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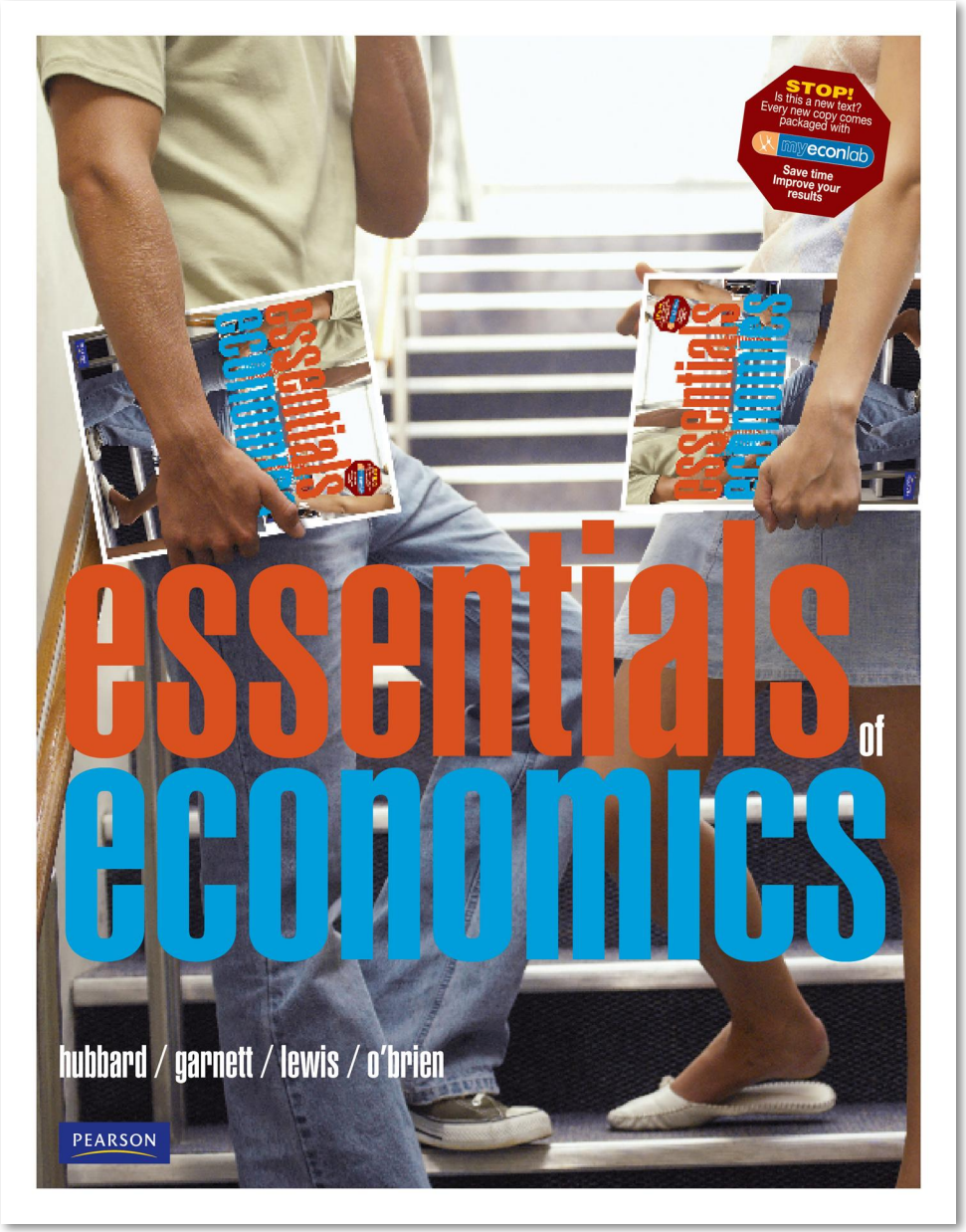
to accompany



Chapter 13

Aggregate Demand and Aggregate Supply Analysis

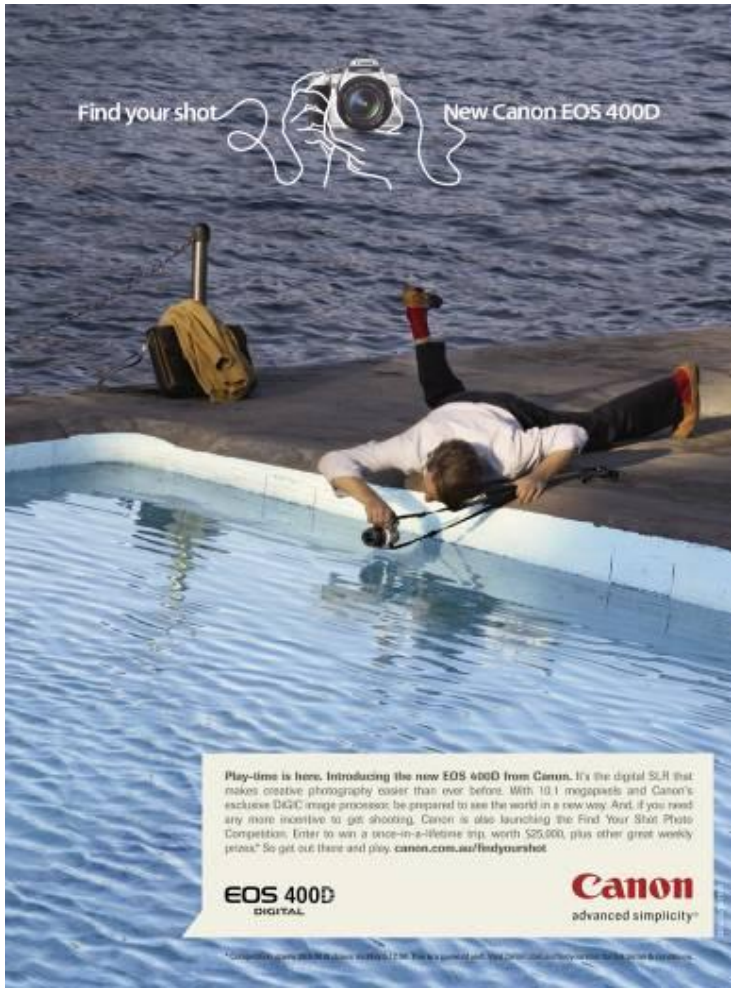
Learning Objectives

1. Understand what happens during business cycles and their relationship to long-run economic growth.
2. Discuss the determinants of aggregate demand, and distinguish between a movement along the aggregate demand curve and a shift of the curve.
3. Discuss the determinants of aggregate supply, and distinguish between a movement along the short-run aggregate supply curve and a shift of the curve.

Learning Objectives

4. Use the aggregate demand and aggregate supply model to illustrate the difference between short-run and long-run macroeconomic equilibrium.
5. Use the dynamic aggregate demand and aggregate supply model to analyse macroeconomic conditions.

Business cycles impacts on Canon



- ***Canon was able to grow rapidly during the economic boom experienced in Australia from the early 1990s to 2007.***
- ***The economic downturn in 2008-09 saw a fall in demand by other businesses for Canon's products.***

The Business Cycle

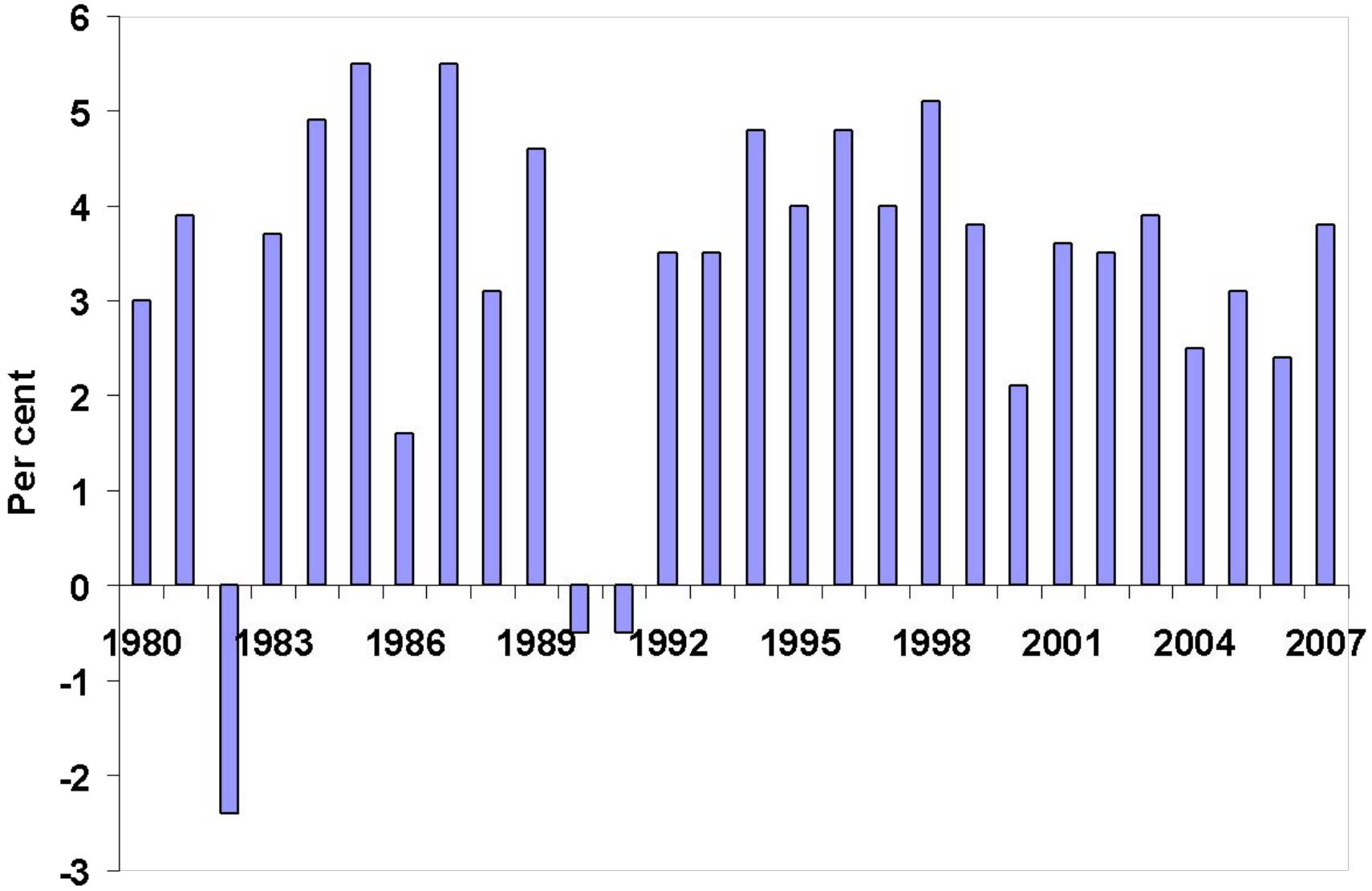
Business cycle: Alternating periods of economic expansion and economic recession.

- The expansion phase
  - Production, employment and income are increasing.
- The business cycle peak
- The recession phase
  - Production, employment and income are declining.
- The business cycle trough

The Business Cycle

- **Recession:** A significant decline in activity spread across the economy, lasting more than a few months, visible in production, employment, real income and wholesale-retail trade.
- *Official definition of a recession*: Two successive quarters of negative economic growth.

Movements in real GDP, Australia, 1980 – 2007: Figure 13.1



Source: Australian Bureau of Statistics (2008), *Australian National Accounts*, Cat. No. 5206.0.

The Business Cycle

What happens during a business cycle?

- Each business cycle is different, however all share some similarities.
  - The end of an expansion is typically associated with rising interest rates rising and wages, and profits begin to fall.
  - A recession often begins with decreased spending by firms on capital goods, and/or decreased spending by households on new houses and consumer durables.

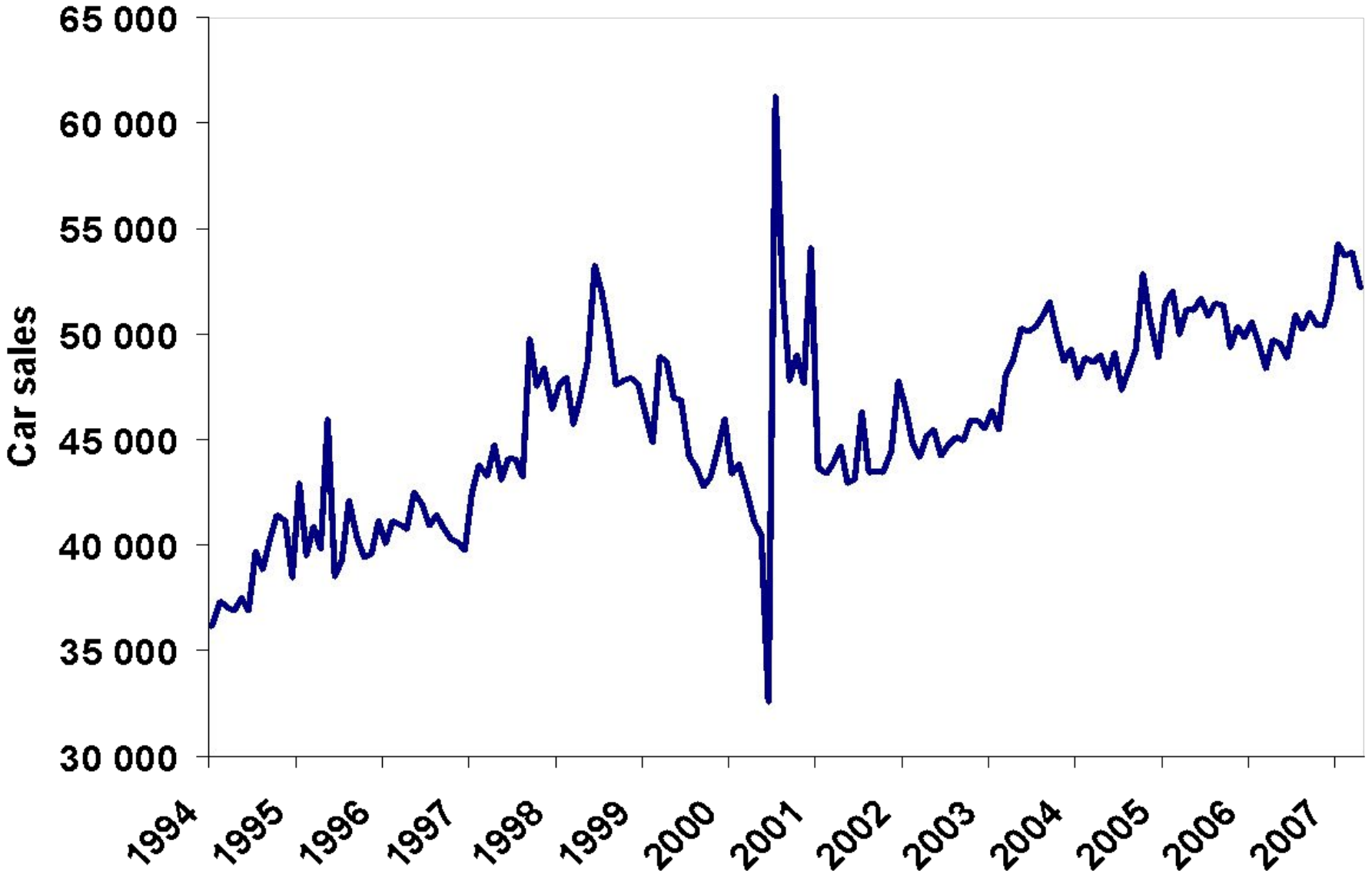
The Business Cycle

What happens during a business cycle?

The effect of the business cycle on car sales.

- Consumer durables are affected by the business cycle more than non-durables.
- People postpone buying durables, particularly expensive items such as new cars, during a recession.

The effect of the business cycle on new car sales, Australia, 1994 – 2007: Figure 13.2



Source: Australian Bureau of Statistics (2007), *Sales of New Motor Vehicles, Australia*, Cat. No. 9314.0.

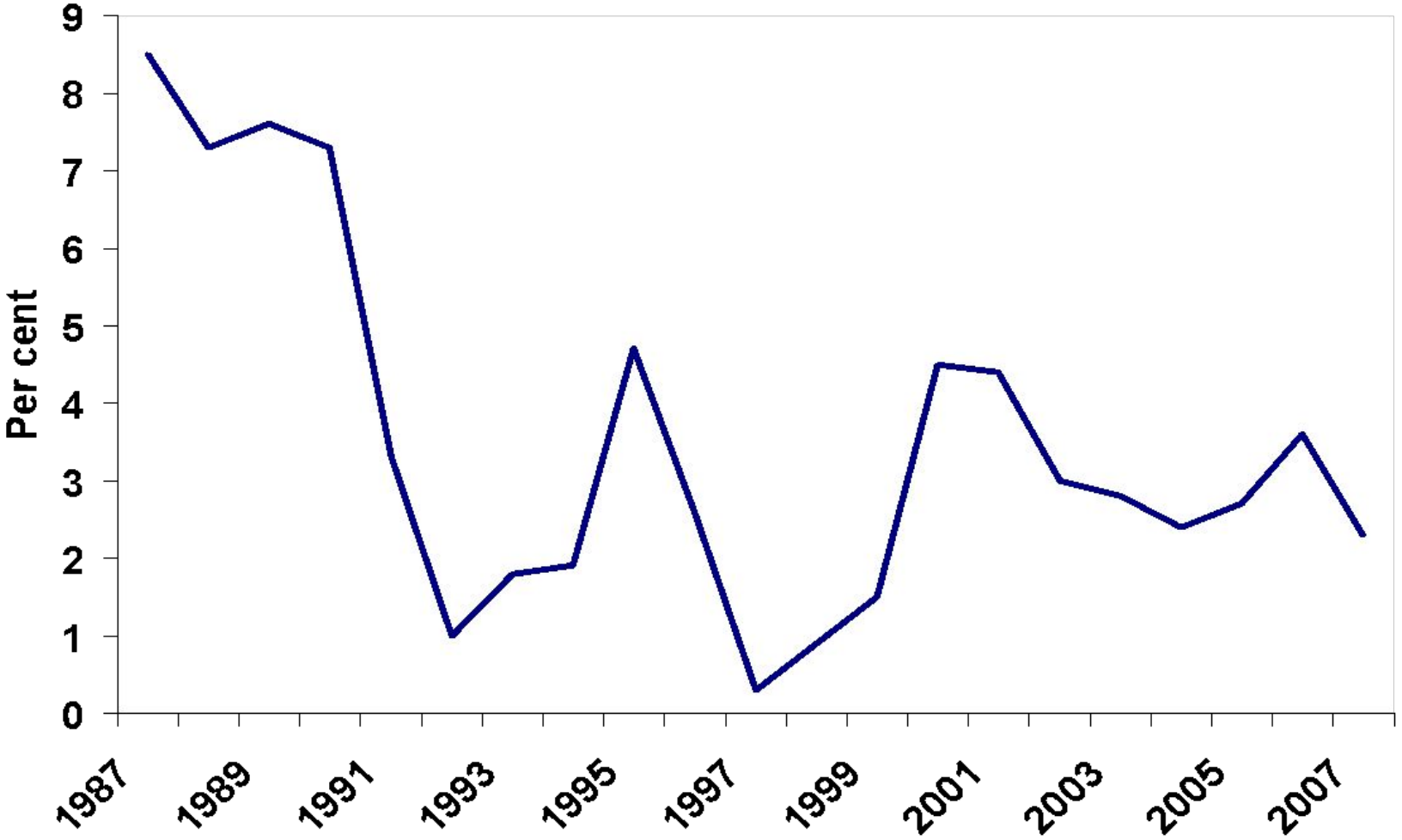
The Business Cycle

What happens during a business cycle?

The impact of a recession on the inflation rate.

- During economic expansions the inflation rate usually increases.
  - Exception: If the expansion is due to rising productivity levels and an expansion of potential GDP.
- During recessions the inflation rate usually decreases.
  - Exception: The recession is caused by a supply shock.

The impact of a recession on the inflation rate, Australia: Figure 13.3



Source: Reserve Bank of Australia (2007), *Statistics: Consumer Price Index, All Goods*, viewed 29 April 2008 at <www.rba.gov.au/statistics>

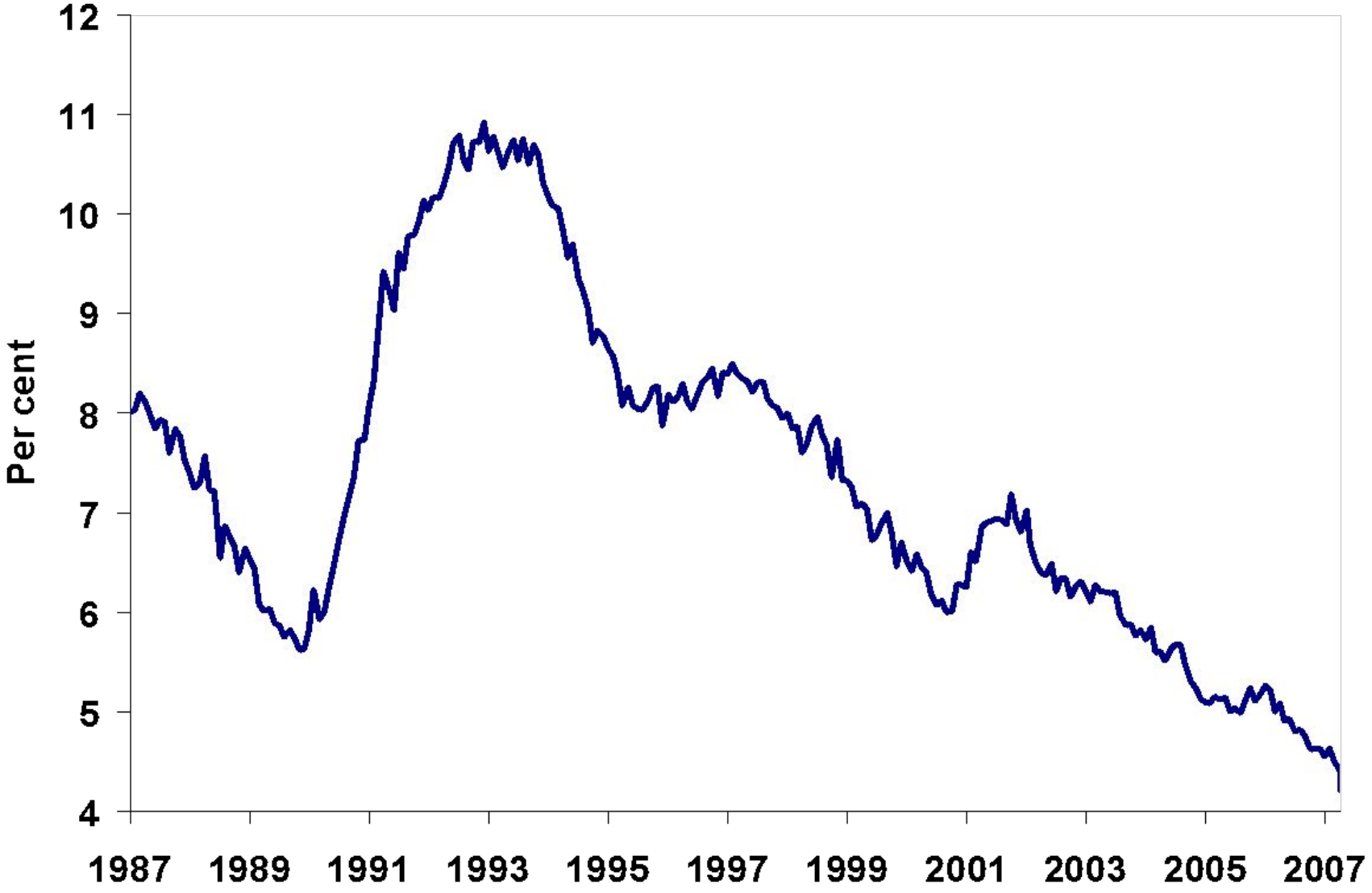
The Business Cycle

What happens during a business cycle?

The impact of a recession on the unemployment rate.

- Recessions cause the unemployment rate to increase.
- The rate of unemployment continues to rise *after* the recession is over, because:
  - Discouraged workers re-enter the labour force.
  - Firms continue to operate below capacity after the recession is over and may not re-hire workers for some time.

The impact of a recession on the unemployment rate, Australia: Figure 13.4



Source: Australian Bureau of Statistics (2007), *Labour Force: Electronic Delivery*, Cat. No. 6203.0.

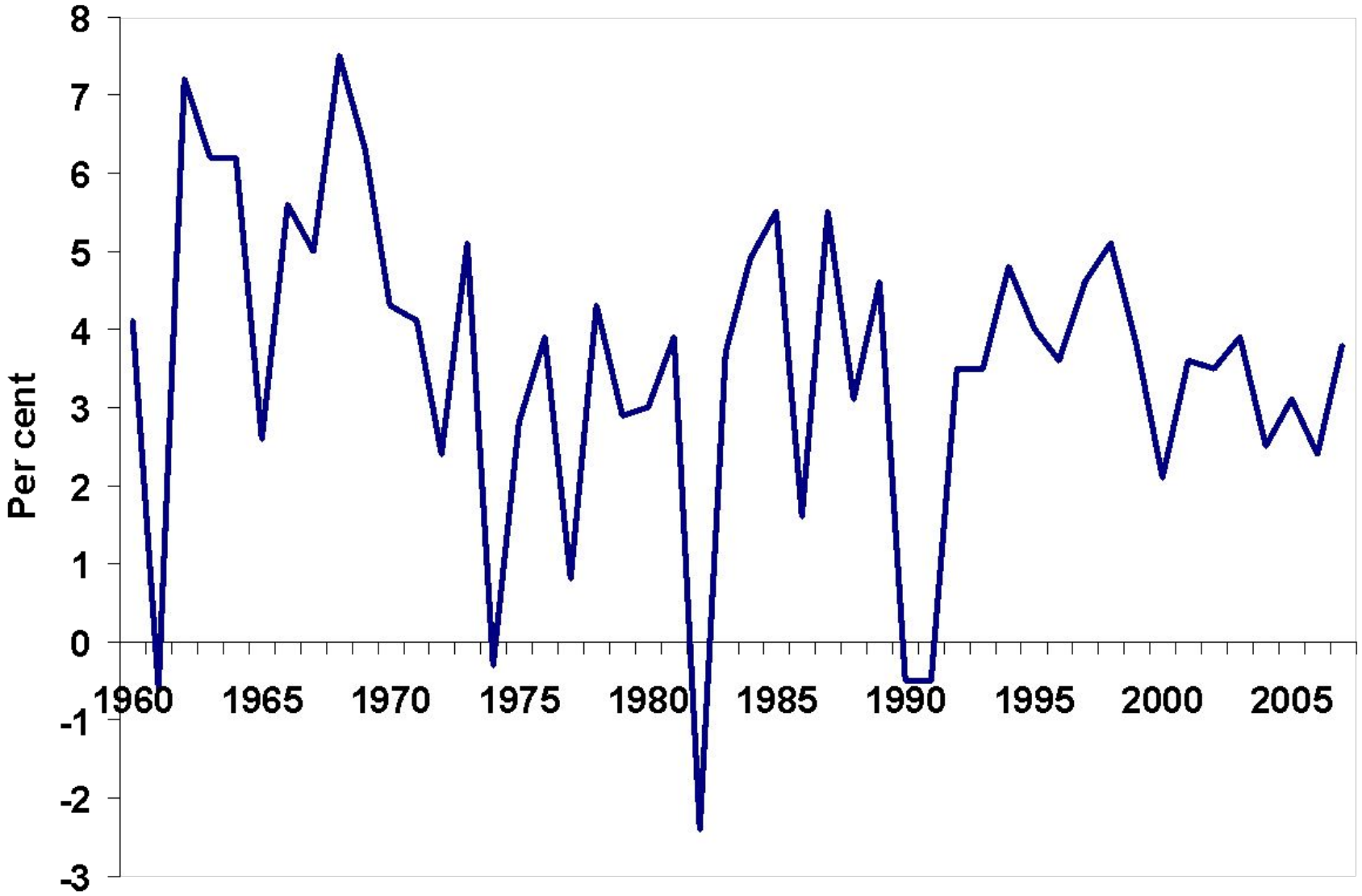
The Business Cycle

What happens during a business cycle?

Recessions are partly due to business cycles and partly due to economic shocks.

- 1974: Oil price shock – OPEC.
- 1982/83: High real wages and inflation.
- 1990: Government induced recession due to high interest rates.
- 2008/09: World financial crisis – credit shortage.

Fluctuations in real GDP, Australia, 1960-2007: Figure 13.5



Source: Australian Bureau of Statistics (2007), *Australian National Accounts*, Cat. No. 5206.0.

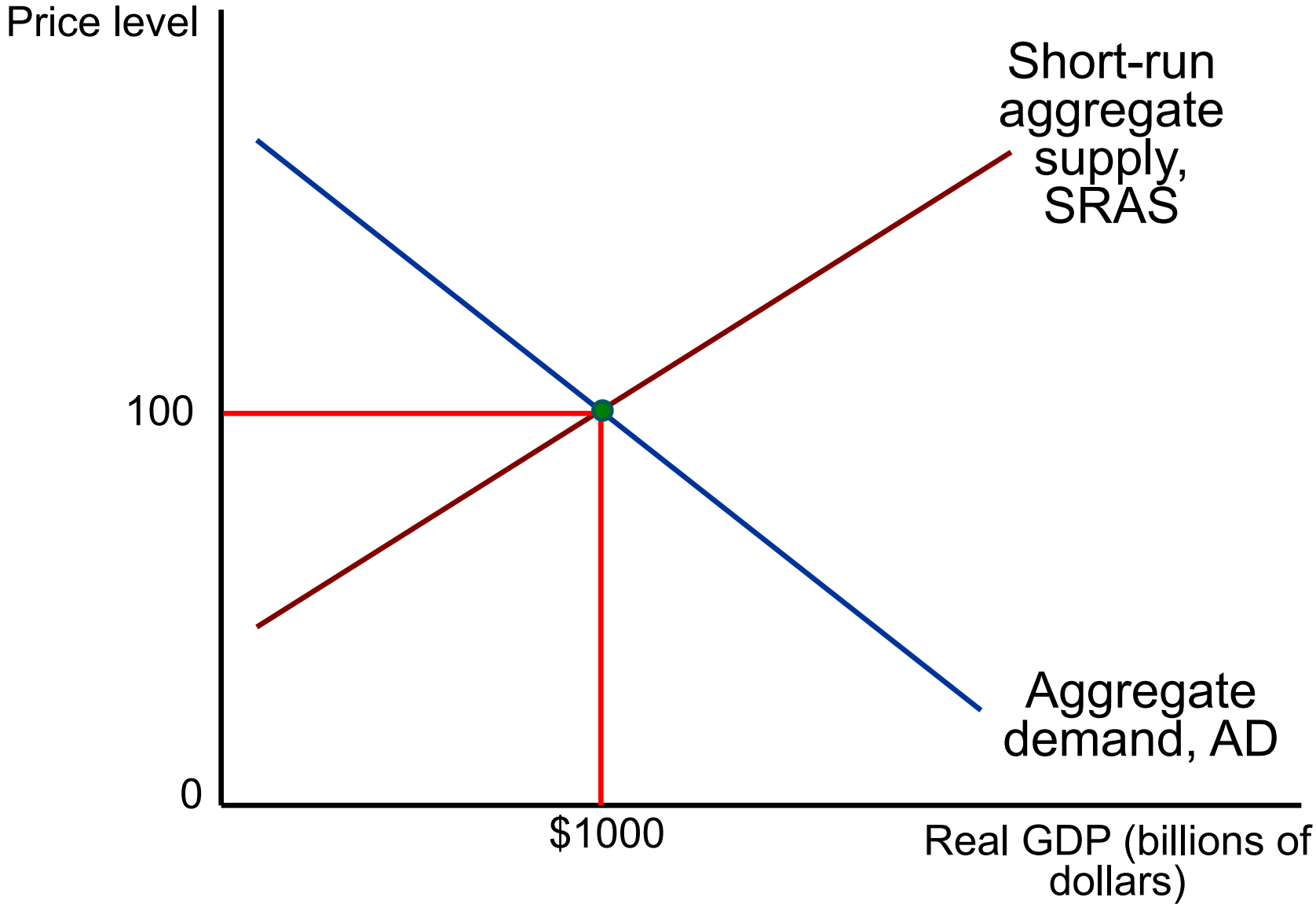
Aggregate Demand

- **Aggregate demand and aggregate supply model:** A model that explains short-run fluctuations in real GDP and the price level.
- Real GDP and the price level are determined in the short run by the intersection of the aggregate demand curve and the short-run aggregate supply curve.

Aggregate Demand

- **Aggregate demand curve (AD):** A curve showing the relationship between the price level and the quantity of real GDP demanded by households, firms and the government.
- **Short-run aggregate supply curve: (SRAS):** A curve showing the relationship in the short-run between the price level and the quantity of real GDP supplied by firms.

Aggregate demand and aggregate supply: Figure 13.6



Aggregate Demand

Why is the aggregate demand curve downward sloping?

1. The wealth effect
   - How a change in the price level affects consumption.
2. The interest rate effect
   - How a change in the price level affects investment.
3. The international-trade effect
   - How a change in the price level affects net exports.

Aggregate Demand

Shifts in the aggregate demand curve versus movements along it.

- The AD curve shows the relationship between the price level and the quantity of real GDP demanded, holding everything else constant.
- Changes in the price level are depicted as movements up or down a stationary aggregate demand curve.

Aggregate Demand

The variables that shift the aggregate demand curve:

1. Changes in government policies.
   - Examples: taxes; government purchases.
2. Changes in the expectations of households or firms.
3. Changes in foreign variables.
   - Examples: exchange rates; relative income levels between countries.

13.1 MAKING THE CONNECTION

The effect of exchange rates on sales

- During some years, the falling value of the Australian dollar against the New Zealand dollar reduced prices of Australian exports to New Zealand.

SOLVED PROBLEM

Determinants of Aggregate Demand

- Explain whether each of the following will cause a movement along or a shift of the Aggregate Demand (AD) curve.
- In each case, specify which of the four components of AD will be impacted, and explain how.

SOLVED PROBLEM

Determinants of Aggregate Demand

a) Rising interest rates cause a drop in consumer optimism as households become concerned about their ability to meet mortgage payments.

b) An increase in the price level decreases the value of superannuation accounts held by Australian households to fund their retirement.

c) The Australian dollar falls in value against the US dollar and other major currencies.

SOLVED PROBLEM

Determinants of Aggregate Demand

- STEP 1: Review the material. This question is intended to help differentiate between events that will cause a change in aggregate quantity demanded, (a movement along the aggregate demand curve), and a change in aggregate demand (a shift in the AD curve). The material is covered in the sections 'Why is the aggregate demand curve downward sloping?', and 'The variables that shift the aggregate demand curve'.

SOLVED PROBLEM

Determinants of Aggregate Demand

- STEP 2: Answering (a): Households become pessimistic about the future. In order to ensure they can continue to meet higher mortgage payments caused by rising interest rates, consumers spend less in the present. The AD curve will shift inwards to the left.
- STEP 3: Answering (b): This is an example of a change in the value of assets, or the wealth effect. Superannuation accounts are one of the most important assets for many Australians.
- An increase in the price level decreases the real value of superannuation funds.

SOLVED PROBLEM

Determinants of Aggregate Demand

- Aggregate quantity demanded will decrease as households spend less in order to contribute more to their superannuation. This is reflected in an upward movement along the AD curve.
- STEP 4: Answering (c): A fall in the value of the Australian dollar means it costs less in terms of other currencies to buy Australian dollars, and hence also goods, services and investments denominated in Australian dollars. Net exports should therefore increase, and this will be reflected in an increase in AD – a shift to the right of the AD curve.

Aggregate Supply

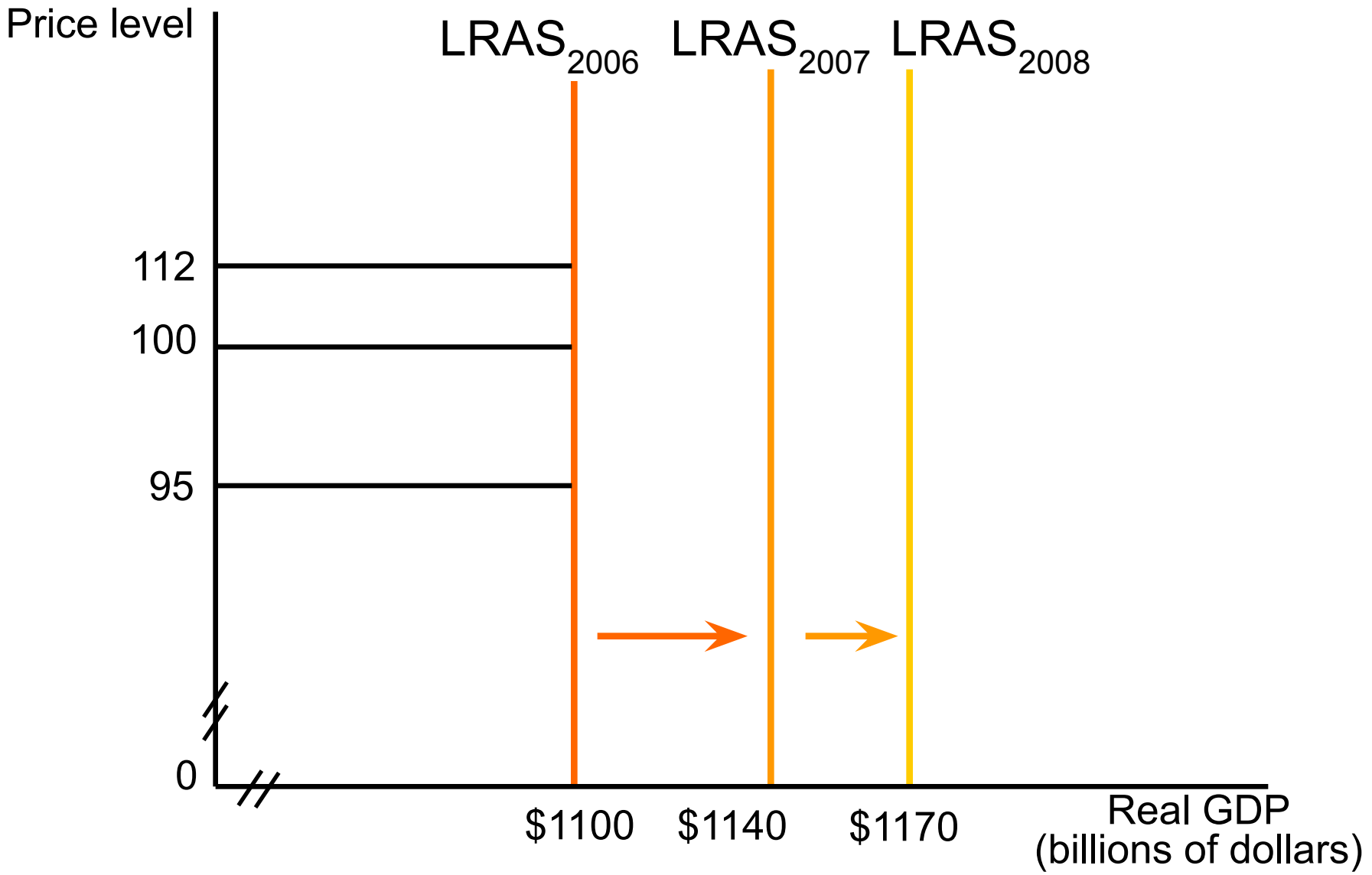
- **The long-run aggregate supply curve (LRAS)**: A curve showing the relationship in the long run between the price level and the quantity of real GDP supplied.
- The long-run aggregate supply curve shows that in the long run, increases in the price level **do not** affect the level of real GDP.
- The long-run aggregate supply curve is a vertical line at potential GDP.

Aggregate Supply

Shifts in the long-run aggregate supply curve.

- The LRAS curve shifts because potential real GDP increases over time.
- Increases in potential GDP (or economic growth) are due to:
  1. An increase in resources.
  2. An increase in machinery and equipment.
  3. New technology.

The long-run aggregate supply curve: Figure 13.7



Aggregate Supply

The short-run aggregate supply curve.

- The SRAS is upward sloping, showing that in the short-run firms will produce more in response to higher prices.
- The prices of inputs tends to rise more slowly than the prices of final products.
  - Contracts make some wages and prices 'sticky'.
  - Firms are often slow to adjust wages.
  - Menu costs make some prices sticky. **Menu costs** are costs to firms of changing prices.

Aggregate Supply

Shifts in the short-run aggregate supply curve versus movements along it.

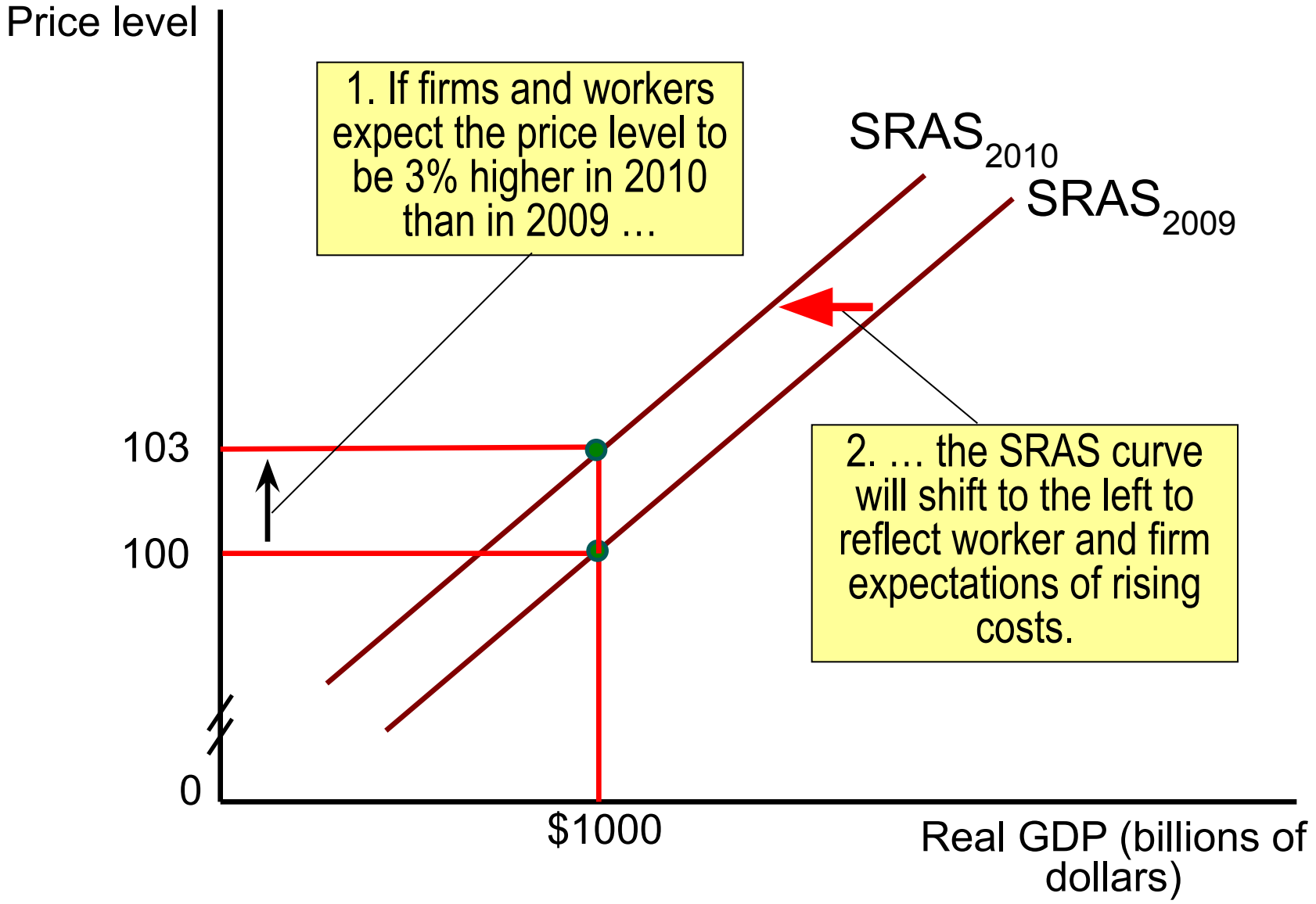
- The SRAS curve shows the short-run relationship between the price level and the quantity of goods and services firms are willing to supply, holding everything else constant.
- Changes in the price level are depicted as movements up or down a stationary short-run aggregate supply curve.

Aggregate Supply

Variables that shift the SRAS curve.

1. Expected changes in the future price level.
2. Adjustments of workers and firms to errors in past expectations about the price level.
3. Unexpected changes in the price of an important natural resource.

How expectations of the future price level affect the short-run aggregate supply: Figure 13.8



Aggregate Supply

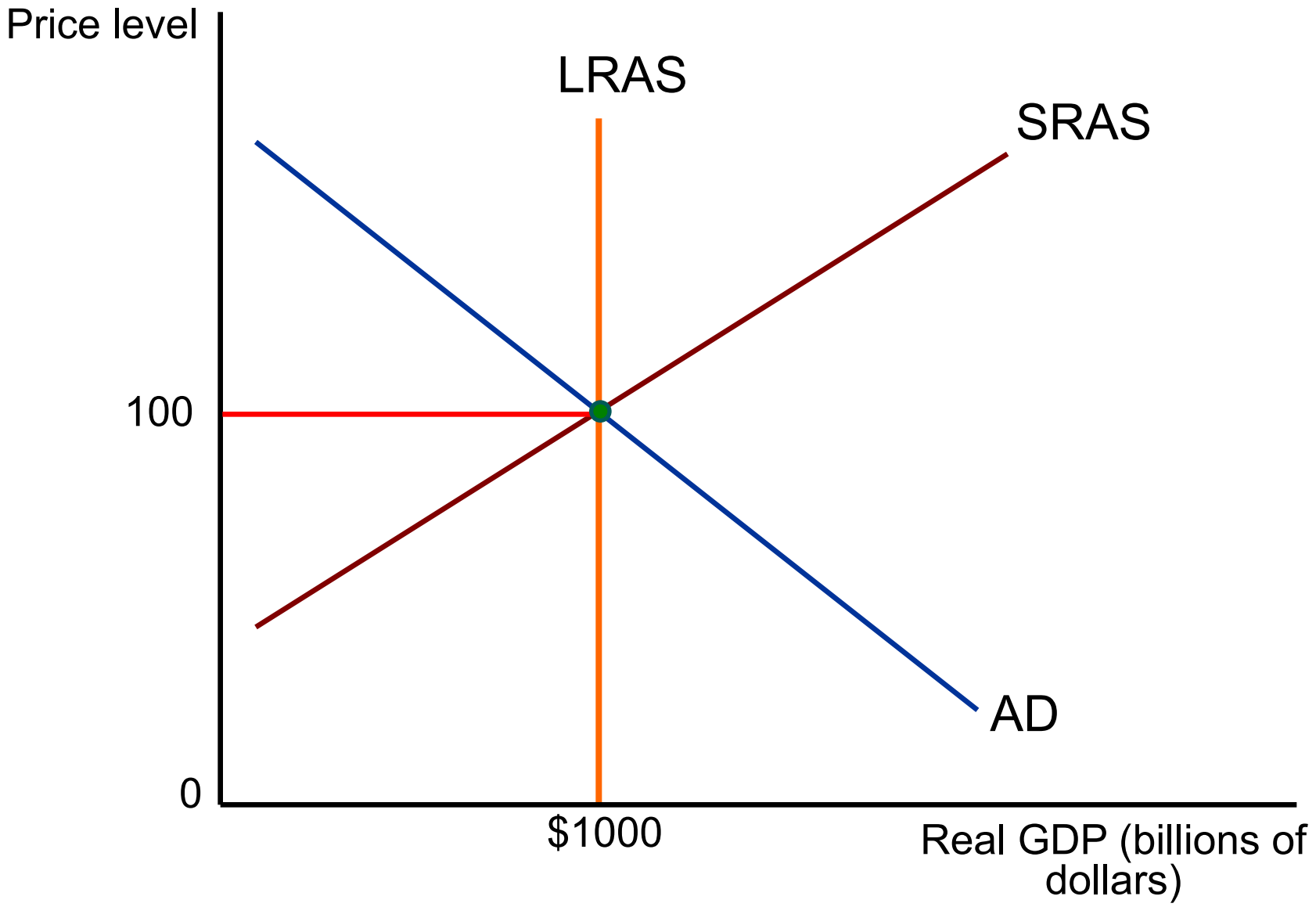
Variables that shift the short-run and the long-run aggregate supply curves.

1. Increases in the labour force and/or in the capital stock, and/or in resources.
2. Technological change.

Macroeconomic equilibrium in the long run and the short run

- In long-run equilibrium, the aggregate demand and short-run aggregate supply curves intersect at a point along the long-run aggregate supply curve.

Long-run macroeconomic equilibrium: Figure 13.9



Macroeconomic equilibrium in the long run and the short run

Recessions, expansions and supply shocks.

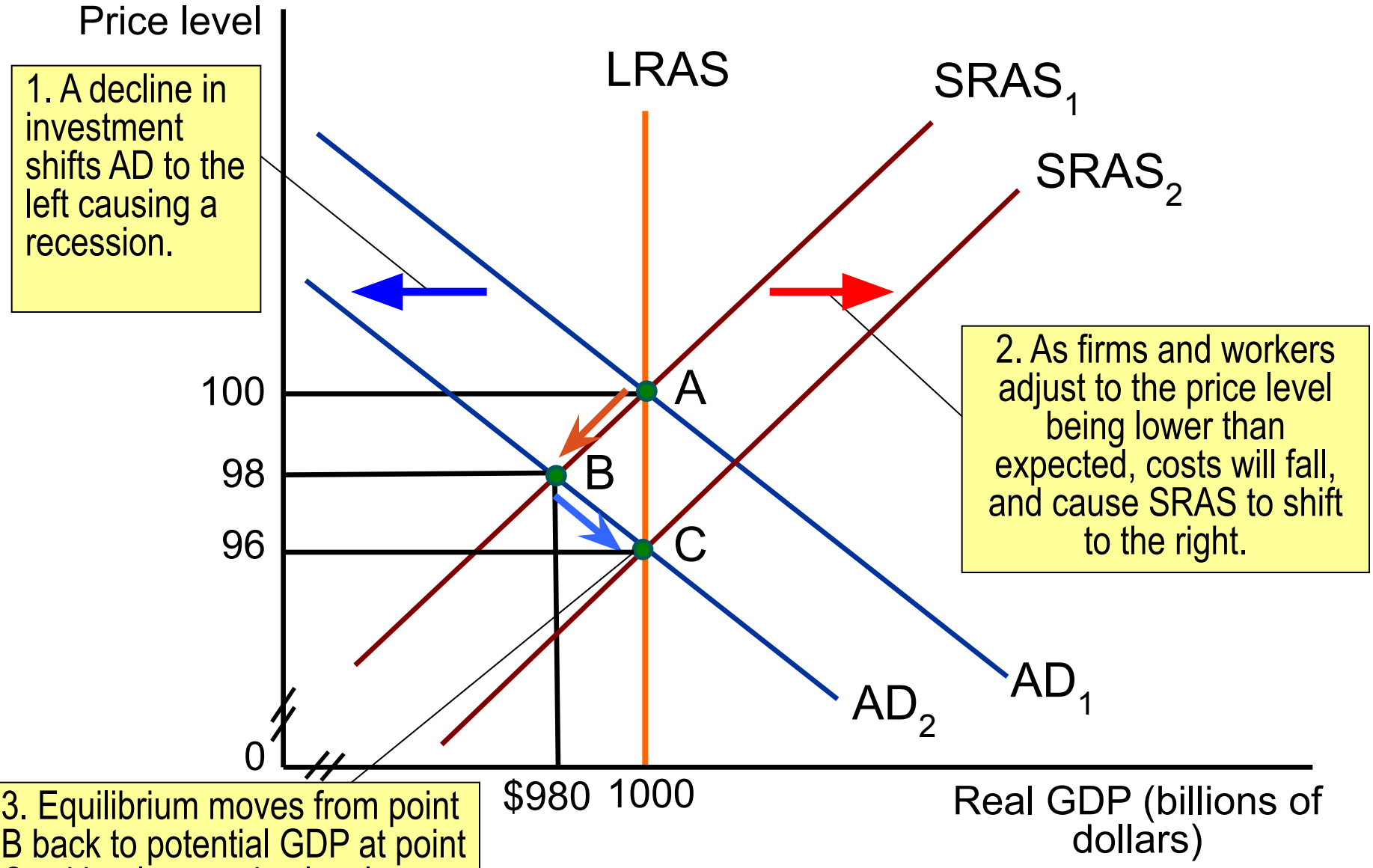
- The following analysis of the aggregate demand and aggregate supply model begins with a simplified case, using two assumptions:
  1. The price level is currently at 100, and workers and firms expect it to remain at 100 in the future.
  2. Potential GDP is at $1000 billion and will remain at that level in the future.

Macroeconomic equilibrium in the long run and the short run

Recession

1. The short-run effect of a decline in aggregate demand.
   - AD curve shifts left, and real GDP declines.
2. Adjustment back to potential GDP in the long run.
   - *Automatic adjustment mechanism*: SRAS curve shifts right, (which may take several years).

The short-run and long-run effects of a decrease in aggregate demand: Figure 13.10

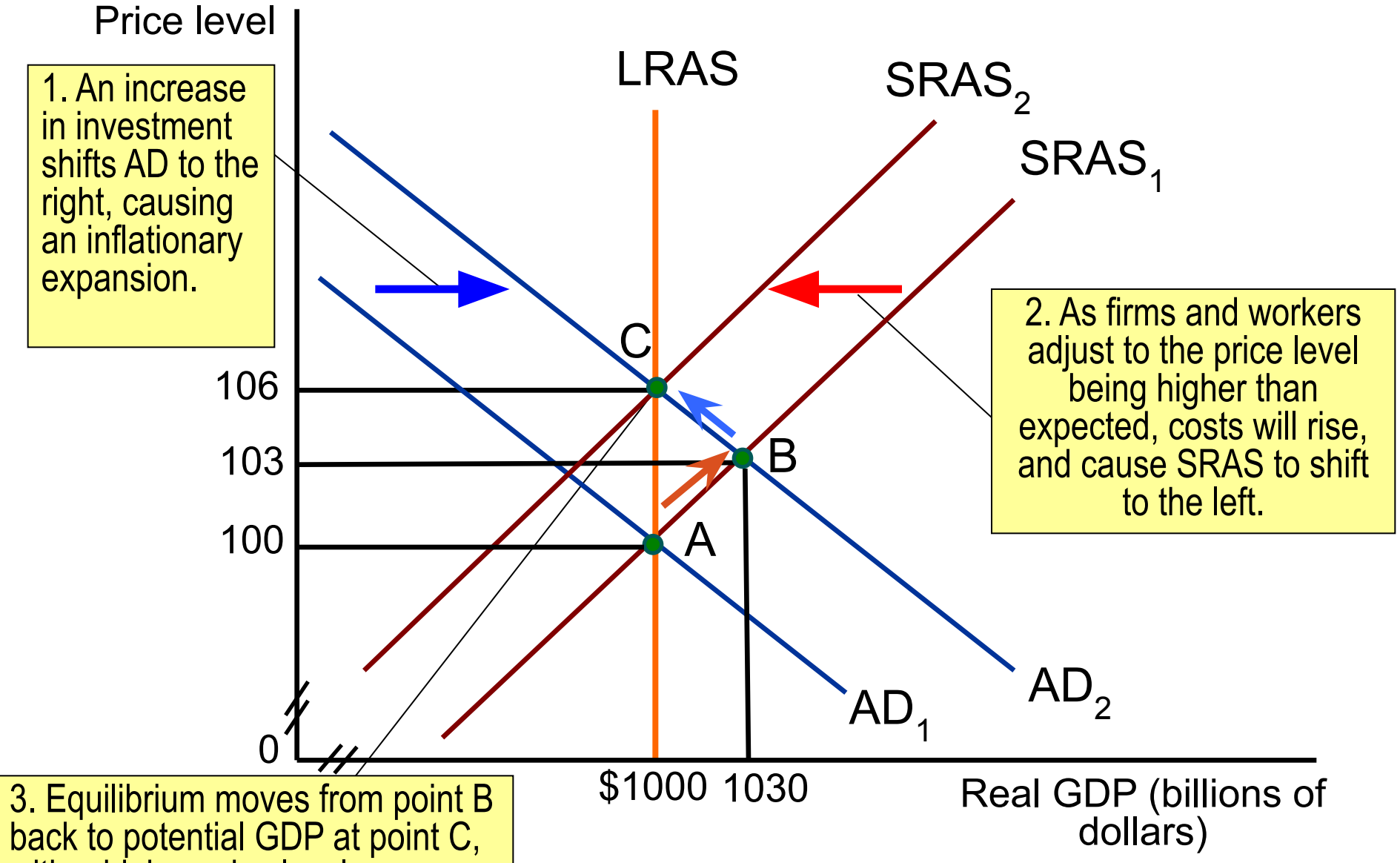


Macroeconomic equilibrium in the long run and the short run

Expansion

1. The short-run effect of an increase in aggregate demand.
   - AD curve shifts right, real GDP and the price level rise.
2. Adjustment back to potential GDP in the long run.
   - *Automatic adjustment mechanism*: SRAS curve shifts left, (which may take a year or more).

The short-run and long-run effects of an increase in aggregate demand: Figure 13.11



Macroeconomic equilibrium in the long run and the short run

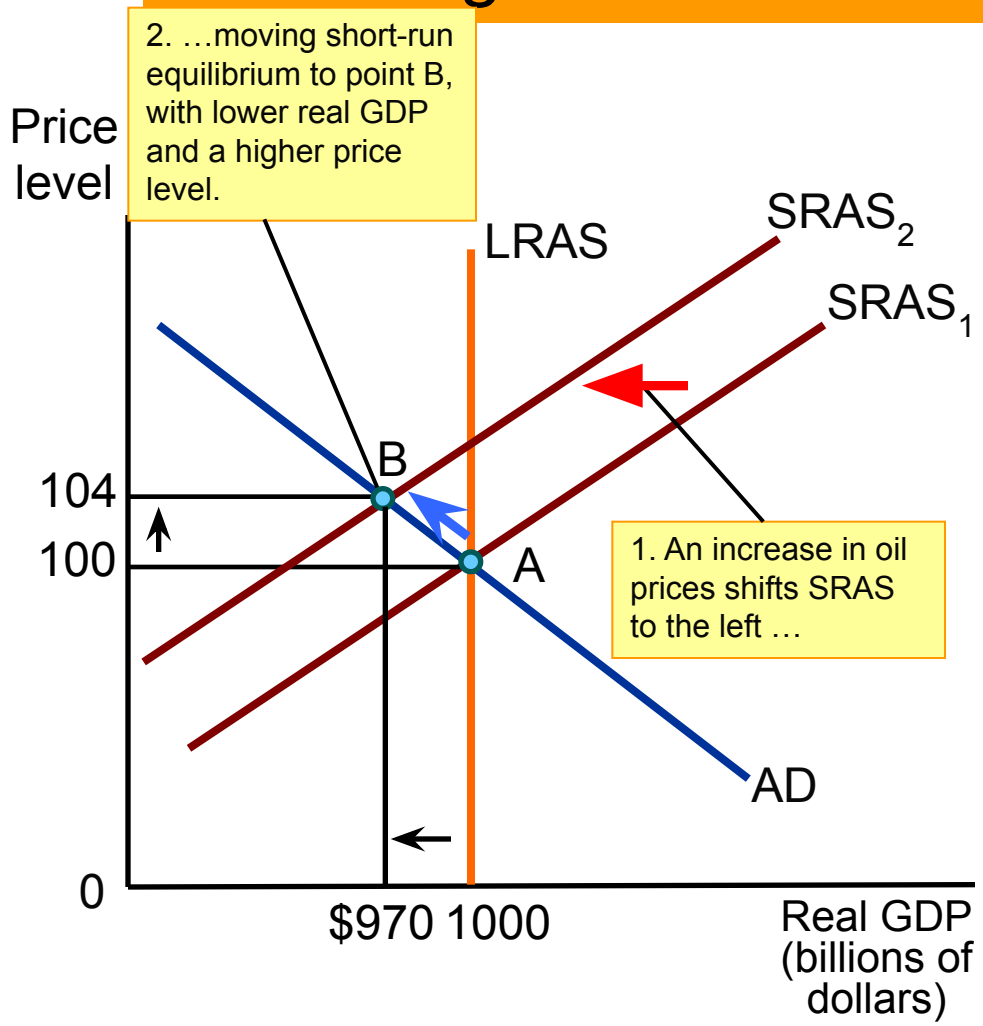
- **Supply shock:** An unexpected event that causes the short-run aggregate supply curve to shift.
- **Stagflation**: A combination of inflation and recession, usually resulting from a supply shock.

Macroeconomic equilibrium in the long run and the short run

Supply shock

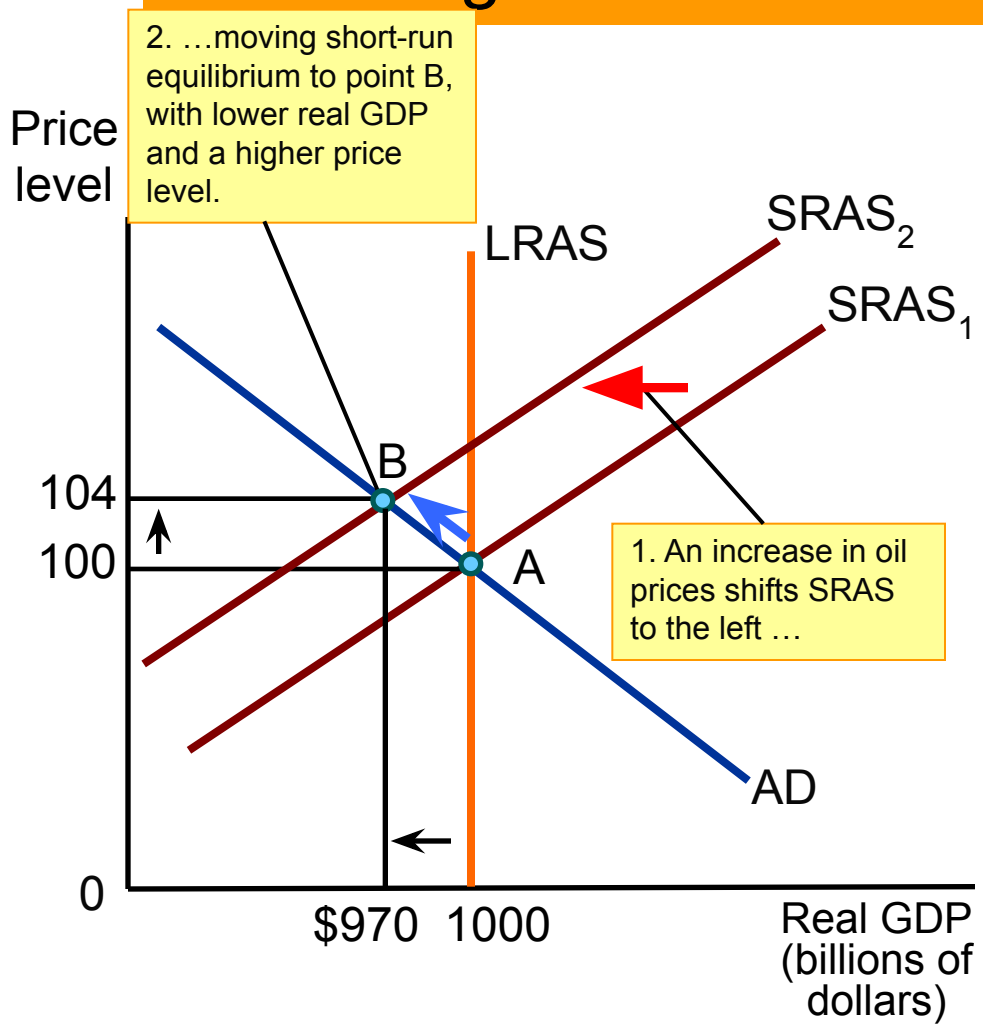
1. The short-run effect of a supply shock.
   - SRAS curve shifts left, real GDP falls and the price level rises.
2. Adjustment back to potential GDP in the long run.
   - SRAS curve shifts right, (which may take several years).

The short-run and long-run effects of a supply shock: Figure 13.12

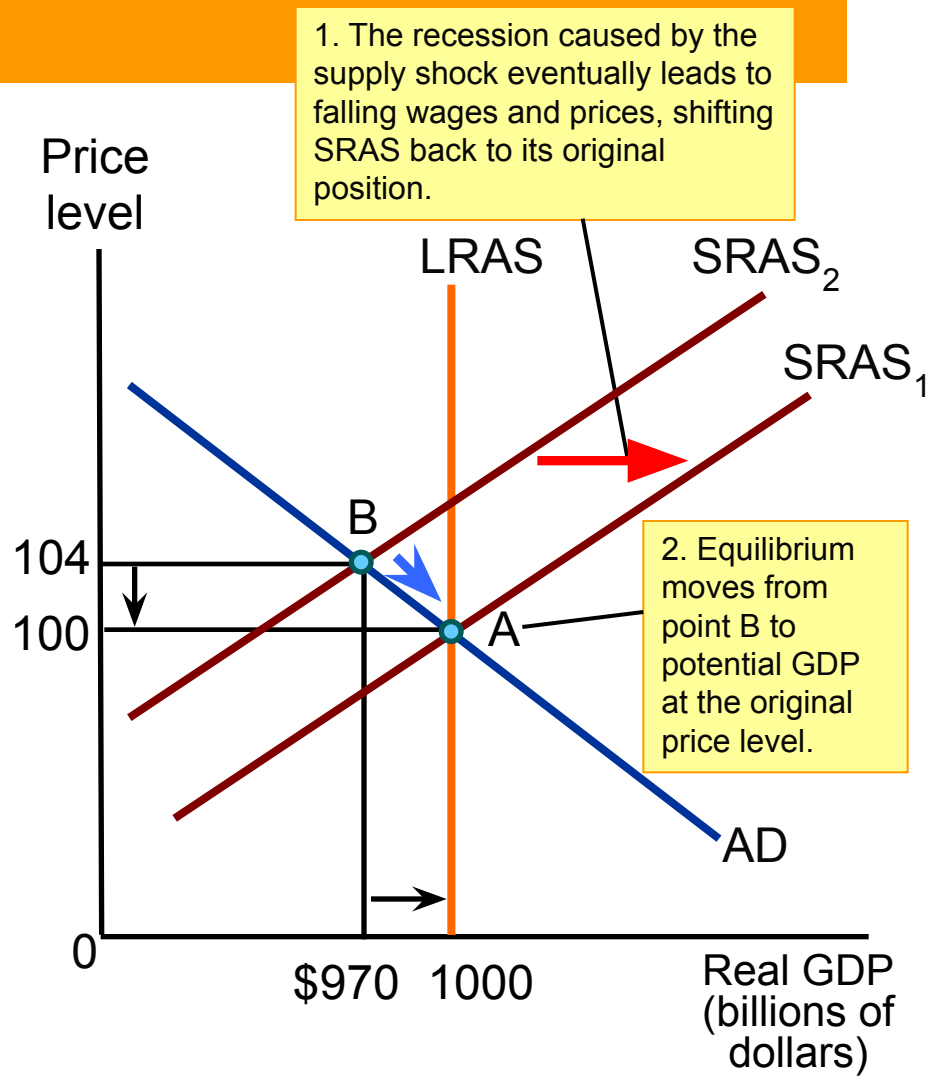


(a) A recession with a rising price level – the short-run effect of a supply shock.

The short-run and long-run effects of a supply shock: Figure 13.12



(a) A recession with a rising price level – the short-run effect of a supply shock.



(b) Adjustment back to potential GDP – the long-run effect of a supply shock.

SOLVED PROBLEM

Using the Aggregate Demand Aggregate Supply model.

- Assume the economy is initially in equilibrium with long-run aggregate supply (LRAS) constant. Now suppose growing GDP in China and India leads to an increase in demand and higher prices for Australian resources. Explain both the initial change in equilibrium and the longer term effect.

SOLVED PROBLEM

Using the Aggregate Demand Aggregate Supply model.

- STEP 1: Review the chapter material. The basic equilibrium model is explained in the section on 'Macroeconomic equilibrium in the long run and in the short run'.
- STEP 2: An increase in demand for Australian exports will cause an increase in AD represented by a rightward shift of the AD curve. Short-run equilibrium will move beyond potential GDP, causing an increase in the price level.

SOLVED PROBLEM

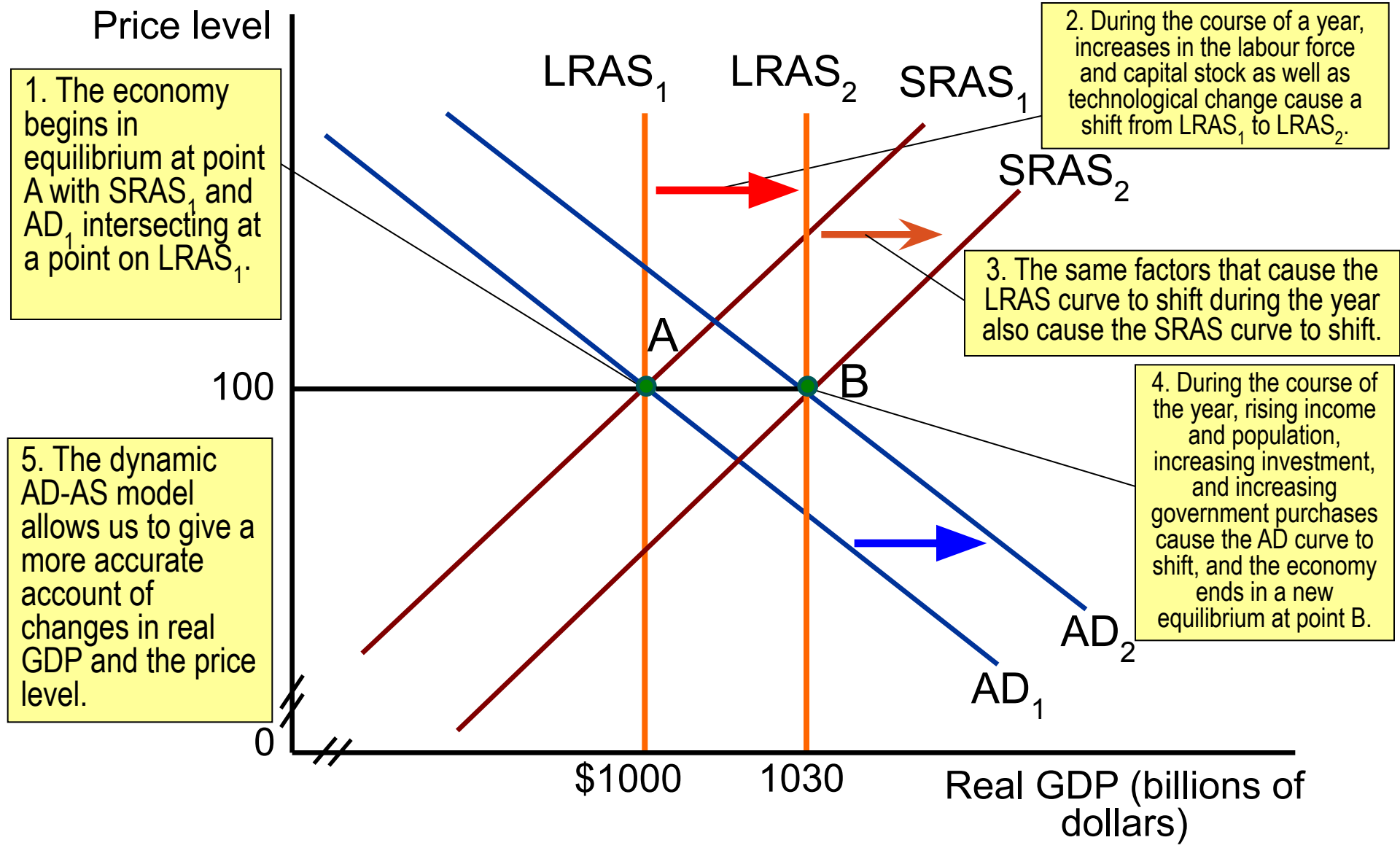
Using the Aggregate Demand Aggregate Supply model.

- The price level is now higher than workers and firms had expected. As workers and firms adjust to the higher price level, prices and wages rise, and the short-run aggregate supply curve shifts inwards to the left.
- Equilibrium moves back to potential GDP, but at a higher price level.

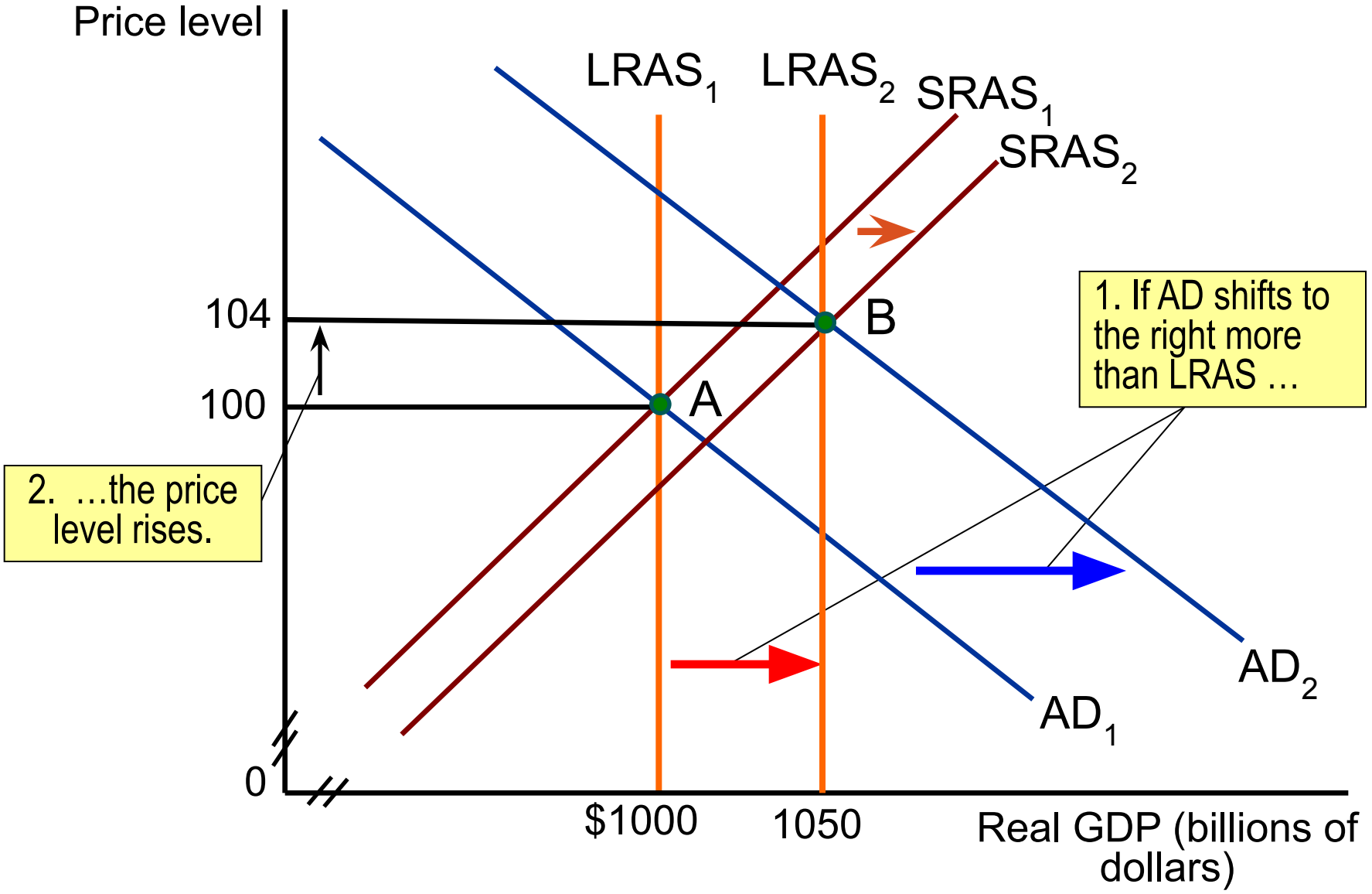
A dynamic aggregate demand and aggregate supply model

- A dynamic aggregate demand and aggregate supply model can be created by making three changes to the basic model:
  1. Potential real GDP increases continually, shifting the long-run aggregate supply curve to the right.
  2. During most years the aggregate demand curve will be shifting to the right.
  3. Except during periods when workers and firms expect high rates of inflation, the short-run aggregate supply curve will be shifting to the right.

A dynamic aggregate demand and aggregate supply model: Figure 13.13



Using dynamic aggregate demand and aggregate supply to understand inflation: Figure 13.14



13.2 MAKING THE CONNECTION

Does rising productivity growth reduce employment?

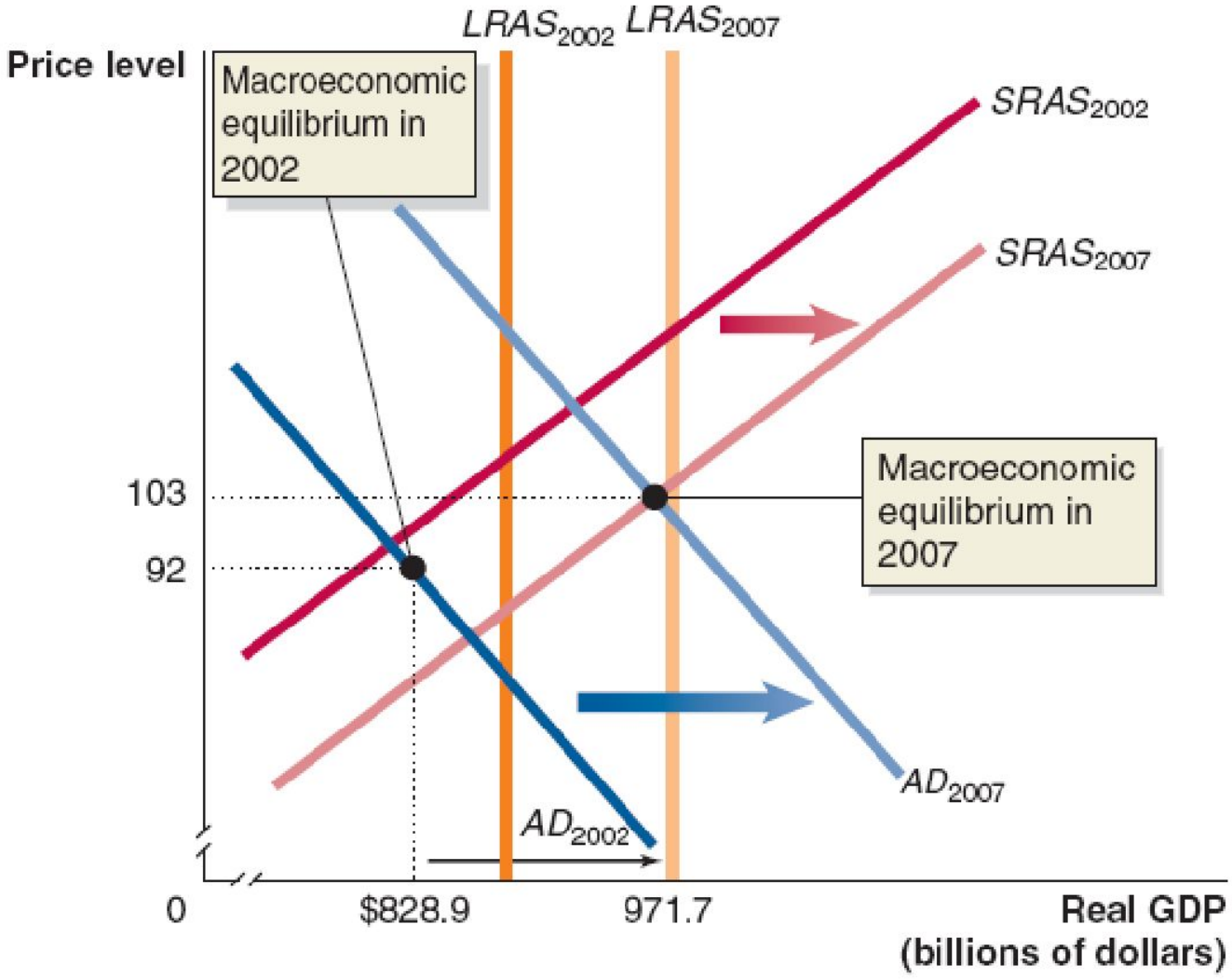
- New technology and equipment increases labour productivity.

An Inside Look

- JB Hi-Fi reports sales up 36% and net profit after tax up 56%.

An Inside Look

Figure 1: Australian economic expansion between 2002 and 2007



Key Terms

- Aggregate demand and aggregate supply model
- Aggregate demand curve (AD)
- Business cycle
- Long-run aggregate supply curve (LRAS)
- Menu costs
- Short-run aggregate supply curve (SRAS)
- Stagflation
- Supply shock

Get Thinking!

At various times, the Australian dollar increases in value against the US dollar and other major currencies. At the same time, higher education continues as an important component of Australia's export revenue. The cost of education in Australia therefore increases when the Australian dollar rises relative to other currencies.

Discuss with your fellow students from other countries the role the changing value of the Australian dollar played in their decision to study in Australia.

Explain the impact that such changes have on the net export component of aggregate demand, and hence aggregate demand, ceteris paribus.

Check Your Knowledge

Q1. From a trough to a peak, the economy goes through:

a. The recession phase of the business cycle.

b. The expansion phase of the business cycle.

c. A contraction.

d. A depression.

Check Your Knowledge

Q1. From a trough to a peak, the economy goes through:

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Check Your Knowledge

Q2. During the early stages of a recovery:

a. Firms usually rush to hire new employees before other firms employ them.

b. Firms are usually reluctant to hire new employees.

c. The rate of unemployment surges dramatically.

d. The rate of unemployment decreases dramatically.

Check Your Knowledge

Q2. During the early stages of a recovery:

a. Firms usually rush to hire new employees before other firms employ them.

b. Firms are usually reluctant to hire new employees.

c. The rate of unemployment surges dramatically.

d. The rate of unemployment decreases dramatically.

Check Your Knowledge

Q3. The aggregate demand curve shows the relationship between the price level and the quantity of real GDP demanded by:

a. Households.

b. Firms.

c. The government.

d. All of the above.

Check Your Knowledge

Q3. The aggregate demand curve shows the relationship between the price level and the quantity of real GDP demanded by:

a. Households.

b. Firms.

c. The government.

d. All of the above.

Check Your Knowledge

Q4. Which of the following factors do not cause the aggregate demand curve to shift?

a. A change in the price level.

b. A change in government policies.

c. A change in the expectations of households and firms.

d. A change in foreign factors.

Check Your Knowledge

Q4. Which of the following factors do not cause the aggregate demand curve to shift?

a. A change in the price level.

b. A change in government policies.

c. A change in the expectations of households and firms.

d. A change in foreign factors.

Check Your Knowledge

Q5. How can government policies shift the aggregate demand curve to the right?

a. By increasing personal income taxes.

b. By increasing business taxes.

c. By increasing government purchases.

d. All of the above.

Check Your Knowledge

Q5. How can government policies shift the aggregate demand curve to the right?

a. By increasing personal income taxes.

b. By increasing business taxes.

c. By increasing government purchases.

d. All of the above.

Check Your Knowledge

Q6. Which of the following statements is true?

a. In the long run, increases in the price level result in an increase in real GDP.

b. In the long run, increases in the price level result in a decrease in real GDP.

c. In the long run, increases in the price level result in no change in real GDP.

d. In the long run, increases in the price level may increase or decrease real GDP.

Check Your Knowledge

Q6. Which of the following statements is true?

a. In the long run, increases in the price level result in an increase in real GDP.

b. In the long run, increases in the price level result in a decrease in real GDP.

c. In the long run, increases in the price level result in no change in real GDP.

d. In the long run, increases in the price level may increase or decrease real GDP.

Check Your Knowledge

Q7. Which of the following would shift both the short-run and the long-run aggregate supply curves?

a. A higher expected future price level.

b. An increase in the current price level.

c. A technological advance.

d. All of the above.

Check Your Knowledge

Q7. Which of the following would shift both the short-run and the long-run aggregate supply curves?

a. A higher expected future price level.

b. An increase in the current price level.

c. A technological advance.

d. All of the above.

Check Your Knowledge

Q8. Which of the following is usually the cause of stagflation?

a. Reductions in government spending.

b. Increases in investment.

c. Printing money to finance government expenditures.

d. An adverse supply shock.

Check Your Knowledge

Q8. Which of the following is usually the cause of stagflation?

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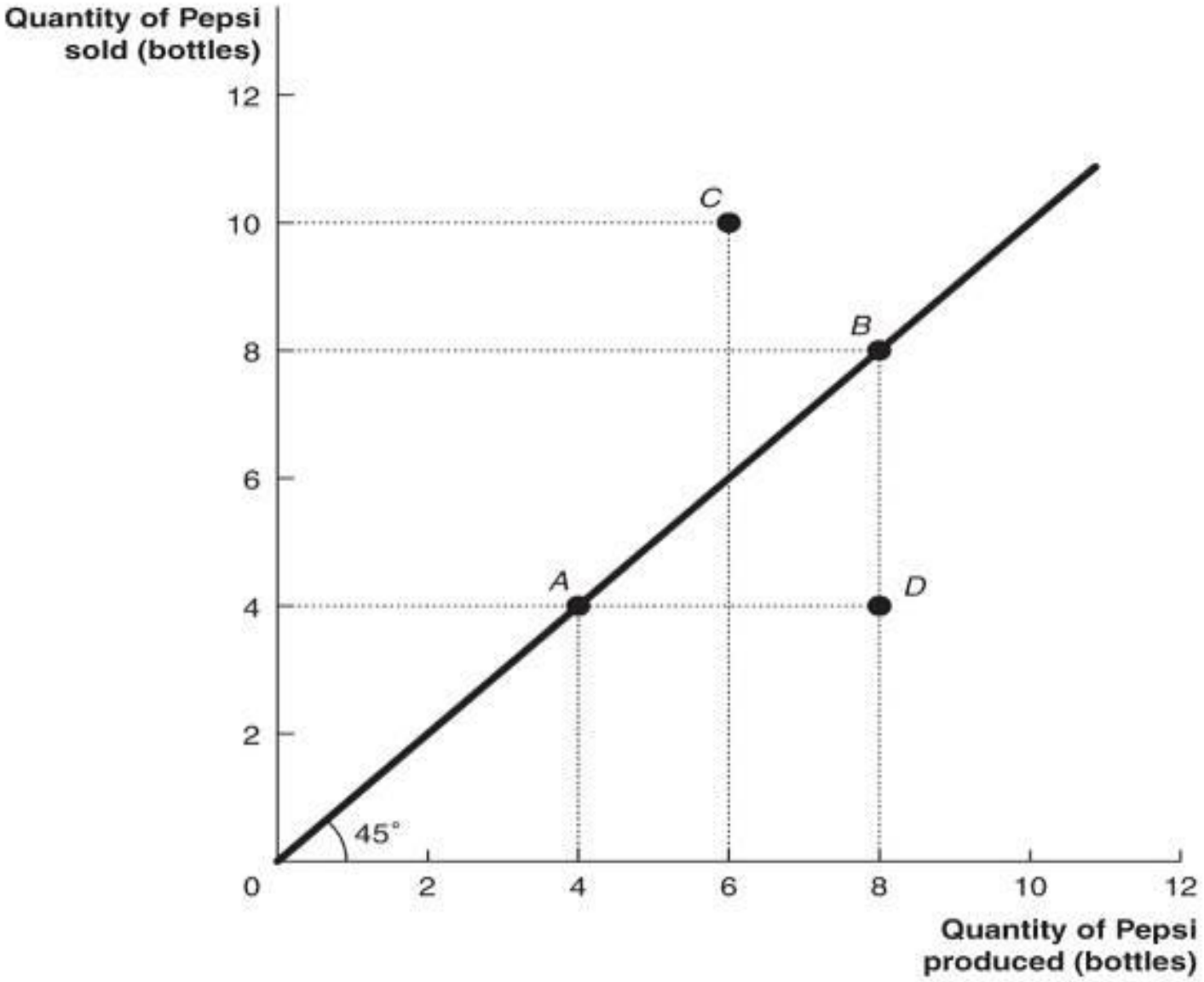
c. Printing money to finance government expenditures.

d. An adverse supply shock.

The aggregate expenditure model

- **Aggregate Expenditure Model:** A macroeconomic model that focuses on the relationship between total spending and real GDP, assuming the price level is constant.
- The model is composed of a graph called the 45° line diagram to illustrate macroeconomic equilibrium.
  - Sometimes the model is also known as the Keynesian cross diagram.

An example of a 45° line diagram: Figure 13A.1



The aggregate expenditure model

- **Aggregate Expenditure (AE):** The total amount of spending in the economy: the sum of consumption (C), planned investment (I), government purchases (G), and net exports (NX).

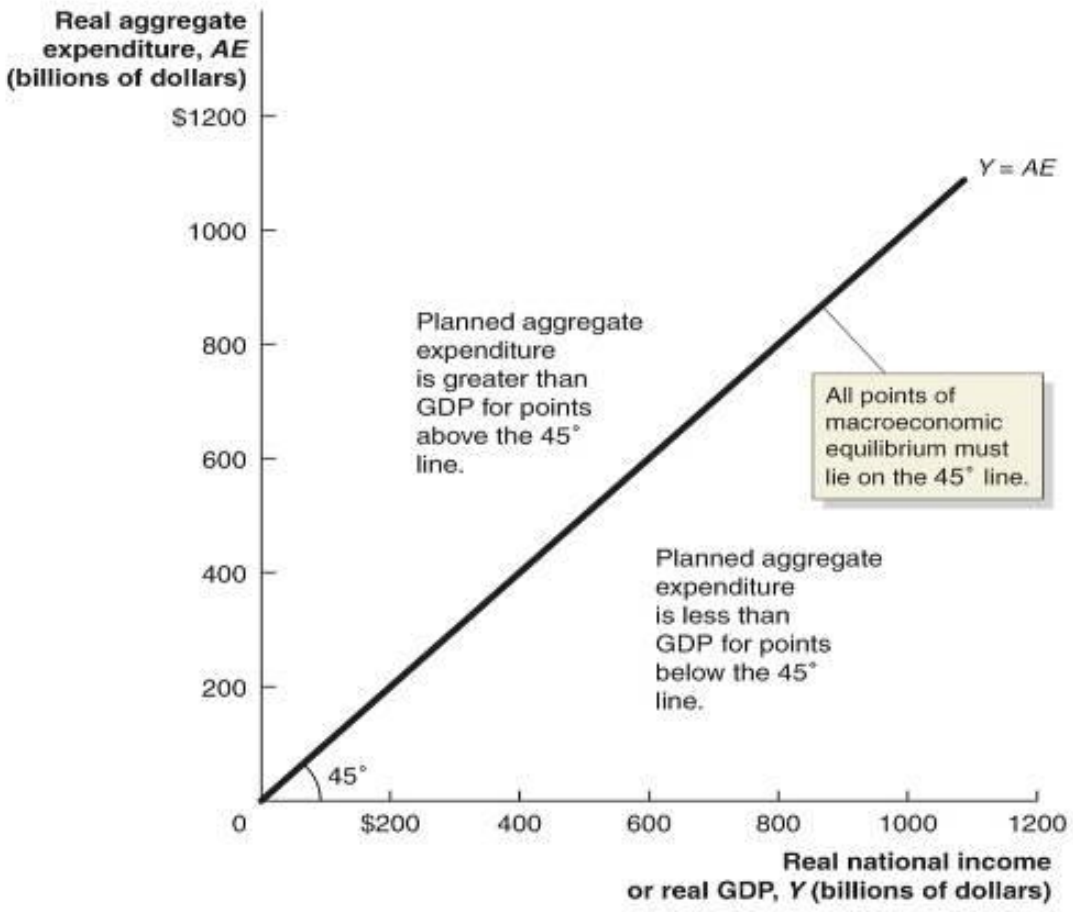
$$AE = C + I + G + NX$$

Graphing macroeconomic equilibrium

Using the 45° line diagram to illustrate macroeconomic equilibrium.

- The 45° line measures real national income against planned real aggregate expenditure.
- All points of macroeconomic equilibrium must lie along the 45° line.
  - At points above the 45° line, aggregate expenditures are greater than GDP.
  - At points below the 45° degree line, aggregate expenditures are less than GDP.

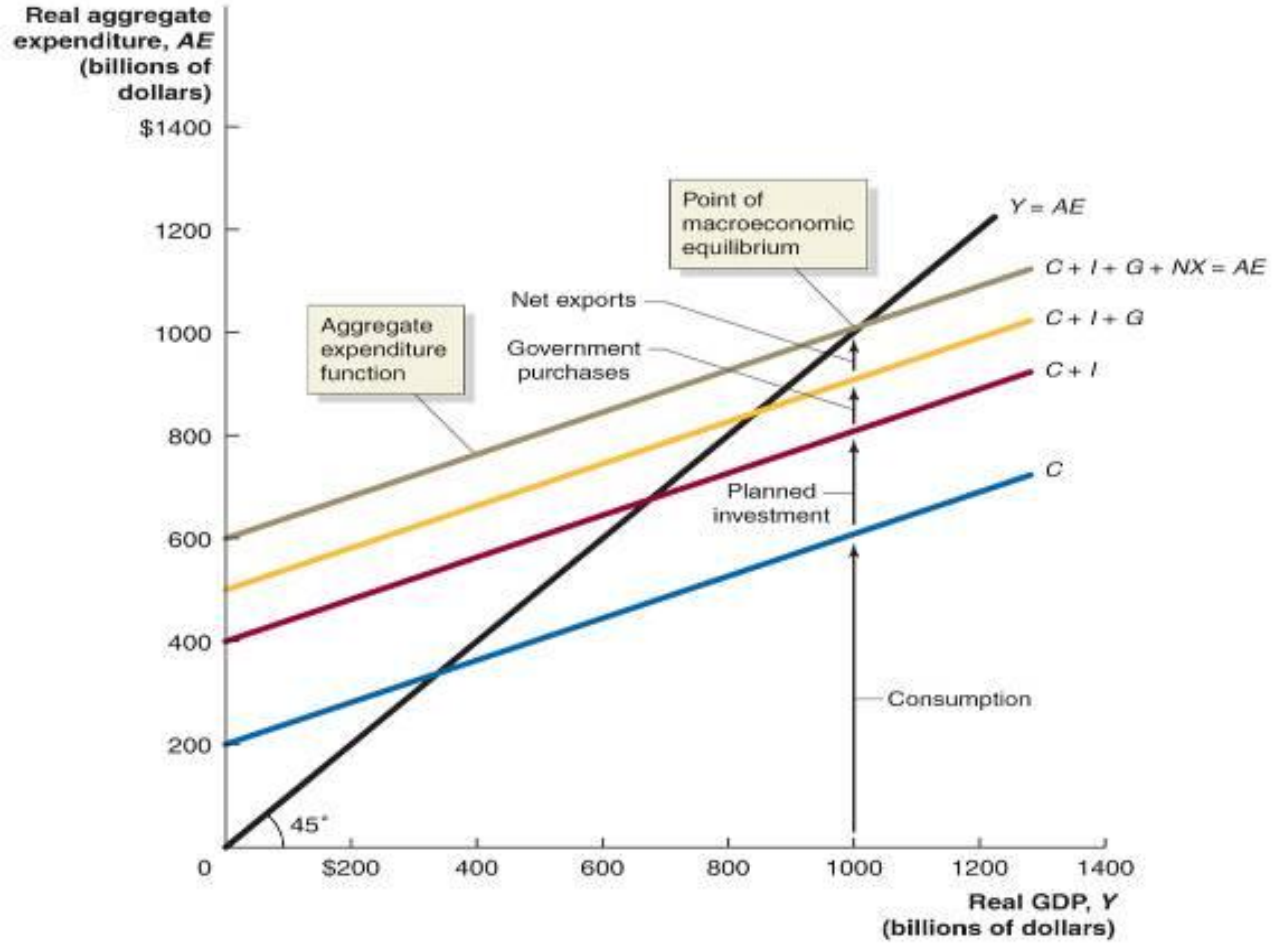
The relationship between planned aggregate expenditure and GDP on a 45° line diagram: Figure 13A.2



The aggregate expenditure model

- **Consumption function:** The relationship between consumption spending and disposable income.
  - The consumption function intersects the vertical axis on the 45° diagram at a point above zero due to autonomous consumption.
- **Autonomous consumption:** Consumption that is independent of income.
- **Induced consumption:** Consumption that is determined by the level of income.

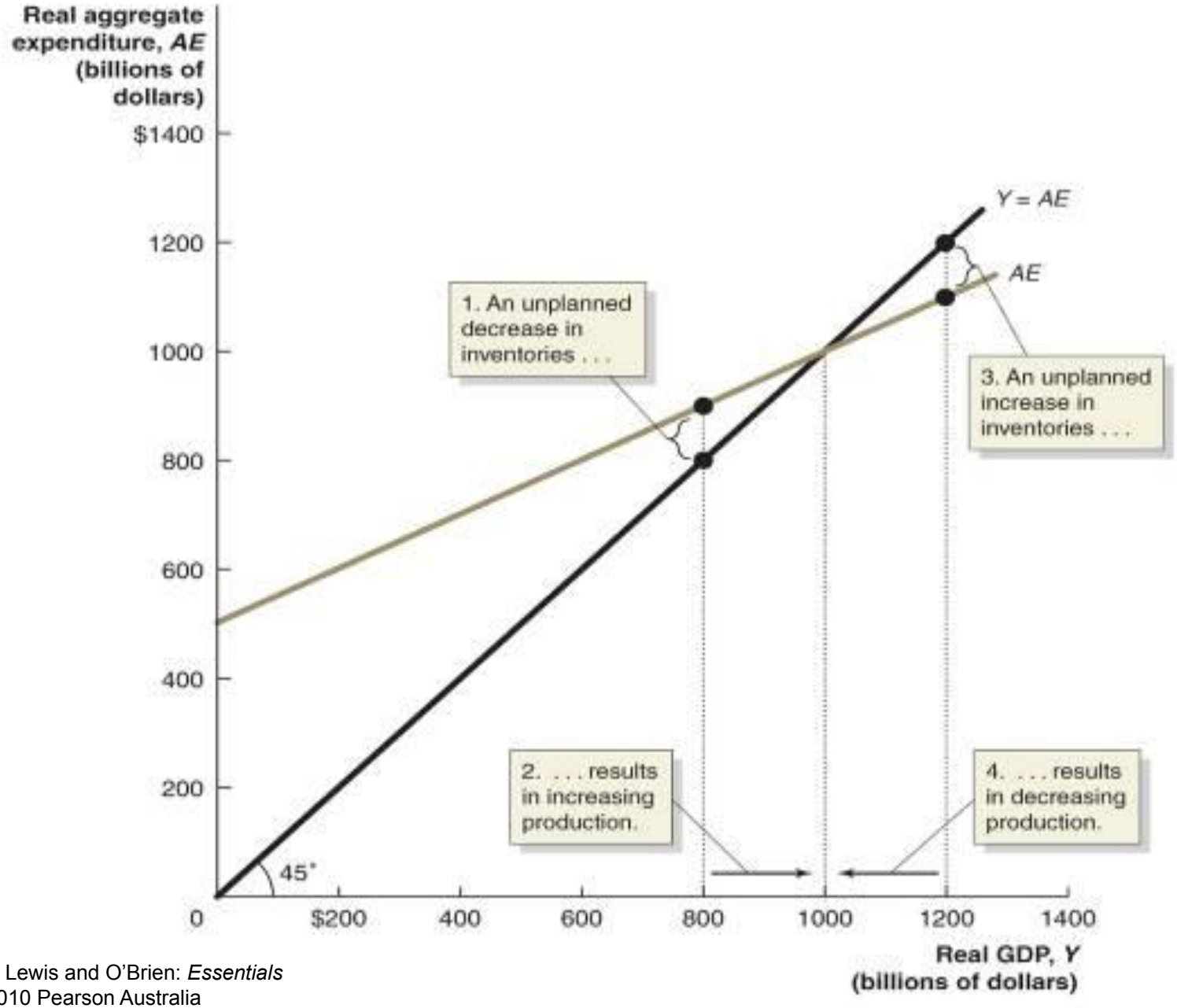
Macroeconomic equilibrium on the 45° line diagram: Figure 13A.3



The aggregate expenditure model

- The AE line intersects the 45° line at equilibrium real GDP.
- At points above the 45° line, planned aggregate expenditures are greater than GDP, inventories will fall, leading to an increase in production.
- At points below the 45° degree line, planned aggregate expenditures are less than GDP, firms will experience an unplanned increase in inventories, leading to a decrease in production.

Macroeconomic equilibrium : Figure 13A.4

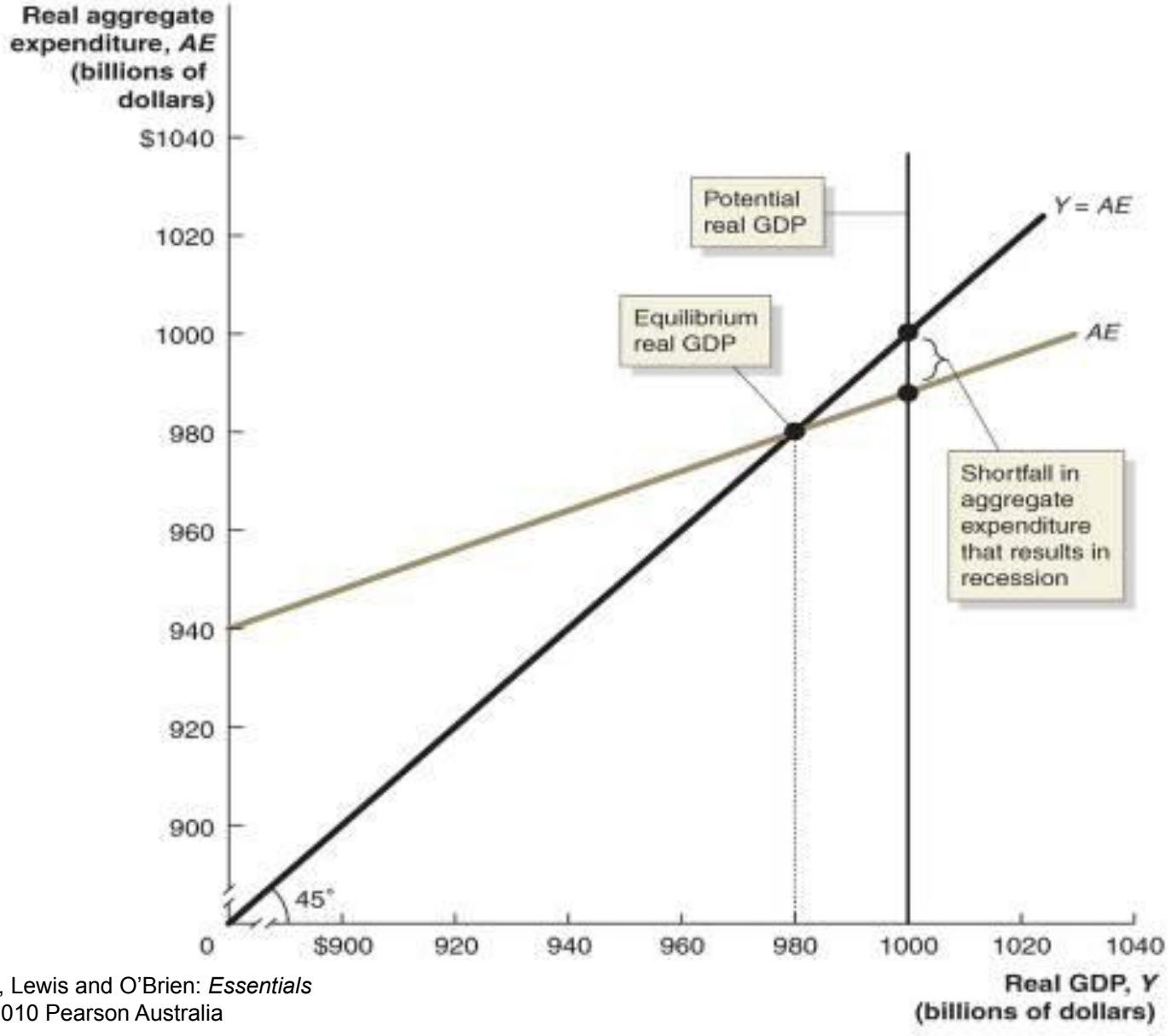


The aggregate expenditure model

Showing a recession on the 45° line diagram

- Macroeconomic equilibrium can occur at any point on the 45° line.
- Ideal to have equilibrium occur at potential real GDP.
- If there is insufficient aggregate spending, equilibrium will occur below potential real GDP: the economy will be in a recession.

Showing a recession on the 45° line: Figure 13A.5



Check Your Knowledge

QA1. The idea of the aggregate expenditure model is that, in any particular year, the level of gross domestic product (GDP) is determined mainly by:

a. The economy's endowment of economic resources and technology.

b. The level of interest rate for the economy as a whole.

c. The level of aggregate expenditures.

d. The level of government expenditures.

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Check Your Knowledge

QA2. Which of the following statements is correct?

a. Actual investment and planned investment are always the same.

b. Actual investment will equal planned investment only when inventories rise.

c. Actual investment will equal planned investment only when there is no unplanned change in inventories.

d. Actual investment and planned investment only when inventories decline.

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