



15

MACROECONOMIC OBJECTIVE: ECONOMIC GROWTH

15.1

The meaning of economic growth

Learning outcomes

- Define economic growth as an increase in real GDP.

Economic growth is enjoyed by different countries to different degrees.

Microeconomics and macroeconomics differ in numerous ways, as you have seen in Chapters 13 and 14, which have emphasized aggregate measures of a nation's economic health, from changes in the average price level to the unemployment rate.



Economic growth is an increase in the total output of goods and services (GDP) in a nation over time.



The use of aggregates in macroeconomics sets it apart from microeconomics, which focuses on individual markets producing and selling particular goods and services. An increase in production of a particular good or service may result from an increase in its demand or its supply. But an increase in the output of an entire national economy is achieved through the increase in the nation's aggregate demand (AD) and/or its aggregate supply (AS). Economic growth is defined as a sustained upward trend in the total output of goods and services in a nation.

Growth is good. This, at least, is the established consensus among macroeconomic policymakers. As a nation's output increases over time, the quantity and quality of goods and services available to the people of the nation increases.

It is a basic tenet of economics that the standard of living of people improves when they are able to produce and consume more goods and services. However, a nation with a large GDP is not necessarily a rich nation. What matters is not the total output of goods and services, but the *average output per person*. A nation with a large population may have a higher GDP than a

much smaller nation, but the large nation is not necessarily richer. To compare GDP across nations in a way that tells us something about the living standards of the people of those nations, *GDP per capita*, or the average GDP per person, is measured (Table 15.1).

TABLE 15.1 GDP VS GDP PER CAPITA

	GDP (2008)/billions of \$	Population (2008)	GDP <i>per capita</i> /
Germany	2816	82 329 758	34 204
India	2816	1 166 079 217	2 415
Singapore	218	4 657 542	46 806
Algeria	218	34 178 188	6 378



As you can see, the German and Indian economies are the same size – the total value of Germany's output was the same in 2008 as the total value of India's output. But Germany is the richer country on a *per capita* basis, since the population of Germany is less than 10% of the population of India. The average income of a person in Germany is, therefore, more than 10 times greater than the average income of an Indian citizen. The same analysis applies to Singapore (a rich country) and Algeria (a middle-income country). Again the figures for GDP are the same, but because the size of the populations differ substantially, GDP *per capita* is vastly different.

Any increase in a nation's GDP while its population is held constant will by definition increase the *per capita* GDP of the nation and the average output and income of the people of the nation. Economic growth is therefore a goal of macroeconomic policies, since a GDP growth rate that is greater than the population growth rate will make the average income of the nation rise.

However, it is not certain that an economy will experience growth over time. Population growth in much of the world is greater than GDP growth, meaning that, over time, the average income in such nations falls. This is the reality for many countries in the world, particularly the 40 countries of sub-Saharan Africa and around 20 countries in Central and South Asia and Latin America, yet the global trend over the last 50 years has been a vast increase in *per capita* income. In particular, this is notably true in the US (Figure 15.1).

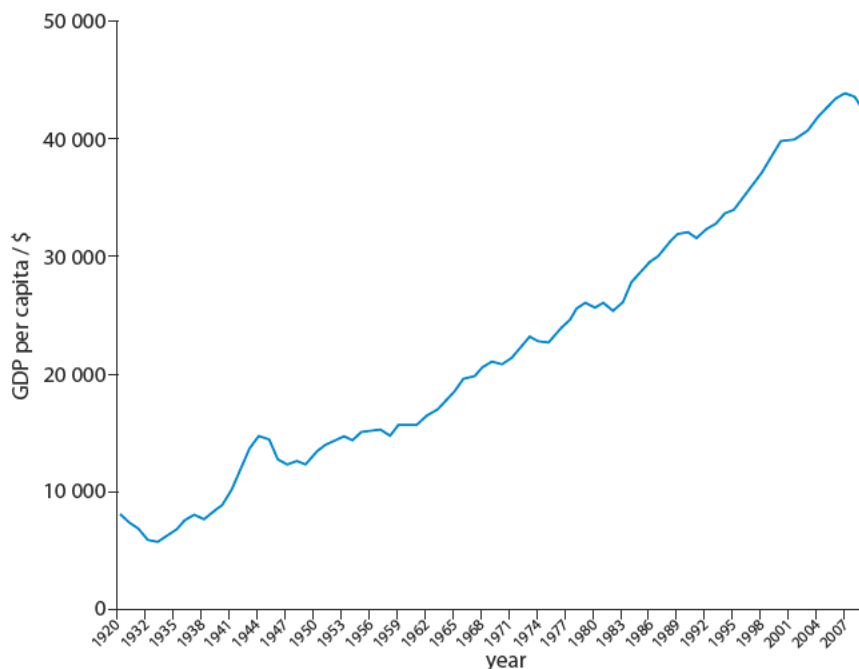


Figure 15.1

Per capita GDP in the US since the Great Depression.

The global population has more than doubled since 1960, from 3 billion to almost 7 billion people. Over the same period, the world's nominal GDP has grown from \$1.35 trillion to over \$60 trillion, a 45-fold increase. The world's *per capita* nominal income today is therefore more than 20 times what it was in 1960. The phenomenal increase in the total value of the world's output is evidence of a massive improvement in the standard of living of the average world citizen from 50 years ago. Of course, this increase in nominal income does not account for the effect inflation has had on the value of people's income over the years but, nonetheless, the output of goods and services in the world has far outpaced the growth in population, pointing to an increase in the average income and standard of living of the world's people due to economic growth.



More is better. Discuss.

Illustrating economic growth

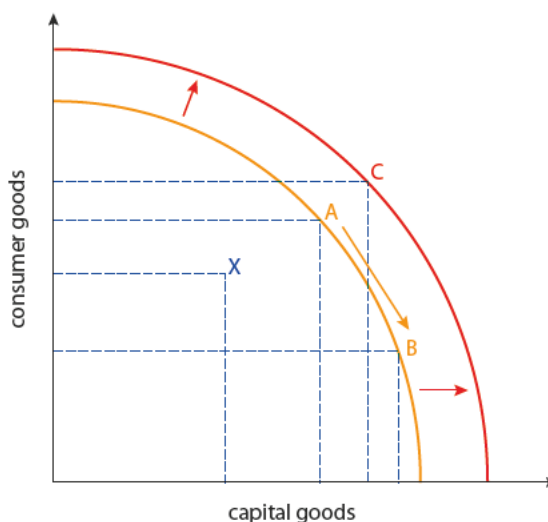
Several macroeconomic models can be used to illustrate economic growth. As you learned in Chapter 1, the most basic method for showing growth is with a production possibilities curve (PPC).

Economic growth in the PPC model

The PPC model (Figure 15.2) can be used to illustrate growth in a number of ways.

Figure 15.2

Economic growth is shown as an outward shift in the PPC.



Movement from point X to point A or B

Point X is inside the nation's PPC, indicating that the economy's resources are underemployed or not being used to their greatest efficiency. If the nation were to move from point X to points A or B (both on the PPC), then the nation would experience an overall increase in the total output of goods and services, achieving economic growth. This would correspond with a movement from below full employment in the AD/AS model to a level of output at which the AD curve intersects the long-run aggregate supply (LRAS) curve at the full-employment level of output.

Movement from points A or B to point C

An outward shift of a nation's PPC shows that the nation is able to produce and consume more of everything. A movement from point A or B to point C in Figure 15.2 is only possible through an increase in the quality or quantity of the nation's productive resources. More capital, land or labour, or better capital, land or labour could lead to economic growth shown by an outward shift of a nation's PPC.

Movement from point A to point B

At points A and B, the nation is producing at its full-employment level of national income. A movement from point A to point B is not considered economic growth in the short term, since the total output of the nation does not increase. The nation's output of capital goods does increase, but at the expense of fewer consumer goods. Aggregate output remains the same, but a movement from A to B may actually lead to an eventual outward shift from the orange PPC to the red PPC.

How can a movement along the PPC lead to an outward shift of the PPC? The answer requires an understanding of sources of long-run economic growth in a country. One such

source is an increase in the quantity of resources. Capital goods are inputs, or factors of production, whereas consumer goods are outputs, or goods and services. A nation that moves from point A to B on the PPC is sacrificing current consumption of goods and services for current production of capital goods.

The production of capital goods leads to future economic growth and ability of this country to produce and consume at a level beyond its current full-employment level. The opportunity cost of producing more capital goods today is the current consumption of consumer goods, but the benefit is the increased future output, consumption, and income of both consumer and capital goods. The various sources of economic growth are discussed in more depth later in this chapter.

Economic growth in the business cycle

A second model that shows economic growth is the business cycle (Figure 15.3). The business cycle illustrates both short-run economic growth and long-run economic growth. Due to the short-term fluctuations in consumption, investment, government spending and net exports experienced as a normal part of a nation's business cycle, an economy may experience periods of rapid expansion followed by sudden contractions in output and employment.

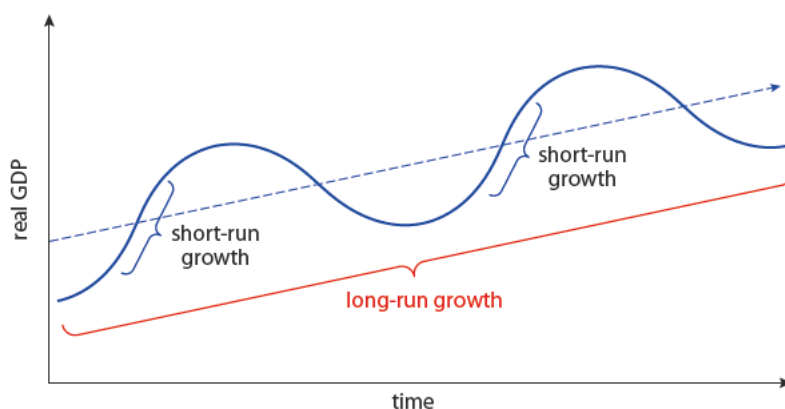


Figure 15.3

The business cycle illustrates both short-run and long-run economic growth.

The upward-sloping sections of the business cycle represent periods of rapid short-run economic growth. When the level of demand for a nation's output grows more rapidly than the level of AS, output may increase beyond the full-employment level in the short run, but as wages and prices adjust to higher levels of demand, output will eventually fall and the period of rapid growth is followed by a contraction or recession.

A nation's business cycle reflects periods of unsustainable short-run growth fuelled by fluctuations in AD, but also a long-run upward trend in output resulting from increases in the quantity and the quality of the nation's resources over time. Despite short-run fluctuation of the business cycle, most developed countries have experienced long-run economic growth over the last 50 years (Figure 15.4, overleaf).

Each of the countries whose GDP is shown in Figure 15.4 experienced periods of stagnant or even negative growth over the last 50 years. Generally, however, the lines are upward sloping, showing that the long-run trend line of these nations' business cycles is one of economic growth.

Economic growth in the AD/AS model

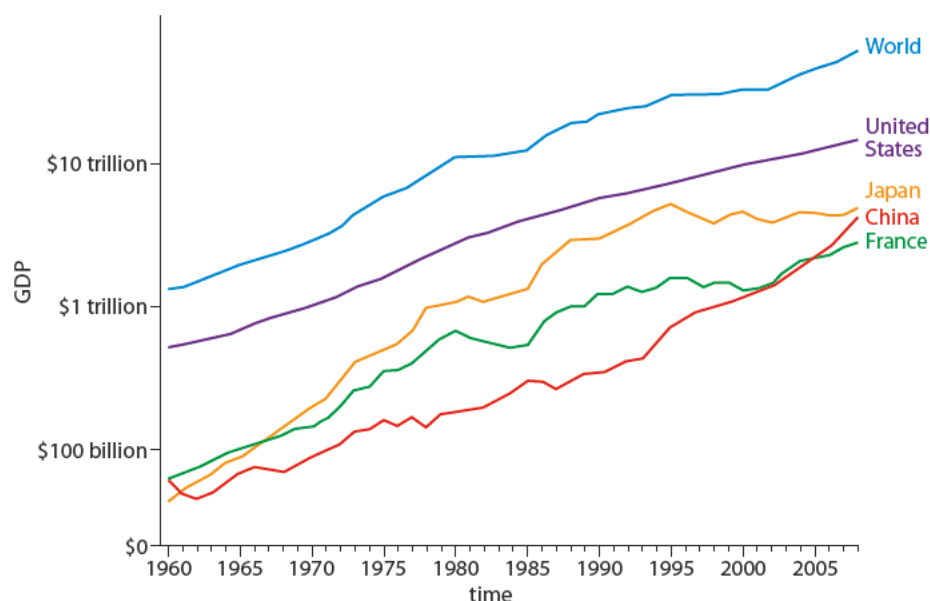
The most useful and detailed model for illustrating economic growth in both the long run and the short run is the AD/AS diagram (Figure 15.5, overleaf). Economic growth occurs any



Humans are rational beings, therefore our economic interactions with one another are driven by rational behaviour. Yet the business cycle demonstrates that despite our rational, self-interested behaviour, the economy still experiences periods of instability and volatility. Why do the collective actions of rational beings result in a seemingly irrational outcome? Are humans as rational as economists assume?

Figure 15.4

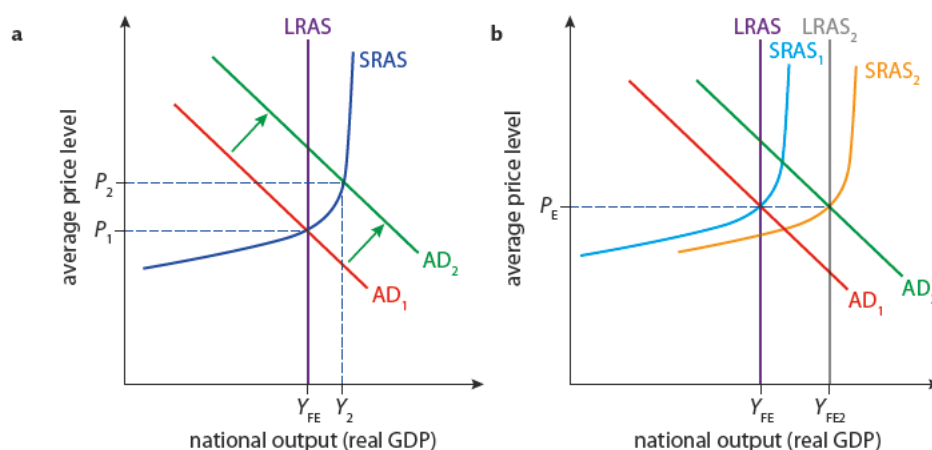
GDP in selected countries – 1960–2008.



time a nation's GDP increases. An increase in GDP occurs any time AD increases when an economy is below its full-employment level of output. An economy in a recession that begins to recover is, therefore, technically growing as output returns to its full-employment level.

Figure 15.5

Economic growth in the AD/AS model. **a** Short-run economic growth; **b** long-run economic growth.



In the short run, as shown in Figure 15.5, if an economy producing at its full-employment level experiences a rise in AD, it produces at a level of output beyond its full-employment level, although at the cost of higher inflation. In the long run, however, an increase in AD alone does not result in economic growth since the wage rate increases and AS will shift left until output returns to its full-employment level.

This suggests that, in the long run, an economy cannot expect to increase its output beyond its full-employment level by stimulating AD alone. Long-run economic growth is achieved only when the nation's full-employment level of output increases, in other words, when LRAS shifts outwards.

Figure 15.5b shows an economy experiencing long-run economic growth – all three curves, LRAS, SRAS and AD, have shifted to the right. Increases in consumption, investment, government spending and exports may account for the shift in AD, but the increases in SRAS and LRAS are what allow this economy to achieve a greater level of output in the long run. Without increases in AS, this economy's ability to grow is restrained to the full-employment level by its limited supply of land, labour and capital.

In this regard, a nation's LRAS reflects its production possibilities given its existing stock of resources. That brings us to the sources of economic growth: factors that increase either the quantity or the quality of a nation's productive resources.

15.2 Causes of economic growth

Learning outcomes

- Describe, using a production possibilities curve (PPC) diagram, economic growth as an increase in actual output caused by factors including a reduction in unemployment and increases in productive efficiency, leading to a movement of a point inside the PPC to a point closer to the PPC.
- Describe, using a PPC diagram, economic growth as an increase in production possibilities caused by factors including increases in the quantity and quality of resources, leading to outward PPC shifts.
- Describe, using an LRAS diagram, economic growth as an increase in potential output caused by factors including increases in the quantity and quality of resources, leading to a rightward shift of the LRAS curve.
- Explain the importance of investment for economic growth, referring to investment in physical capital, human capital and natural capital.
- Explain the importance of improved productivity for economic growth.

Productivity growth

An outward shift of a nation's PPC is made possible only by an increase in the quantity or the quality of productive resources in the nation. But just how do more and better resources lead to economic growth? The answer is rooted in a very important concept that must be explored in some depth: worker productivity.

Economists define productivity as the amount of output per unit of input. Worker productivity is measured in output per hour, and indicates the value of the average worker's output attributable to one hour of work. Increases in productivity allow for a nation's economy to grow, but more importantly lead to growth in *per capita* income.

Growth in national output can also result from increases in the number of workers, but since the size of the labour force usually only grows when the entire population increases, this type of growth in GDP is unlikely to lead to increases in the average income of a nation. Therefore, productivity growth is the primary prerequisite for long-run economic growth of a nation and improvement in *per capita* income and the average standard of living of a nation's people.

Since 1947, output per hour of labour has increased at an average annual rate of 2.27% in the US. At this rate, the amount of output attributable to each American worker doubles every 30 years. If productivity gains continue at this rate, an American born today can expect to be twice as productive (and therefore earn twice the income) when he enters the labour force as his parents were.

Sources of productivity growth: physical capital

So why does productivity matter? Simple: if the output per worker doubles every 30 years, then the income of the average worker also doubles. Twice as much stuff per worker corresponds with a higher standard of living.



To access Worksheet 15.1 on macroeconomic indicators, please visit www.pearsonbaconline.com and follow the onscreen instructions.



Productivity refers to the amount of output attributable to each unit of input. Productivity is an important source of economic growth, as the more productive a nation's resources (land, labour and capital), the more output and income can be generated on a *per capita* basis.

A major source of increases in worker productivity is the increase in the quantity and the quality of the physical capital available to each worker in a nation. Physical capital refers to the human-made resources employed in the production of goods or services. Factories, robots, computers, buildings, tools and other such equipment are all considered physical capital.

Higher national levels of private investment increase the quantity and the quality of physical capital, which makes workers more productive and leads to long-run economic growth. To demonstrate why more capital increases productivity, imagine for a moment that a nation's whole economy is a single bakery.

- A bakery with one oven and three bakers cannot produce as much per hour of labour as a bakery with three ovens and three bakers.
- More ovens allow each baker to produce more bread per hour, increasing the productivity of labour.
- Economies with greater quantities of capital per worker experience a greater level of output per hour of labour and, therefore, a higher level of economic growth.
- Increases in capital stock result from high levels of private investment, as firms replace old capital and expand existing factories to meet rising AD over time.

Perhaps more important than the *quantity* of capital available to workers, is the *quality* of capital in a nation. Increases in the quality of capital and technology lead to vast improvements in worker productivity and, therefore, higher rates of growth. Let's consider a single sector of an economy – farming.

- A farmer with a buffalo and an iron plough is far more productive than a farmer with a bamboo rake.
- A farmer with a John Deere tractor is even more productive than the farmer with the buffalo.
- The quality of capital in an economy matters as much if not more than its quantity in determining the overall growth rate.

Improvements and innovations in primary, secondary and tertiary sector technologies have transformed the structures of economies from the time of the agricultural revolution 10 000 years ago to the industrial revolution 200 years ago and the internet revolution 20 years ago. Each of these waves of technological innovation plunged human societies and economies into new eras of productivity growth and increased income and welfare: first in food production when farming was invented, second in the manufacture of consumer goods when assembly lines and modern factories transformed the secondary sector, and most recently in services when high-speed internet and computer technologies allowed instantaneous exchange of knowledge, information, and highly skilled services around the world.

Without high levels of private investment by entrepreneurs and their capitalist backers, improvements in technology would be slow to come to the market and economic growth would be hindered because economies would lack access to cutting-edge, productivity-improving methods of production.

Sources of productivity growth: human capital

Increases in the quantity or the quality of physical capital increase labour productivity and promote economic growth. But a tool is only as useful as the worker operating it – which brings us to the ultimate resource and driver of economic growth, human capital.

Human capital refers to the value of labour created through education, training, knowledge and health. Just as better technologies improve the quality of physical capital, better

The average American worker today is backed up by around \$110 000 worth of physical capital – far more than a US worker had 100 years ago and far more than the average worker in most countries has today.

Paul Krugman,
Macroeconomics, 2006



human capital is achieved through improvements in the education and health of a nation's workforce.

Resources are scarce: this is the basic problem of economics, which addresses questions surrounding the allocation of earth's scarce resources. The planet's natural capital (minerals, fossil fuels, forests and fisheries) will eventually be depleted if our industrial economy continues to exploit them at an unsustainable rate. Physical capital (machines and tools employed in production) depends on inputs of natural resources for production – this means that physical capital is also limited by the scarcity of natural capital.

Human capital, on the other hand, is effectively limitless, to the extent that it can be improved through education. Economist Julian Simon considered human ingenuity and creativity the 'ultimate resource' that would allow human societies to overcome the physical scarcity of natural resources and thereby achieve long-run economic growth even in the face of resource depletion.

Adding more people to any community causes problems, but people are also the means to solve these problems. The main fuel to speed the world's progress is our stock of knowledge, and the brake is our lack of imagination. The ultimate resource is people – skilled, spirited, hopeful people.

Julian Simon, *The Ultimate Resource*, 1998

The infinite nature of human capital, argued Simon, is the key to overcoming the physical scarcity of natural capital. More and better education is the key to improving human capital and achieving long-run economic growth among all nations.

Governments that recognize the importance of human capital will promote policies that contribute to the education and training of the nation's population. Such policies lead to greater productivity and output per worker and ultimately promote long-run economic growth.

Figure 15.6 shows the correlation between literacy and output per worker for six developing nations – a simple example of the importance of education for a nation's economic health. Literacy is one measure of the education level of a nation's people. It may seem obvious, but the better educated a nation, the richer the people of that nation tend to be.

Socially optimal levels of education and healthcare are not likely to be provided if they are left entirely to the free market. Such merit goods will be under-provided by the private sector due to the non-rivalrous nature of their benefits to society as a whole. Without government provision of education, job-training, and healthcare, a nation's labour force



Julian Simon argued that humans were the ultimate resource, and that all other scarce resources could be overcome by human ingenuity. To what extent is population growth an obstacle to or a contributor to economic growth?

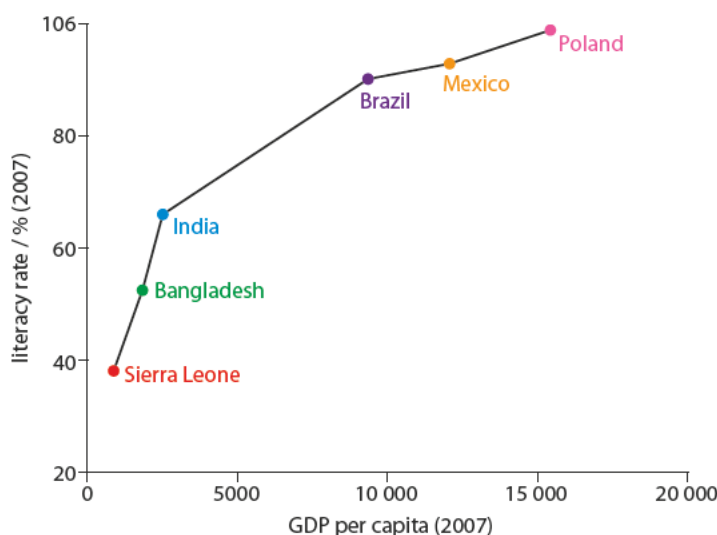


Figure 15.6

A better-educated workforce correlates with higher *per capita* income.

Which comes first, high education levels or high incomes? What kind of information would you seek out to test your hypothesis?



To access Worksheet 15.2 on jobless growth, please visit www.pearsonbacconline.com and follow the onscreen instructions.



Human beings are of economic value insofar as they can contribute to the economic growth of a nation. Therefore, the greatest argument for improving a nation's education system is the positive effect a more productive workforce will have on economic growth. Discuss this view with your class.



will become relatively unproductive in the competitive global economy. Therefore, long-run economic growth will be severely restricted and, over time, the standard of living of the nation's people will decline if the government fails to provide the people with an education system that prepares people to be productive members of the economy.

Much as private sector investment is needed to replace and expand a nation's stock of physical capital, government investment is required to improve and equip a nation's stock of human capital with the skills and knowledge necessary to promote economic growth and increases in income and quality of life for the average worker.

Productivity's effect on unemployment: Ironically, the effect of increased productivity on unemployment is not always a positive one. Recent studies have actually shown that as productivity increases, greater unemployment could result.

CASE STUDY

Okun's law and the unemployment surprise of 2009

In 2009, strong growth in productivity allowed firms to lay off large numbers of workers while holding output relatively steady. This behaviour threw a wrench into the long-standing relationship between changes in GDP and changes in the unemployment rate, known as Okun's law. If Okun's law had held in 2009, the unemployment rate would have risen by about half as much as it did over the course of the year.

Economists have long known that the overall performance of the economy as measured by GDP has a direct bearing on unemployment. But the relationship between changes in output and changes in the unemployment rate deviated from expectations in 2009. Over the course of the year, unemployment rose rapidly, while GDP remained relatively flat, or near zero growth. This pattern was surprising because it departed substantially from a long-standing forecasters' rule of thumb known as Okun's law. Named for Yale University economist Arthur Okun (1962), the law describes the empirical relationship between changes in output and changes in the unemployment rate. Okun's law tells us that, for every 2% that real GDP falls below its trend, we will see a 1% increase in the unemployment rate. Since real GDP was almost flat in 2009 while the corresponding trend level increased by 3%, the unemployment rate under Okun's law should have increased by 1½ percentage points. Instead it rose by 3 percentage points, more than twice the predicted increase.

The factor that turns out to be the main driver of the recent departure from Okun's law is average labour productivity, measured as GDP per non-farm hour worked. The deviation in average labour productivity relative to the GDP gap is far outside the range plotted over time and is consistent with the rapid productivity growth recorded in 2009. The surge in labour productivity allowed employers to keep output steady while shedding workers and reducing hours of work in the economy. As such, it allowed unemployment to rise much more than expected given the change in GDP, breaking the normal pattern between the two measures observed over the past 60 years ... If productivity keeps on growing at an above-average pace, then unemployment forecasts based on Okun's law could continue to be overly optimistic.

Mary Daly and Bart Hobijn, Federal Reserve Bank of San Francisco Economic Letter, 8 March 2010

EXERCISES

- 1 Explain how increases in productivity may allow a nation to increase its level of output without increasing employment.
- 2 Would America be better off today if productivity had not increased during the recession of 2009? Why or why not?
- 3 If productivity gains continue, how will this affect the rate of unemployment in the economy as the US economy emerges from the recession of 2009?

15.3

Calculating economic growth (HL only)

Learning outcome

- (HL only) Calculate the rate of economic growth from a set of data.

Economists measure the rate of economic growth in a nation by comparing the total value of the output of one year to the output of the previous year. The growth rate (GR) in nominal GDP is found by the formula:

$$GR = \frac{GDP_2 - GDP_1}{GDP_1} \times 100$$

Economic growth rates vary from country to country for year after year based on the macroeconomic conditions within each country (Figures 15.7 and 15.8). A positive growth rate indicates the total output of goods and services has increased from one year to the next. Negative growth is evidence of a recession, caused by either a decrease in AD or a decrease in AS. However, a fall in the rate of growth does not necessarily mean an economy is experiencing a recession, rather that the level of output is increasing at a slower rate.

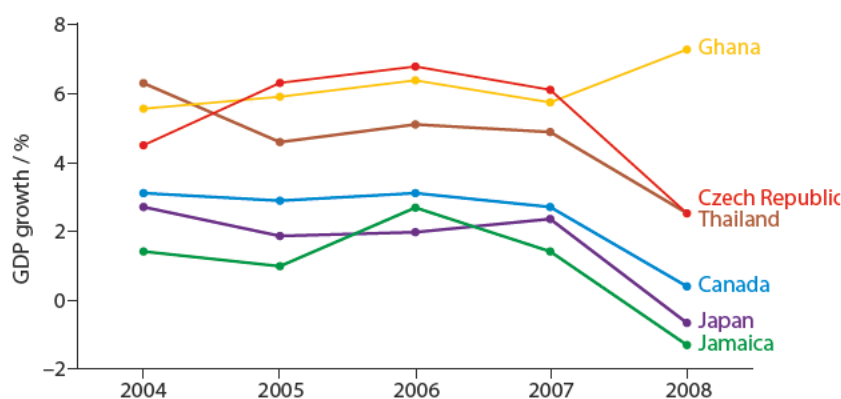


Figure 15.7

Economic growth in different countries, 2004–08.

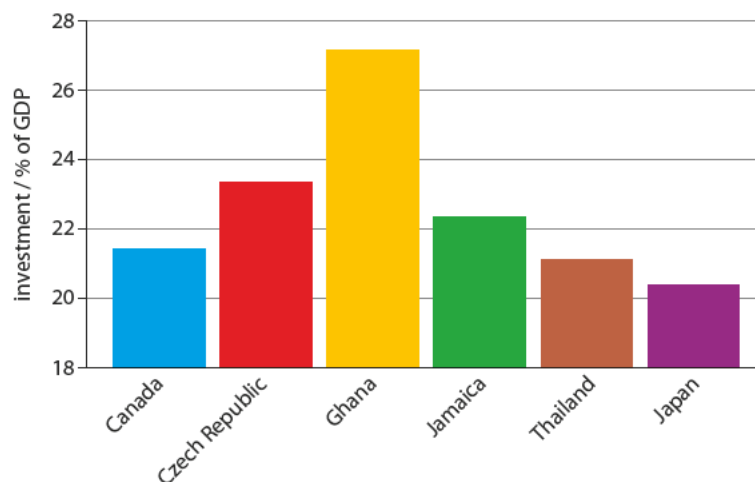


Figure 15.8

Greater levels of investment correspond with higher economic growth, 2004–08.

HL EXERCISES

- 4 Which of the countries in Figures 15.7 and 15.8 experienced a recession between 2004 and 2005?
- 5 Explain what happened to output in the Czech Republic between 2007 and 2008.
- 6 Identify two factors that could account for Ghana's increasing growth rate in 2008.
- 7 Explain the relationship, if any, observable between the percentage of a nation's GDP made up of investment and its rate of economic growth.

To calculate the growth rate for an economy, information on the prices and the quantities of the nation's output of goods and services is needed. As an illustration, Let's go back to Country I and consider its production of only two goods: calzones and robots. Using price and output data for Country I's output in 2010 and 2011, we can determine the rate of increase in nominal GDP between the two years (Table 15.2).

TABLE 15.2 CALCULATING NOMINAL GDP AND ECONOMIC GROWTH IN A SIMPLE ECONOMY

Goods and their prices	Quantity and price of output in 2010	Quantity and price of output in 2011
quantity of calzones	4000	3500
price of calzones	€10	€15
quantity of robots	500	550
price of robots	€200	€250
nominal GDP (total value of output)	$40\,000 + 100\,000 = €140\,000$	$52\,500 + 137\,500 = €190\,000$
nominal GDP growth rate: $\frac{(\text{GDP}_{2011} - \text{GDP}_{2010})}{\text{GDP}_{2010}} \times 100$	-	$\frac{(190\,000 - 140\,000)}{140\,000} = 0.357 \times 100 = 35.7\%$

The total euro value of Country I's output in 2011 increased by 35.7% over 2010. A large increase in nominal GDP tells us one of two things; either the quantity of the nation's output increased or the price of the nation's output increased, or both. In fact, both output and prices increased in Country I.

In order to measure the *real economic growth* (the change in the total value of the goods produced calculated as if prices had stayed at the level they were in the base year) we must adjust the change in nominal GDP for the change in the price level over the same period.

Changes in the price level are determined using a price index (Chapter 14). The real GDP (GDP_R) equals the nominal GDP (GDP_N) divided by the consumer price index expressed in hundredths ($\text{CPI} \times 0.01$):

$$\text{GDP}_R = \frac{\text{GDP}_N}{\text{CPI} \times 0.01}$$

The real GDP in 2011 tells us the amount of output for the year once the change in the price level has been accounted for. Country I's real GDP increased by much less than its nominal GDP because the effect of higher prices is cancelled out (Table 15.3).

Using nominal GDP to compare the output of a nation year to year can be misleading since growth can be overstated if the average price level rises. Adjusting the change in output for inflation gives us the ability to focus on changes in the quantity of output by cancelling out changes in the price level.



As you can see, a nominal GDP growth rate of 35.7% is deflated by the CPI; once the change in the price level is accounted for, Country I's real GDP growth rate is a more modest 7.7%.

TABLE 15.3 CONVERTING NOMINAL GDP TO REAL GDP REQUIRES A PRICE INDEX

Price index (2010 base year): $\left(\frac{P_{B2}}{P_{B1}}\right) \times 100$	$\frac{210}{210} = 1 \times 100 = 100$	$\frac{265}{210} = 1.26 \times 100 = 126$
Real GDP (2010 euros): $\frac{\text{nominal GDP}}{\text{price index in hundredths}}$	$\frac{140\,000}{1} = \text{€}140\,000$	$\frac{190\,000}{1.26} = \text{€}150\,793$
Real GDP growth rate: $\frac{(\text{real GDP}_{2011} - \text{real GDP}_{2010})}{\text{real GDP}_{2010}} \times 100$	-	$\frac{(150\,793 - 140\,000)}{140\,000} = 0.077 \times 100 = 7.7\%$

To determine whether or not Country I's real GDP growth of 7.7% led to an increase in the *per capita* GDP we would simply compare the change in real GDP to the change in the population. If population grew by less than 7.7%, it could be stated that the average worker in Country I earned a higher income and enjoyed a higher level of consumption in 2011 than in 2010. This reminds us that economic growth, or an increase in the real value of a nation's output year on year, is an objective of macroeconomic policy due to the impact that a positive growth rate has on people's well-being.

For example, the US has successfully achieved its goal of economic growth for most of the last 80 years. Since the Great Depression, when GDP shrank for several consecutive years, most of the rest of the century has seen positive growth.

In Figure 15.9, recessions are easy to spot, because a recession is defined as a decrease in the output of a nation over two consecutive quarters. While some recessions may not appear as negative growth (because the growth rates in Figure 15.9 are annual), the major recessions of the last 80 years are starkly visible.

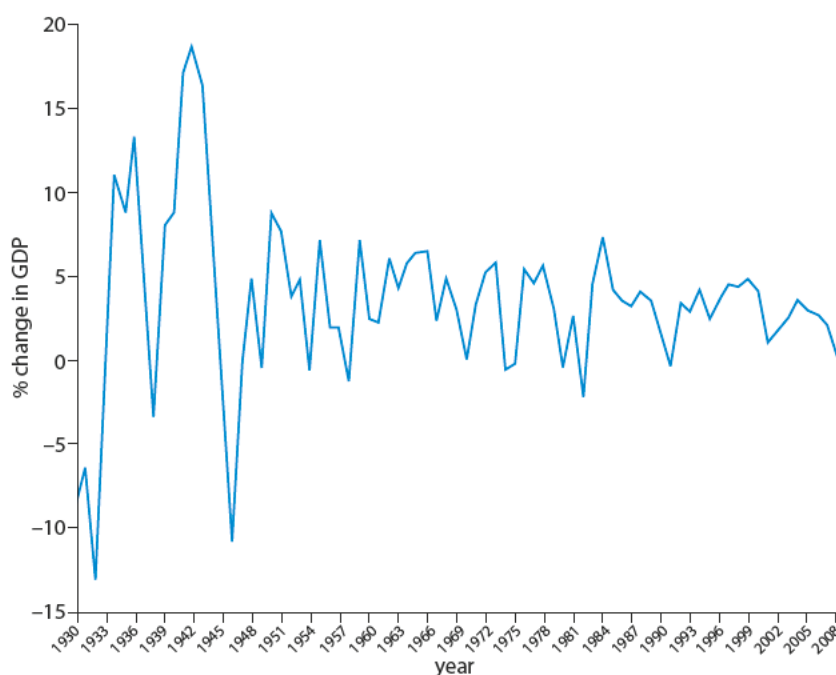


Figure 15.9

Economic growth in the US since the Great Depression.

HL EXERCISES

- 8 In which years did the US experience recessions?
- 9 Explain why the highest growth rates tend to occur in the years following the lowest growth rates.
- 10 In general, what has happened to the fluctuations in growth rates in the US since the late 1970s? What does this tell us about the effectiveness of macroeconomic policy in the US?
- 11 a Using the table below, calculate the nominal growth rate between each of the years:
- 2004, 2005
 - 2005, 2006
 - 2006, 2007
 - 2007, 2008

YEAR	2004	2005	2006	2007	2008
Australia's nominal GDP/\$	631 302 000 000	669 699 000 000	710 288 000 000	760 212 000 000	798 320 000 000
Australia's population	20 127 400	20 394 800	20 697 900	21 072 500	21 431 800
Price index Australia	145.2	149.075	154.35	157.95	164.825

- b Between which years did Australia's nominal GDP grow most rapidly?
- c Calculate the inflation rate in each of the years from 2005 to 2008.
- d Calculate the real GDP growth rate between each of the years.
- e Between which years did Australia's real GDP grow most rapidly?

15.4

Consequences of economic growth

Learning outcomes

- Discuss the possible consequences of economic growth, including the possible impacts on living standards, unemployment, inflation, the distribution of income, the current account of the balance of payments, and sustainability.

Measuring economic growth tells economists whether the value of a nation's output of goods and services increases or decreases year after year. Changes in nominal GDP alone do not tell us whether an economy is actually producing a greater quantity of output since increases in nominal GDP may result from inflation or an increase in actual output. Therefore, changes in real GDP (determines whether or not output has increased regardless of the inflation rate) are a more accurate measure of the size of the economy.

But even real GDP growth has its shortcomings as an indicator of an increase in the well-being of a nation's people. If population grows more rapidly than output, then the average person may have a lower income even as real GDP grows; for this reason *per capita* real GDP is a superior measure of the standard of living of a nation's people.



Economic consequence of growth

The economic consequence of growth in *per capita* GDP is an increase in the average level of income and consumption in a nation.

Non-economic consequences of growth

There are several non-economic consequences of growth that should be considered when evaluating growth as a goal of macroeconomic policymakers.

Externalities

Increases in a nation's output often lead to decreases in environmental and physical health. Firms that externalize their production costs by polluting air and water keep their costs low and are thereby able to sell their products at lower prices and produce greater quantities of output. The real GDP of the nation may grow, increasing *per capita* income, but the environmental and physical health of the nation may simultaneously diminish due to the externalizing behaviour of growth-focused firms.

Inflation

Growth achieved primarily through increases in AD can result in greater output per worker but also inflation. It was recently reported that China's real GDP growth rate for 2010 reached an astonishing 10.3%, a rate which made China the second largest economy in the world by early 2011, surpassing both Japan and Germany. If both China and the US continue to grow at their 2010 rates, China will become the largest economy in the world in less than 20 years.

On the downside, official inflation in China was around 5% in 2010; but this rate does not reflect the real impact of growth on the average Chinese household because it excludes both food and fuel price rises. The negative effect of China's rapid growth is an ever-increasing cost of living for the Chinese household, a hardship ignored by official growth and inflation figures.

Resource depletion

Sustainability is not reflected in a nation's growth figures. In its pursuit of greater output, a nation's non-renewable resource base may be depleted at an unsustainable rate.

For instance, Brazil's GDP may increase as the Amazon rainforest is converted into sugar and soy plantations and land for grazing cattle because these commodities are counted in the national output. However, the economic value of the standing forest is not subtracted from Brazil's growth figures, nor is the depletion of soil fertility and the decline in biodiversity resulting from environmentally harmful economic behaviour. A nation in pursuit of more and more rapid economic growth may reduce its potential for achieving long-run sustainable economic development.

Structural unemployment

Growing economies experience structural changes as productivity gains in the secondary and tertiary sectors lead to an ever-shifting demand for skills in the labour force.

Unemployment results among workers whose skills are no longer needed as an economy grows and the composition of output evolves from primary commodities to manufactured goods to high-skilled services.

Composition of output (capital vs consumer goods)

Growth may be the result of high levels of investment by firms in capital rather than high levels of consumption by households. In the case of China, for most of the last decade private investment has made up roughly 50% of the country's GDP. Capital investment, while contributing to the nation's stock of productive resources, does not directly benefit households, for whom production of goods and services for domestic consumption is desirable.

Additionally, a nation with a large export sector may experience rapid growth as foreign demand for its products grows, but domestic consumers will benefit little from such growth if it is accompanied by large trade surpluses resulting from the country exporting more of its output than it consumes in imports from abroad.

Composition of output (military vs civilian goods)

An economy which invests heavily in military equipment or weapons technology may achieve rapid economic growth, but such production does little to improve the material well-being of the average person in that country, for whom production of consumer goods and services is more beneficial. Military spending may help a nation expand its industrial and political agenda abroad and create employment at home, but the trade-off is a decreased quantity and variety of consumer goods for the nation's households to enjoy.

Unequal income distribution

The benefits of economic growth may be enjoyed by an elite minority within the nation's economy or even among foreign owners of capital in the country. The gains in income often accrue among the capital owners, shareholders in large corporations, corrupt political leaders or the educated classes, while the working class, lower-skilled workers in the secondary sector or the rural poor may be left out of the gains from growth. Governments must ensure through progressive taxation and transfer payments that the benefits of growth are enjoyed by all citizens.

The chance that growth will lead to less equal income distribution presents policymakers with a final macroeconomic objective, equity in the distribution of income. Chapter 16 explores the meaning of equity in income distribution, measures for determining income equality and the role of taxation and government spending in re-allocating national income to achieve a more balanced distribution across a nation's people.

To learn more about economic growth, visit www.pearsonhotlinks.com, enter the title or ISBN of this book and select weblink 15.1.



Effect on the balance of payments

In Chapter 23, we will learn about the composition of a nation's balance of payments, which measures all the flows of money, income, goods, services and resources between one nation and the rest of the world. A nation with a high rate of income growth is likely to demand more of the rest of the world's output than the rest of the world demands of its output. Rising domestic incomes generally lead to a net inflow of goods from the rest of the world, shifting a nation towards a deficit in its trade balance with other countries.

When this is the case, the deficit is necessarily accompanied by an inflow of funds from investors abroad seeking to purchase domestic assets, such as factories, real estate and government debt. While such trade imbalances are not necessarily a bad thing, they do lead to several other challenges for government that are explored in more depth in Chapter 23.

Is economic growth always beneficial? What could be meant by the word 'beneficial'? Is there always a cost to economic growth?



PRACTICE QUESTIONS

- 1**
 - a** Outline three strategies which governments may use to increase their economic growth rates. (10 marks) [AO1]
 - b** Discuss whether increasing the rate of economic growth should be the major policy objective of government. (15 marks) [AO3]
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- 2**
 - a** Why might the goal of full employment conflict with the goal of economic growth? (10 marks) [AO2]
 - b** Examine the possible impact economic growth may have on the distribution of income among a nation's households. (15 marks) [AO3]
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- 3**
 - a** Using an AD/AS model, distinguish between short-run economic growth and long-run economic growth. (10 marks) [AO2], [AO4]
 - b** Discuss the importance of investment for economic growth. (15 marks) [AO3]



To access Quiz 15, an interactive, multiple-choice quiz on this chapter, please visit www.pearsonbacconline.com and follow the onscreen instructions.