Chapter 9: The Aggregate Demand (AD)–Aggregate Supply (AS) Model: Long-Run Analysis and Economic Growth

Learning Objectives

After studying this chapter, you should be able to

9.1 Derive the long-run aggregate supply curve and provide a rationale for its vertical shape

9.2 Identify the factors that shift the long-run aggregate supply curve

9.3 Determine a position of long-run macroeconomic equilibrium

9.4 Analyze the effects that a shift of the *LRAS* curve has on equilibrium real GDP and the price level

9.5 Analyze the effects of a change in aggregate demand under conditions of long-run equilibrium

9.6 Discuss the possibility of equilibrium at, above, or below the full-employment level of real GDP

9.7 Understand the meaning of economic growth and how to calculate it

9.8 Discuss the desirability of economic growth and the issue of sustainability

9.9 Identify the determinants of economic growth and the measures to promote it

Assess Your Knowledge

1. What are the factors that determine an economy's productive capacity?
2. What does *labour productivity* mean?
3. What effect will a long-term, consistent improvement in labour productivity have on the average level of prices?

Long-Run Aggregate Supply

LO 9.1 Derive the long-run aggregate supply curve and provide a rationale for its vertical shape

The Meaning of the Long Run

The long run refers to a period **when all inputs can vary and firms fully adjust to market conditions.** Firms and resource owners possess sufficient information to make informed decisions. Aggregate supply equals the real GDP the economy can produce under full employment.

LRAS Curve

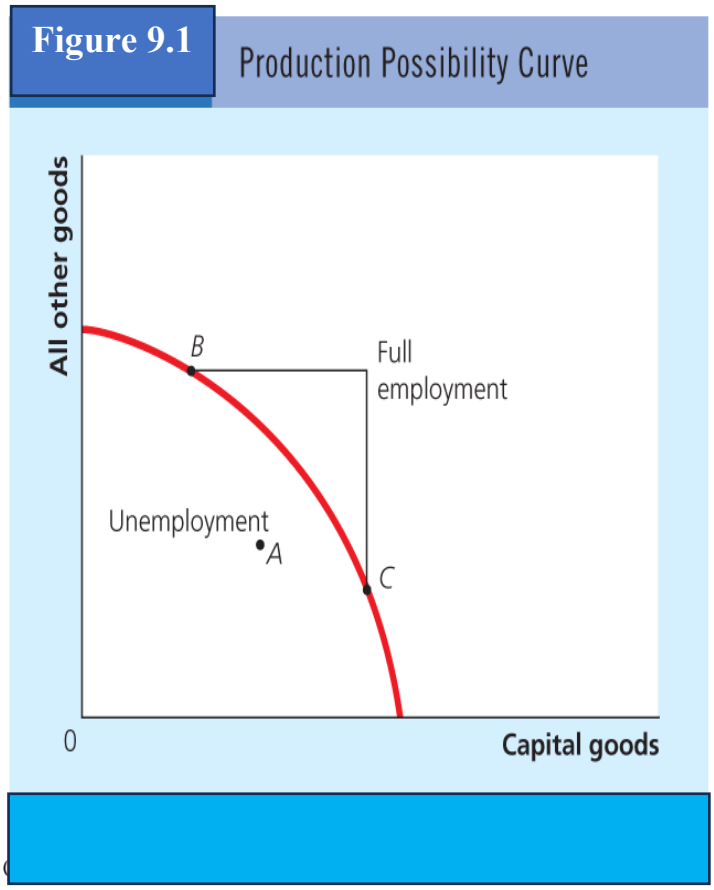
The LRAS curve is a vertical line **that represents the economy's maximum sustainable output.** According to the Parliamentary Budget Office, Canada's potential real GDP was $2,225 billion in 2023, with projected growth averaging 2% from 2018 to 2023 (https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043401).

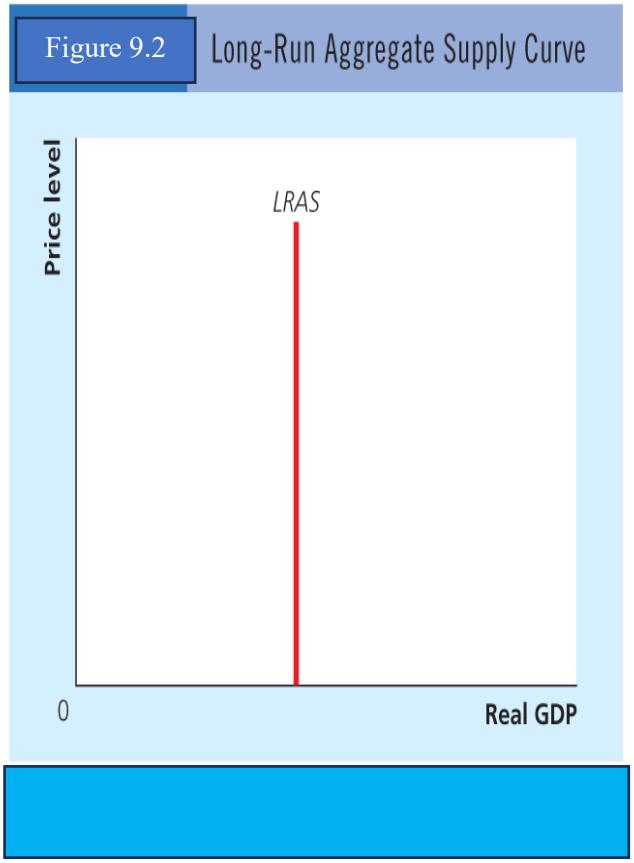
Shape of LRAS

The long-run aggregate supply curve is a vertical line because real output at full employment does not

change with the price level. This reflects the economy's maximum sustainable production, given current resources and technology. Points on the production possibilities curve, such as B or C, illustrate full employment, while points inside the curve, such as A, indicate underutilized resources. Figure 9.2 shows this vertical LRAS, which captures the economy's potential real output.

Figure 9.1 Production Possibility Curve **Figure 9.2 Long-Run Aggregate Supply Curve**





LRAS Shifters: Factors Affecting the Long-Run Aggregate Supply Curve

LO 9.2 Identify the factors that shift the long-run aggregate supply curve

Factors that Cause Shifts in the LRAS

The LRAS curve shifts when a country's resource base or productivity changes. Increases in labour productivity, improvements in resource quality, expansion of capital stock, or advances in technology raise the economy's potential output and shift LRAS right. In Figure 9.3, acquiring more labour or capital moves the production possibilities curve from PPC to PPC1 and shifts LRAS to LRAS1

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Catastrophes and LRAS

Natural disasters reduce a country's productive capacity by destroying labour, capital, or infrastructure, shifting the LRAS curve left. The 2010 Haiti earthquake crippled output through widespread loss of resources. In 2023, the earthquakes in Turkey and Syria killed over 55,000 people and caused more than $100 billion in damage, disrupting regional production. In China, recurring floods and droughts affect hundreds of millions, delaying economic development. Other shocks—famine, war, or political collapse—also reduce potential GDP by disrupting production systems. The war in Ukraine, for example, damaged infrastructure, displaced millions, and sharply reduced agricultural and industrial output.

Reading Comprehension

1. What do economists mean by the long run?
2. What is the long-run aggregate supply (*LRAS*) curve? What is its shape?
3. Is there any relation between an economy's production-possibility (p-p) curve and its long-run aggregate supply curve? Explain.

BUSINESS SITUATION 9.1

Global Events and Local Impact

Geopolitical crises that disrupt oil supply continue to affect local businesses far from the conflict zone. In 2022, Russia's invasion of Ukraine led to a sharp increase in global oil prices, **driven by sanctions, supply disruptions, and market panic.** Brent crude rose above $120 per barrel, **raising transportation, heating, and input costs worldwide.** A small business owner in Calgary, Alberta, **would likely face higher fuel prices, increased delivery**

charges, and rising costs from suppliers. Even firms not directly tied to oil use—such as retail or hospitality—**would feel indirect effects through reduced consumer spending and inflation-driven cost increases.**

Would a small business owner in Calgary, Alberta, be affected in any way by this crisis? Discuss.

Long-Run Equilibrium and the Price Level

LO 9.3 Determine a position of long-run macroeconomic equilibrium

Macroeconomic Equilibrium

We determine long-run macroeconomic equilibrium where the AD and LRAS curves intersect. This point reflects the full-employment level of real GDP and establishes the long-run price level. The AD curve slopes downward because higher price levels reduce real wealth, increase interest rates, and raise import demand, all of which lower real GDP demanded. Figure 9.4 illustrates this interaction between AD and LRAS.

Figure 9.3 An Increase in Long-Run Aggregate Supply

Diagram A: The p-p curve shifts to the right

Diagram B: The *LRAS* curve shifts to the right

Figure 9.3 An Increase in Long-Run Aggregate Supply

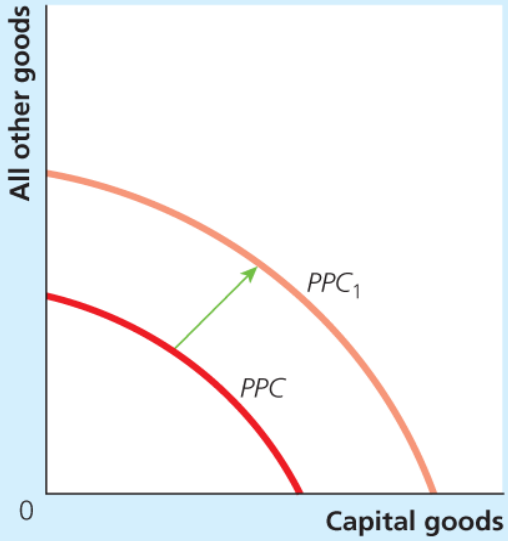


Diagram A: The p-p curve shifts to the right.

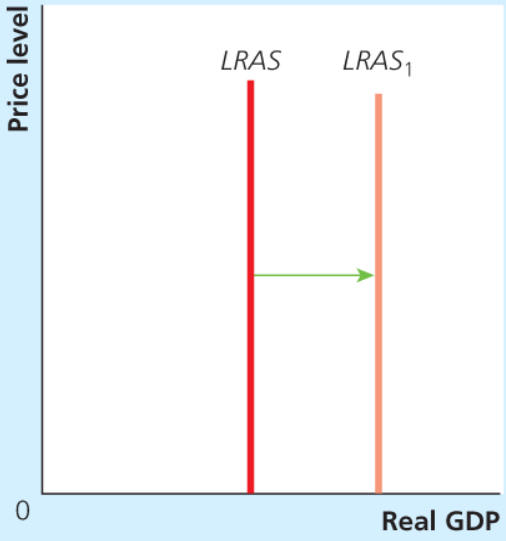


Diagram B: The *LRAS* curve shifts to the right.

long-run macroeconomic equilibrium the condition that exists when the economy's *AD* curve and its *LRAS* curve intersect, which occurs at the full-employment level of real GDP

Reading Comprehension

1. What are the main factors that can cause the economy's p-p curve to shift? Do these same factors cause the *LRAS* curve to shift?

2. What effect (if any) will a sustained increase in the number of immigrants to Canada have on Canada's *LRAS* curve?

3. What effect, if any, will the development of new productive technology have on the p-p curve? Will this affect the position of the *LRAS* curve?

4. Can you imagine the effect on the *LRAS* curve of the 2011 tsunami in Japan? What about the 2008 Sichuan earthquake? Sketch the effects of these natural disasters on the *LRAS* curve for these economies.

Figure 9.4 Long-Run Macroeconomic Equilibrium

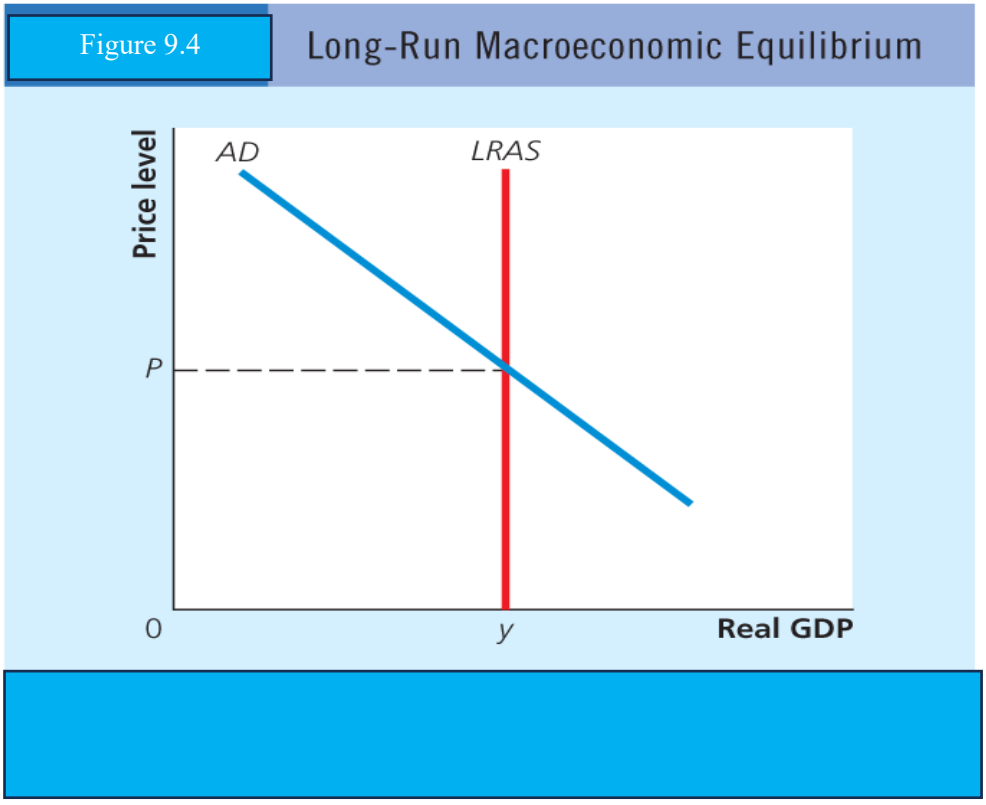
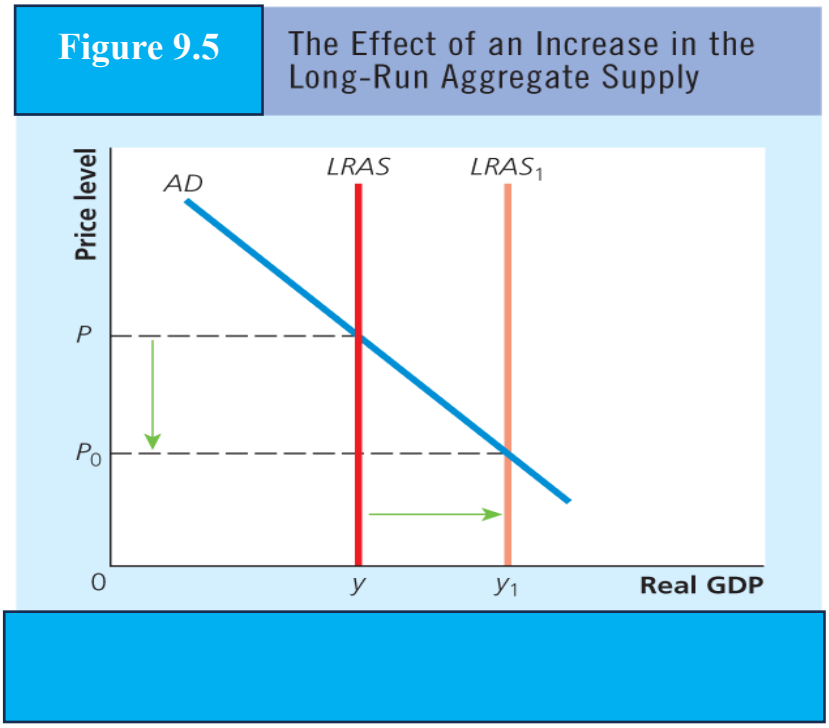


Figure 9.5 The Effect of an Increase in the Long-Run Aggregate Supply



The long-run aggregate supply curve appears in Figure 9.4 as a vertical line labeled LRAS. Its intersection with the aggregate demand curve (AD) determines the full-employment level of real GDP, labeled Y, and the long-run equilibrium price level, labeled P.

Effects of a Shift in *LRAS* on Equilibrium Real GDP and the Price Level

LO 9.4 Analyze the effects that a shift of the *LRAS* curve has on equilibrium real GDP and the price level

Shifting LRAS Right

If the LRAS curve shifts to the right, the economy's productive capacity increases, moving the full-employment output to a higher level. In the absence of a matching shift in aggregate demand, real GDP rises and the equilibrium price level falls. This outcome reflects growth driven by improved technology, capital accumulation, or productivity gains.

Rightward Shift in LRAS

In Figure 9.5, the initial equilibrium occurs where AD and LRAS intersect, yielding real output Y and price level P. A rightward shift of the LRAS curve—from LRAS to LRAS1—raises full-employment output to Y1 and lowers the price level to P0, assuming AD remains constant. This long-term drop in the average price level is called a secular decline in prices, driven by productivity growth or technological progress.

Other things being equal, an increase in long-run aggregate supply will result in an increase in real GDP and a secular decline in the price level.

Reading Comprehension

1. Carefully explain how an economy's long-run equilibrium real output and price level are determined.
2. What is another name for the level of real output under conditions of long-run macroeconomic equilibrium?

Effects of a Change in Aggregate Demand on Equilibrium Real GDP and the Price Level

LO 9.5 Analyze the effects of a change in aggregate demand under conditions of long-run equilibrium

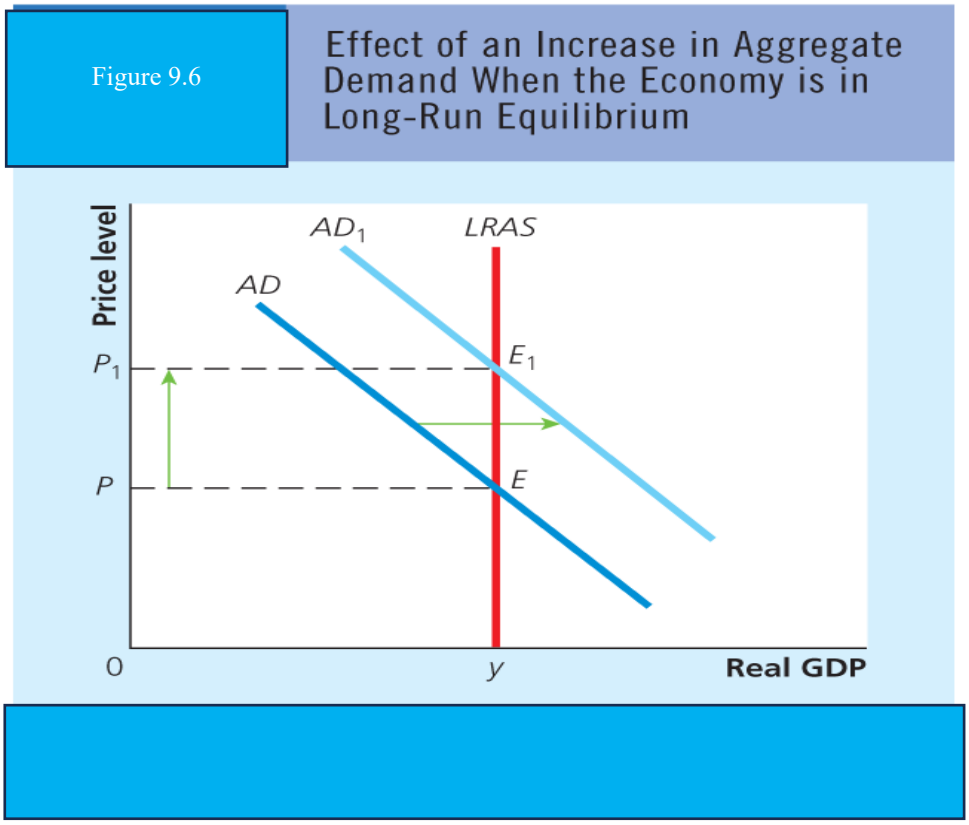
Increase in Aggregate Demand

If aggregate demand increases from this initial equilibrium, **the AD curve shifts rightward, intersecting LRAS at a new point.** Real output remains at full-employment level **Y, but the equilibrium price level rises from P to P1.** This reflects demand-pull inflation—**a rise in prices without an increase in productive capacity.** Figure 9.6 shows this adjustment.

Reading Comprehension

1. Explain the effect, if any, of a decrease in *LRAS* on an economy's real GDP and price level.
2. What is meant by a secular decline in the price level?
3. Illustrate graphically the effects of an increase in the *LRAS* curve on an economy's real GDP and price level.

Figure 9.6 **Effect of an Increase in Aggregate Demand When the Economy is in Long-Run Equilibrium**



Increase in Aggregate Demand

An increase in aggregate demand shifts the AD curve from AD to AD1. The economy moves along the vertical LRAS curve to a new equilibrium at E_1, where real GDP remains at Y and the price level rises to P_1.

We can conclude the following:

1. Real GDP stays constant at full employment.
2. The price level increases due to excess demand.
3. The shift causes demand-pull inflation without changing output capacity.

BUSINESS SITUATION 9.2

Fiscal Policy and Long-Run Equilibrium

If the economy is in long-run equilibrium and the government introduces expansionary fiscal policy—**such as increased spending or tax cuts—to raise real GDP, the AD curve shifts rightward.** Real output remains at full-employment level **Y, but the price level rises to P1.** The result is **higher inflation without any gain in real output, since the economy was already operating at capacity.**

As a business manager, what action would you take in anticipation of the effect of such a policy?

Reading Comprehension

1. Assume that the economy is in long-run equilibrium. What effect will a fall in aggregate demand (*AD*) have on the price level?

2. Sketch the effect of an increase in *AD* on the equilibrium level of real output.

Equilibrium at, above, or below the Full-Employment Level of Real GDP

LO 9.6 Discuss the possibility of equilibrium at, above, or below the full-employment level of real GDP

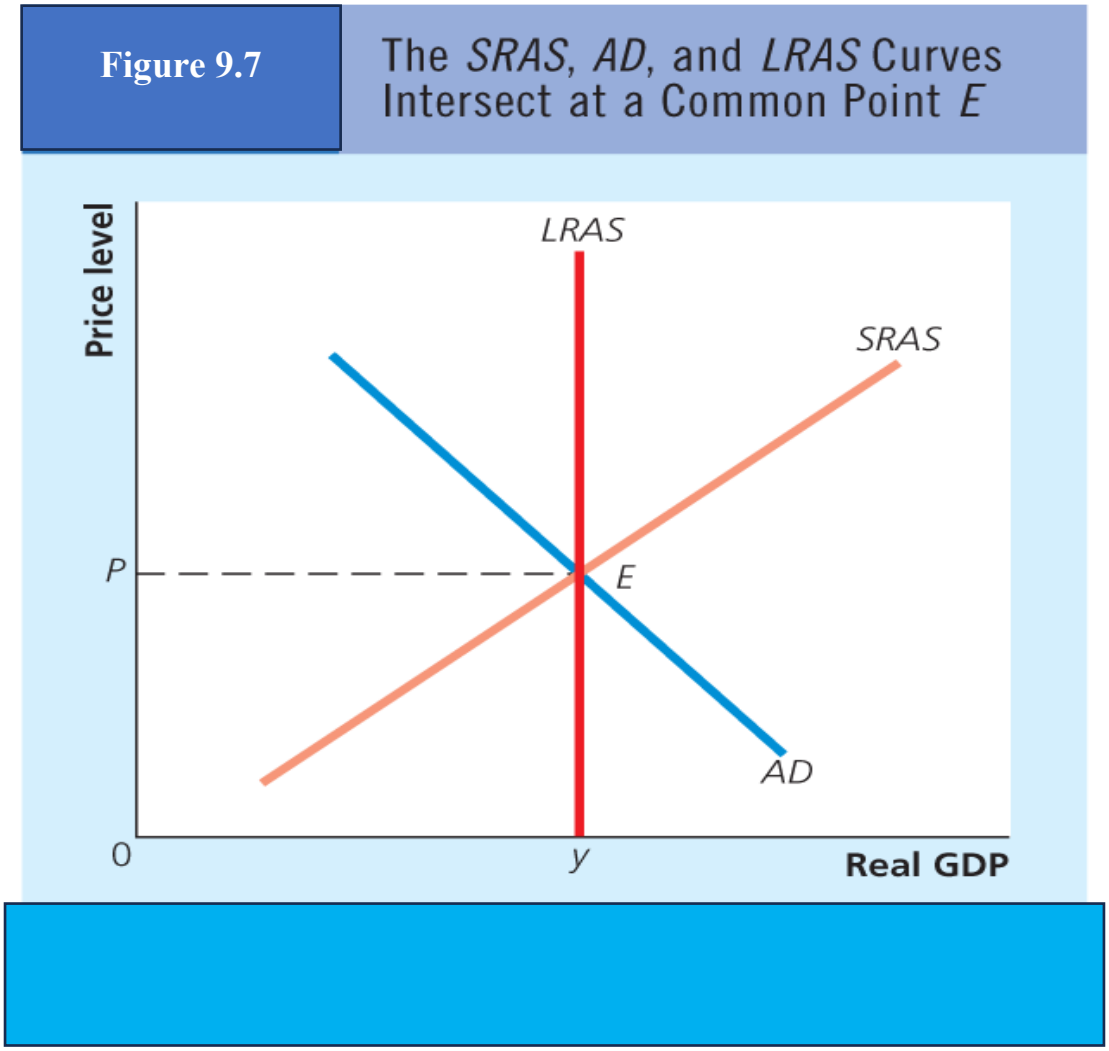
Temporary Departures from Full Employment

Equilibrium does not always occur at full-employment real GDP. In Figure 9.7, equilibrium at point E

reflects both short-run and long-run equilibrium, where AD intersects both SRAS and LRAS, yielding price level P and output Y.

In Figure 9.8, an increase in aggregate demand shifts AD to AD1. The economy moves to short-run equilibrium at E1, where output rises to Y1 and the price level increases to P1. However, this is not a long-run equilibrium—Y1 exceeds full-employment output, and AD does not intersect LRAS. This situation represents an overheated economy, where output temporarily exceeds capacity, creating upward pressure on wages and prices. Over time, SRAS will adjust, and the economy will return to long-run equilibrium at a higher price level.

Figure 9.7 The *SRAS*, *AD*, and *LRAS* Curves Intersect at a Common Point *E*



Falling Demand and Long-Run Disequilibrium

If aggregate demand falls from AD to AD0, the economy moves along the SRAS curve to a new short-run equilibrium at E0. At this point, real GDP drops to Y_0 and the price level declines, but the economy is in long-run disequilibrium—output is below full employment, and AD does not intersect LRAS.

We can conclude that:

1. The economy may temporarily operate below or above full-employment output.
2. Short-run equilibrium can occur off the LRAS curve.
3. Long-run equilibrium always returns to full-employment real GDP as wages and prices adjust.

Figure 9.8

Changes in Aggregate Demand and Equilibrium at Different Levels of Real GDP

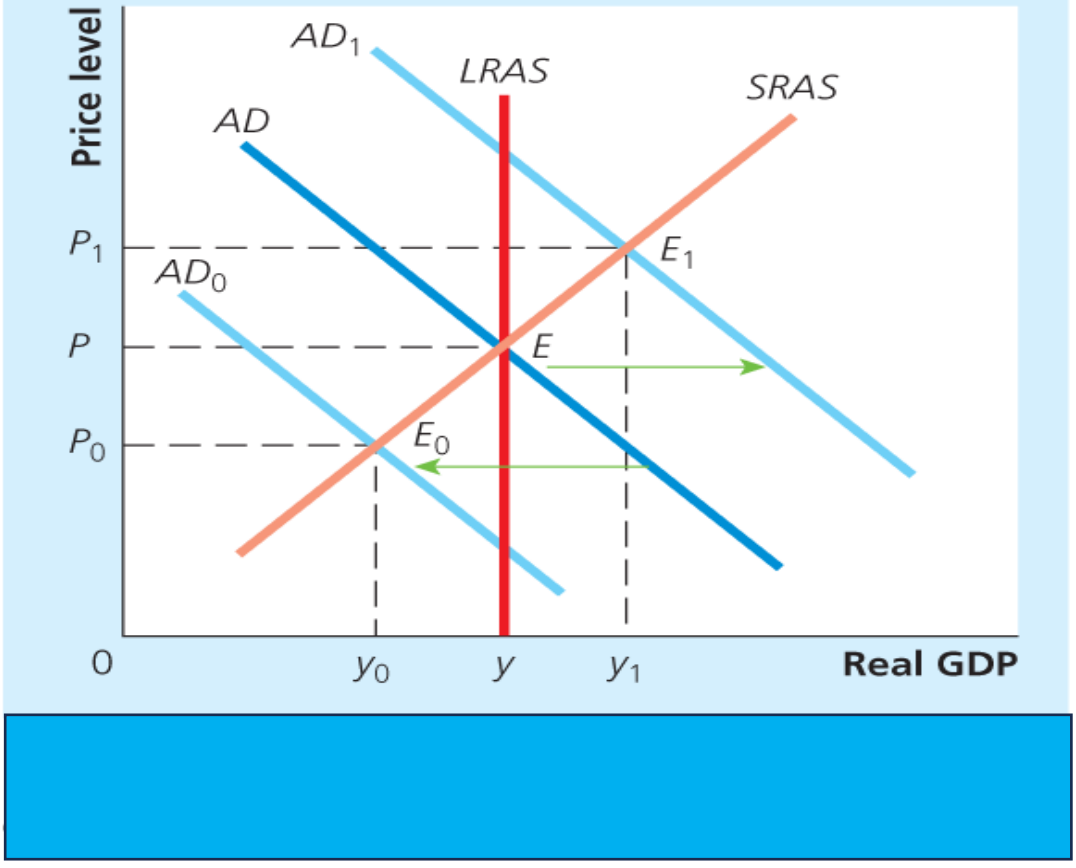


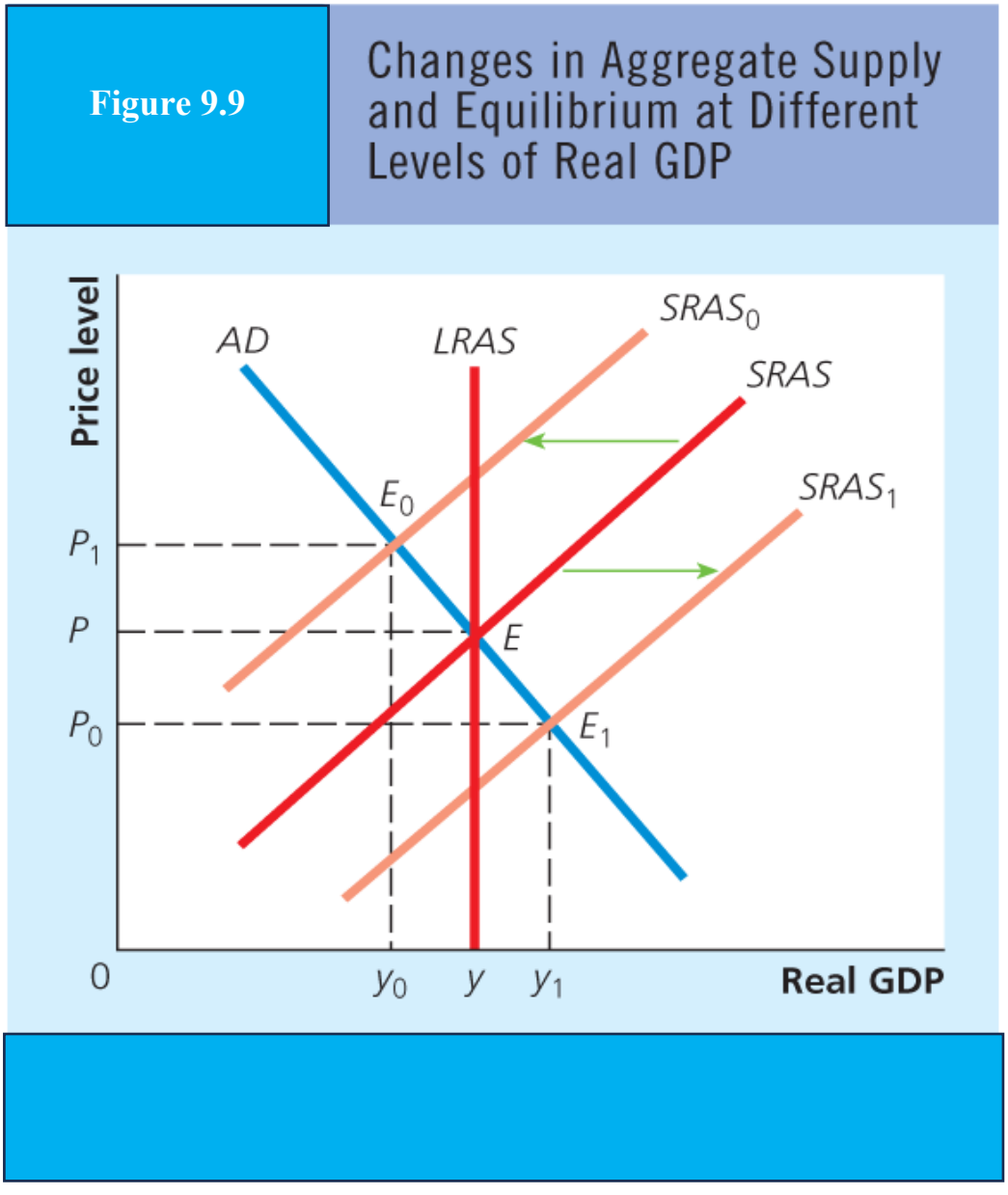
Figure 9.8 Changes in Aggregate Demand and Equilibrium at Different Levels of Real GDP

Short-Run vs. Long-Run Equilibrium

The economy can reach short-run equilibrium at, above, or below full-employment output, depending on the intersection of AD and SRAS. But long-run equilibrium occurs only when AD intersects LRAS, where real GDP equals the full-employment level. Temporary

deviations are common, but long-run adjustments restore output to its sustainable level.

Figure 9.9 **Changes in Aggregate Supply and Equilibrium at Different Levels of Real GDP**



Supply Shocks and Disequilibrium

Shifts in the short-run aggregate supply curve can cause equilibrium output to rise above or fall below full-employment GDP. In Figure 9.9, a rightward shift of SRAS—perhaps due to tax cuts for producers—lowers the price level to P0 and raises output to Y1, creating short-run equilibrium at E1 but long-run disequilibrium. The economy temporarily over-produces.

Conversely, an increase in input costs shifts SRAS left to SRAS0. The economy moves to E0, where output falls to Y0 and the price level rises to P1. This represents short-run equilibrium with output below capacity and rising unemployment.

Conclusion: Supply-side shocks can lead to short-run equilibrium away from full-employment output, but long-run forces restore balance over time.

BUSINESS SITUATION 9.3

Anticipated Subsidies and SRAS

As the owner of a large chicken farm in rural Nova Scotia, you expect agricultural subsidies to reduce production costs. This reduction shifts the short-run aggregate supply (SRAS) curve to the right for the entire poultry sector. Output rises and prices fall, assuming demand stays constant.

What effect do you expect these subsidies to have on your business in the short run? In the long run?

The answer to this Business Situation can be found in Appendix A.

The Meaning of Economic Growth

LO 9.7 Understand the meaning of economic growth and how to calculate it

What Is Economic Growth?

Most countries treat economic growth, full employment, and stable prices as core macroeconomic objectives. News of rising growth expectations tends to lift confidence, especially during recessions. Growth prospects raise hopes for job creation, income security, and wage gains. In contrast, stagnant or negative growth signals economic distress.

Economic growth refers to an increase in a country's real gross domestic product (GDP). For example, if Canada's real GDP stood at **$2.0 trillion in 2018** and rose to **$2.5 trillion in 2023**, the country experienced economic growth over that five-year period (https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043401).

economic growth *an increase in a country's real GDP*

Economic growth can be defined as an increase in a country's real gross domestic product.

Per Capita Growth Matters

Real GDP measures the total output of an economy, but it does not reflect changes in population. If real GDP grows at the same rate as the population, average living standards stay the same.

Reading Comprehension

1. Is it true or false that equilibrium will always occur at the full-employment level of real GDP? Discuss.
2. Explain the difference between short-run macroeconomic equilibrium and long-run macroeconomic equilibrium.

To assess true improvements in economic well-being, economists use real GDP per capita—real output divided by the population. This measure shows how much output is available per person and better captures changes in living standards. For this reason, economic growth is often defined as an increase in real GDP per capita.

real GDP per capita *a measure of GDP that accounts for changes in the population*

Real GDP per capita = real GDP / population

Economic growth refers to a sustained increase in a country's real gross domestic product per capita over time.

Growth as Productive Capacity

Another concept of economic growth refers to an increase in a country's capacity to produce goods and services. This definition focuses on long-term expansion of the economy's potential output.

Figure 9.10 shows this concept as an outward shift of the production possibility curve, which reflects gains in resources, labour productivity, or technology. Unlike short-term fluctuations, this kind of growth indicates a sustained rise in the economy's ability to generate real output.

Economic growth can describe an increase in a country's productive capacity.

What is the growth rate?

The term **growth rate**—frequently used in discussions relating to a country's economic progress—refers to the rate of growth of a country's real gross domestic product per capita.

growth rate *the percentage change in a country's real GDP per capita*

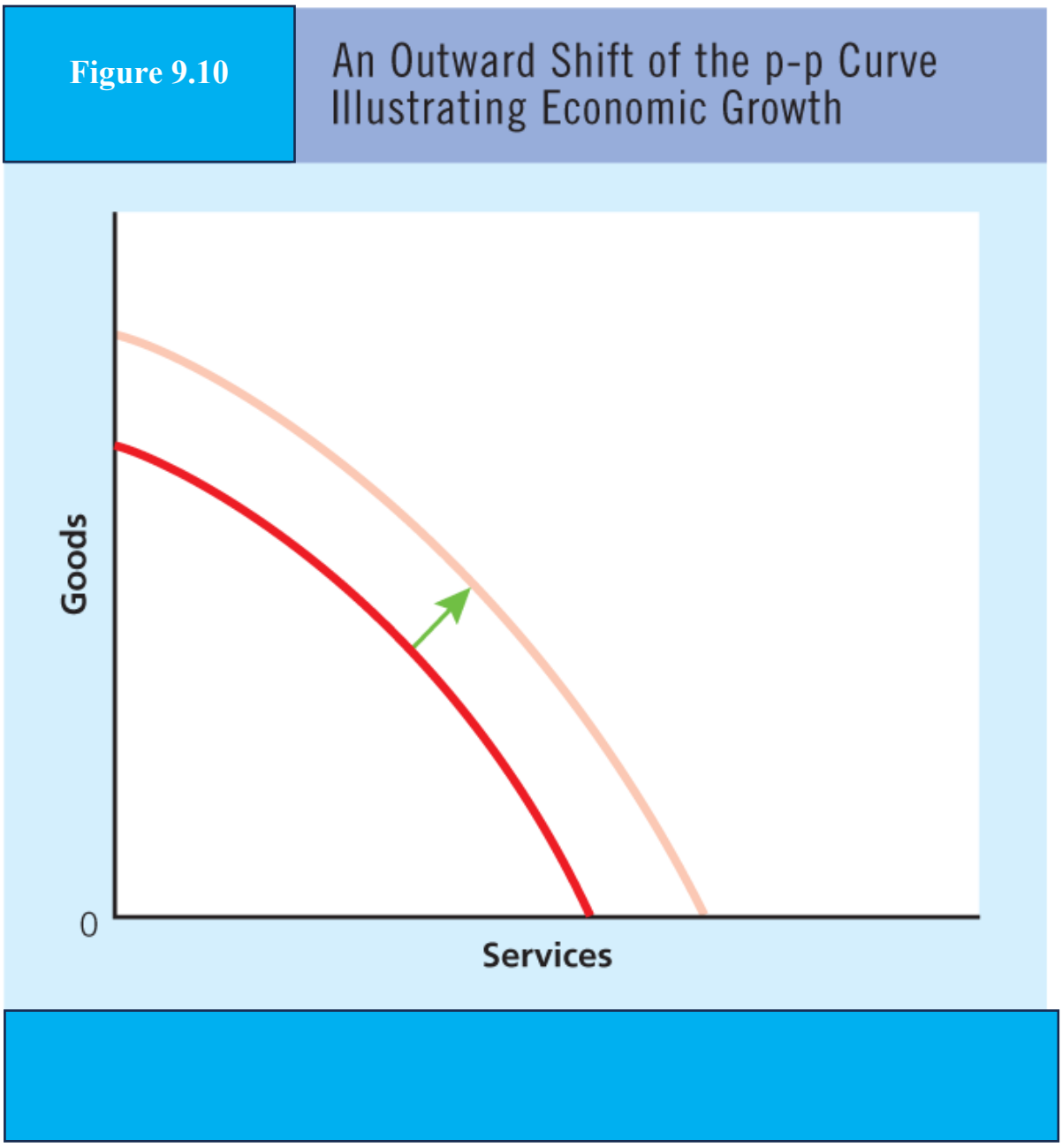


Figure 9.10 An Outward Shift of the p-p Curve Illustrating Economic Growth

The growth rate of real gross domestic product is the percentage change in a country's real gross domestic product per capita.

For example, if the real GDP per capita of an economy increased by 2.5% from 2022 to 2023, we say that the growth rate for that period was 2.5%.

Calculating the Growth Rate

The growth rate refers to the percentage change in real GDP per capita over a period. The formula introduced in Appendix 1A applies here as well:

Growth Rate = [(New Value – Original Value) ÷ Original Value] × 100

This calculation shows how much real GDP per capita has increased or decreased as a proportion of its original value.

Example of Growth Rate Calculation

Using the information in Table 9.1, we can calculate real GDP per capita and then determine the growth rate using the formula provided.

Suppose real GDP per capita in 2022 was $57,000 and increased to $58,254 in 2023. Using the formula:

Growth Rate = [(58,254 – 57,000) ÷ 57,000] × 100 = 2.2%

This indicates a 2.2% increase in real GDP per capita for 2023.

Canada experienced negative growth in real GDP per capita in 2020, during the COVID-19 recession. GDP fell sharply while the population continued to grow, resulting in a decline in output per person.

Forecasts from various agencies predict annual growth rates between 1.5% and 2.3% through to 2026 (https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043401).

Reading Comprehension

1. What is economic growth?
2. Define the growth rate of real GDP.
3. Explain how the growth rate of real GDP can be calculated.

The Desirability of Economic Growth: The Issue of Sustainability

LO 9.8 Discuss the desirability of economic growth and the issue of sustainability

Is Growth Desirable?

Economic growth remains a central goal because it supports rising living standards, reduces unemployment, and broadens the tax base. In 1956, Canada's population was 16.1 million; by 2023, it exceeded 40 million. Between 2015 and 2023, real GDP rose by about 22%, while population grew by

roughly 11% (https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043401). Since GDP outpaced population, Canadians experienced real gains in income and consumption.

Sustained growth enables expanding industries, job creation, and higher government revenues. This revenue allows governments to increase social spending, fund education, improve health care, and support vulnerable groups. Economic growth also correlates with longer life expectancy, stronger public health, better sanitation, and a more educated labour force.

In short, economic growth remains essential for improving living standards and expanding opportunity.

Debating Growth and Sustainability

Although economic growth offers many advantages, it also produces costs that have led to growing opposition—particularly against rapid, unsustainable growth. Critics point to rising traffic congestion, urban overcrowding, and environmental degradation as direct consequences of unchecked expansion.

Rapid GDP growth can strain infrastructure, increase pollution, and generate excessive waste. Some argue that beyond a certain point, higher output does not enhance well-being but may require reduced present consumption or greater resource exploitation.

The debate has shifted from rejecting growth entirely to advocating for sustainable growth—growth that meets current needs without exhausting environmental, social, or economic resources. Sustainability emphasizes long-term balance between economic progress and ecological preservation.

Environmental regulation is not only a result of those actions by individuals and groups who oppose rapid economic growth, but also an attempt by government officials and agencies to protect non-renewable or finite quantity resources—clean air, lakes, streams, fisheries, and mines—which many Canadians value dearly. Because these things are intangible, it makes it difficult to place a value on them—it does not, however, make them less important. Many argue that environmental regulation impedes economic growth; however, it should be recognized that such regulations are designed to prevent the depletion of our precious natural resources which are a *stock* variable. On the one hand the exploitation of these resources will increase our *current* gross domestic product. On the other hand, it will forever reduce our stock of certain non-renewable natural resources. Clearly there is a trade-off.

Sustainable Development

Sustainable development aims to secure the benefits of economic growth while preserving the conditions necessary for that growth to continue over time. In Canada's case, this means pursuing higher GDP, rising incomes, job creation, and improved living standards without depleting non-renewable resources or damaging the environment.

This approach addresses current economic goals while protecting the ability of future generations to meet their own needs. It requires balancing output expansion with resource conservation and environmental resilience.

sustainable development development that meets the needs of the present without compromising the ability of future generations to meet their own needs

UN Sustainable Development and Global Goals

The World Commission on Environment and Development's *Our Common Future*—the Brundtland Report—offers the most widely cited definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf). It emphasizes two central ideas:

- the essential needs of the world's poor, which must receive priority;
- the environmental limitations imposed by current technology and social organization.

In Canada, the National Round Table on the Environment and the Economy (NRTEE) promoted policies that reconciled economic and environmental goals for over two decades (https://www.bac-lac.gc.ca/eng/CollectionSearch/Pages/record.aspx?app=fonandcol&IdNumber=161108&new=-8585743364363011264).

This framework aligns with the United Nations Sustainable Development Goals (SDGs), adopted in 2015 as part of the 2030 Agenda (https://sdgs.un.org/2030agenda). Canada is committed to these 17 goals, including:

- Goal 8: Decent Work and Economic Growth—sustained, inclusive, and sustainable economic growth;
- Goal 12: Responsible Consumption and Production—sustainable use of resources;
- Goal 13: Climate Action—resilience to climate-related impacts (https://sdgs.un.org/goals).

Sustainable development in Canada now reflects these global priorities—economic opportunity, environmental stewardship, and intergenerational fairness (https://www.canada.ca/en/employment-social-development/programs/agenda-2030/national-strategy.html).

BUSINESS SITUATION 9.4

DuPont promotes sustainable growth by setting clear environmental and economic targets (https://www.dupont.com/about/sustainability.html). The company focuses on climate goals, greenhouse gas reduction, water use efficiency, material reuse, and product innovation. DuPont aligns its strategy with the UN

Sustainable Development Goals—specifically Goals 6, 7, 9, 12, and 13 (https://sdgs.un.org/goals). These goals support clean water, affordable energy, industrial resilience, responsible resource use, and climate stability.

What are some of the things that a small business owner operating in Canada can do to reduce its environmental footprint?

The answer to this Business Situation can be found in Appendix A.

Determinants of Economic Growth

LO 9.9 Identify the determinants of economic growth and the measures to promote it

Determinants of Economic Growth

Economists continue to examine the factors that explain long-term economic growth. Although debate persists over their relative importance, several sources are widely recognized:

1. Size of the labour force
2. Quality of the labour force
3. Availability of natural resources
4. Capital accumulation
5. Advancement in technology

Reading Comprehension

1. Why is economic growth such a high priority for so many countries?
2. What are some objections to economic growth?
3. What is meant by sustainable growth?

Size of the Labour Force

The size of a country's labour force plays a major role in determining its rate of economic growth. Other things being equal, the larger the labour force, the greater the economy's real output of goods and services.

Labour must combine with other productive factors to produce the economy's output. If the labour force increases while capital and technology stay fixed, diminishing returns eventually reduce output per worker. A given labour force may be too large or too small, depending on its effect on output per worker. The labour force size that

maximizes output per worker, given fixed capital and technology, reflects the most efficient use of labour inputs.

There is a size of the labour force that maximizes output per worker, given the economy's capital stock and technology.

The Quality of the Labour Force

To a large extent, the quality of the labour force influences the rate of economic growth. A highly skilled and well-educated labour force raises the economy's capacity to produce goods and services. The same holds for a labour force that is healthy, energetic, and creative. Educational attainment among individuals aged 15 and older provides a practical measure of labour force quality.

Another component of human capital is population health. Human capital includes the education, skills, and health of workers. The availability of medical infrastructure and health professionals offers an indication of the population's health status.

Natural Resources

The role of natural resources in economic growth remains contested. Japan is frequently cited as evidence that a country can achieve rapid growth without abundant resource endowments. Still, most economists agree that a rich resource base supports faster growth. Mineral deposits, energy sources, and fertile land expand productive capacity. Canada, with its substantial resource wealth, has seen the natural resource sector contribute significantly to long-term growth.

Capital Accumulation

Most growth theories assign a central role to capital formation. A larger stock of machinery, equipment, and infrastructure raises an economy's productive potential. Investment increases the capital stock, so higher investment tends to support faster growth. But capital alone does not guarantee sustained growth; other inputs: labour quality, technology, and institutions—also matter.

Technological Change

Technological change refers to improvements in production methods that allow firms to produce more output using the same quantity of inputs—or the same output using fewer inputs. It reflects advances in processes, machinery, or organization that increase efficiency. The way in which the economy's resources combine to produce goods and services affects its productive capacity.

A production method that requires fewer inputs to achieve a given level of output will be preferred over less efficient alternatives, assuming other factors remain constant.

Total Factor Productivity

While technological change is a key driver of growth, it is only one component of total factor productivity (TFP), a broader concept that measures output growth not accounted for by increases in capital or labour. TFP captures gains from technology, but also from better management, institutional improvements, economies of scale, and resource reallocation.

Increases in TFP signal that the economy is producing more from the same inputs, reflecting overall efficiency improvements beyond what capital or labour growth alone can explain.

Measures to Promote Economic Growth

Government and Growth Promotion

Governments promote economic growth through policies that build human capital, support technological progress, encourage investment, expand infrastructure, and maintain stable economic conditions. These actions influence the economy's capacity to produce goods and services, raise productivity, and sustain long-term development.

One of the most direct ways governments support growth is by investing in human capital. This includes providing financial assistance—grants, loans, and scholarships—to make postsecondary education more accessible. A better-educated workforce strengthens productivity and innovation.

Governments also promote growth through support for research and development (R&D). Tax incentives and public funding encourage private firms to invest in new technologies . Public agencies fund research that improves productivity and expands the economy's technological frontier

.

Investment in physical capital can also be encouraged through monetary and fiscal policy. Low and stable interest rates reduce borrowing costs and make capital projects more attractive. Tax measures, such as investment tax credits and accelerated depreciation, provide further incentives for firms to invest.

Reading Comprehension

1. What are the main factors that contribute to economic growth?
2. Define the optimal labour force.
3. Discuss the role of capital in promoting economic growth.
4. What measures can a government take to promote long-term economic growth?
5. What have governments in Canada done to promote long-term economic growth?

Governments contribute to long-term growth through infrastructure spending. Efficient transportation networks, reliable energy systems, and digital connectivity reduce business costs and raise private-sector productivity.

Finally, governments support growth by maintaining macroeconomic stability and fostering competitive markets. Sound fiscal policy, price stability, and regulatory clarity build investor confidence. Trade openness, secure property rights, and fair competition strengthen market performance.

The Canadian Government's Role

In Canada, economic growth policy involves both federal and provincial governments. Human capital development is supported through the Canada Student Financial Assistance Program, provincial student loan systems, and subsidies to postsecondary institutions. These programs improve access to education and raise labour productivity.

Research and development is funded through federal bodies such as the National Research Council (NRC), Natural Sciences and Engineering Research Council (NSERC), Social Sciences and Humanities Research Council (SSHRC), and Canadian Institutes of Health Research (CIHR). The Scientific Research and Experimental Development (SR&ED) tax incentive program also encourages private-sector innovation.

Canada's fiscal and monetary institutions—particularly the Bank of Canada and the Department of Finance—work to maintain macroeconomic stability through inflation targeting, interest rate policy, and

prudent fiscal management. These institutions help create the predictable conditions necessary for investment and long-term planning.

The federal government also invests in infrastructure through programs like the Canada Community-Building Fund and the Investing in Canada Plan. These initiatives finance public transit, green energy, broadband access, and transportation systems that enhance productivity and regional development.

By combining education, innovation, investment, infrastructure, and stability, the Canadian government shapes the conditions for sustainable economic growth.

Review

1. Review the learning objectives listed at the beginning of the chapter.
2. Have you accomplished all the objectives? One way to determine this is to answer the Reading Comprehension questions at the end of each section. These will help you assess your understanding of the learning objectives.
3. If you have not accomplished an objective, review the relevant material before proceeding.

Key Points to Remember

1. **LO 9.1** The long-run aggregate supply (*LRAS*) curve shows the amount of real GDP that the economy can produce at full employment. The *LRAS* curve is a vertical line at the potential or capacity level of real GDP.
2. **LO 9.2** The *LRAS* curve will shift if the economy's productive capacity changes. Such factors as changes in the labour force, technology, capital stock, and resource endowment will affect the economy's productive potential and will therefore shift the *LRAS* curve.
3. **LO 9.3** Long-run, economy wide equilibrium occurs when the aggregate demand (*AD*) curve and the *LRAS* curve intersect. Long-run macroeconomic equilibrium always occurs at the full-employment level of real GDP.

4. **LO 9.4** Changes in long-run aggregate supply affect the equilibrium price level and the equilibrium level of real GDP. When the *LRAS* curve shifts both the equilibrium price and output levels will be affected.

5. **LO 9.5** Increases in aggregate demand, when the economy is in long-run equilibrium, will cause increases in the price level, but will have no effect on long-run equilibrium real GDP.

6. **LO 9.6** Short-run macroeconomic equilibrium can occur at, above, or below full-employment real output.

7. **LO 9.7** Economic growth refers to the situation in which real GDP per capita is increasing. It is measured by the increase in real GDP per capita between two time periods, as a proportion of the original period's real GDP per capita, times one hundred.

9. **LO 9.8** Economic growth is desirable, but somewhat controversial. Economic growth brings with it several benefits, including lower unemployment and a higher standard of living. The negative effects of economic growth include traffic congestion, pollution, and the potentially serious side effects from the overuse or depletion of scarce resources. Sustainable development refers to development that meets the needs of the present (an increase in productive capacity) without compromising the ability of future generations to meet their own needs (excessive depletion of natural resources).

9. **LO 9.9** The sources or determinants of economic growth are the quantity and quality of the labour force, natural resources, capital formation, and technological change.

Problems and Exercises

Basic