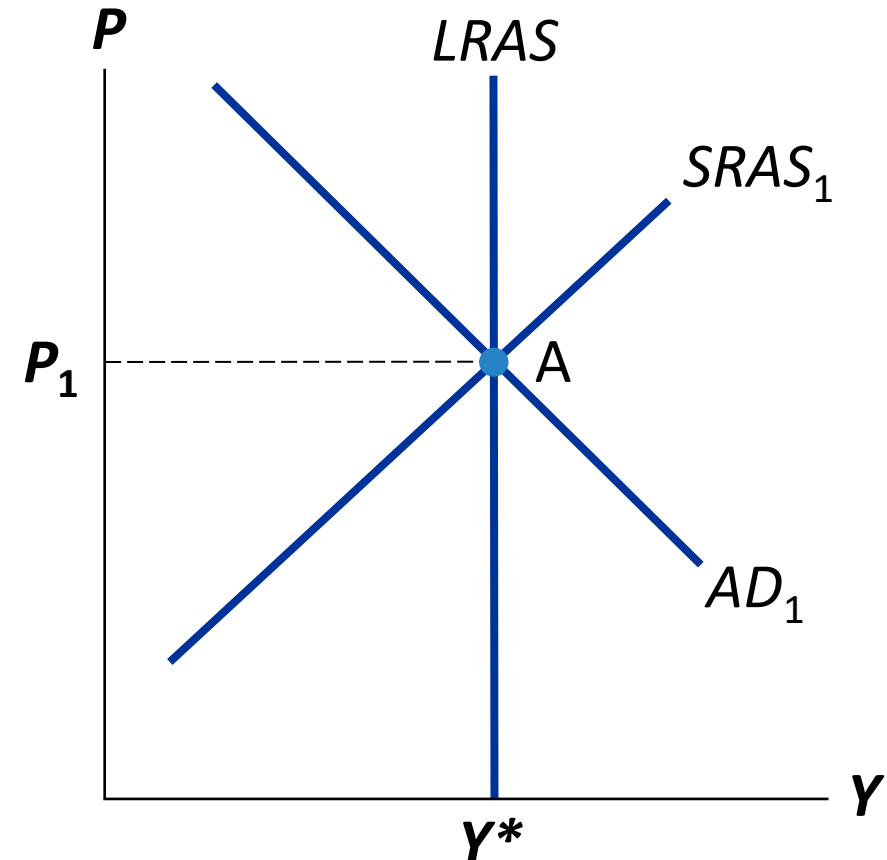
There are four steps to analyzing economic fluctuations:

- 1) Determine whether the event shifts *AD*, or *AS*, or *both*.
- 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 analyze how the economy moves from its new SR equilibrium to its LR equilibrium.

The Effects of a Shift in AD

Event: Stock market crash

1. Change in wealth affects **C** and the **AD curve**.
2. **C** ↓, so **AD** shifts **left**.
3. SR equilibrium is **B**. **P** and **Y** decrease and unemployment ↑.
4. Over time P_e falls, so **SRAS** shifts **right** until economy is at the LR equilibrium at **C**. **Y** and unemployment are back at initial levels.



The Effects of a Shift in SRAS

Event: Oil prices rise

1. Production costs increase → shifts **SRAS**

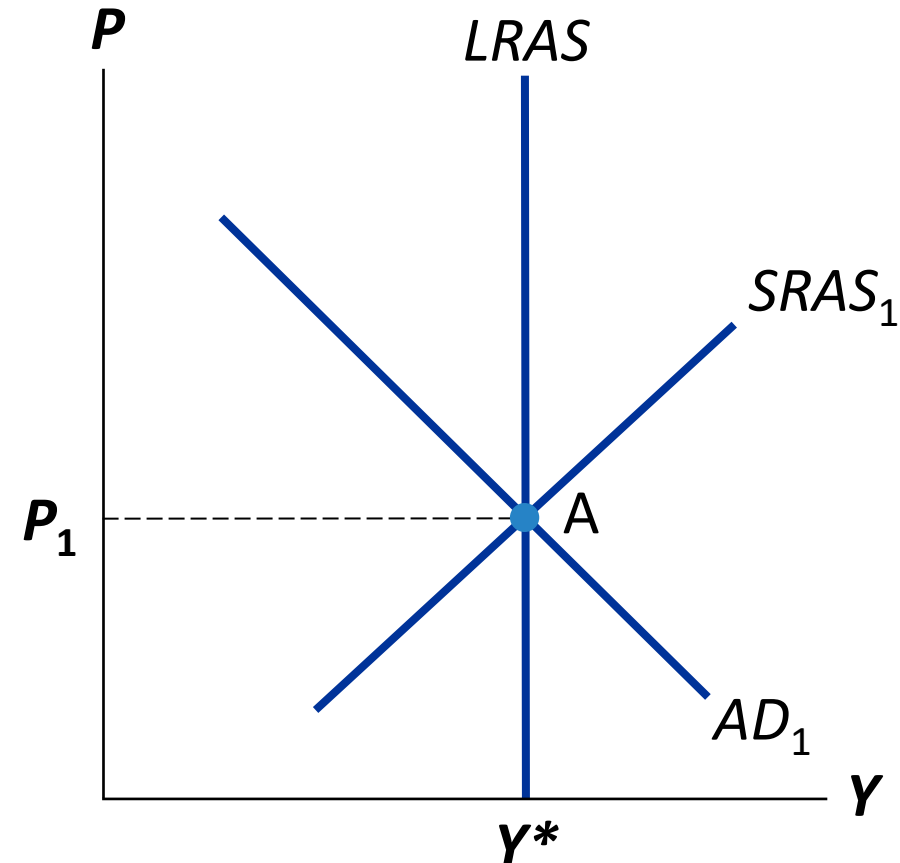
2. **SRAS** shifts **left**.

3. SR equilibrium moves from A to B.

$P \uparrow$, $Y \downarrow$, and unemployment \uparrow .

From A to B there is **stagflation** =
a period of falling output and rising prices.

4. Over time wages **fall** and **SRAS** shifts **right**.
The economy moves back to A. **Y , P , and unemployment move back to initial levels.**



How Shifts in AD or SRAS Affect Output and Price Level

	Short Run		Long Run	
	Y	P	Y	P
Increase in AD	Up	Up	$Y = Y^*$	Up
Decrease in AD	Down	Down	$Y = Y^*$	Down
Increase in SRAS	Up	Down	$Y = Y^*$	$P = P_1$
Decrease in SRAS	Down	Up	$Y = Y^*$	$P = P_1$

Exercise

Draw the AD-SRAS-LRAS diagram for the Canadian economy, starting in a long-run equilibrium. A boom occurs in the U.S.. Determine the SR and LR effects on Canadian GDP, the price level, and unemployment.

