MEASURING NATIONAL ECONOMIC PERFORMANCE

11.1 The circular flow model of income

Learning outcomes
- Describe, using a diagram, the circular flow of income between households and firms in a closed economy with no government.
- Identify the four factors of production and their respective payments (rent, wages, interest and profit) and explain that these constitute the income flow in the model.
- Outline that the income flow is numerically equivalent to the expenditure flow and the value of output flow.
- Describe, using a diagram, the circular flow of income in an open economy with government and financial markets, referring to leakages/withdrawals (savings, taxes and import expenditure) and injections (investment, government expenditure and export revenue).
- Explain how the size of the circular flow will change depending on the relative size of injections and leakages.

Three Gorges Dam – as this model shows, it is a project of enormous scale. Consequently, it is a symbol of great national achievement for China.

Every year, the US business magazine *Forbes* publishes a list of the world's richest individuals. In 2010, the list was headed by Carlos Helu of Mexico, Bill Gates and Warren Buffett of the US, then Murkesh and Lakshmi Ambani of Mittal of India. In creating the list, *Forbes* has a methodology for assessing the net worth of the world's billionaires and ranking them accordingly.

There are many organizations that attempt to make similar assessments about countries. The OECD, World Bank, IMF, and other groups have all developed and published their assessments of each country's economic performance. Even the Central Intelligence Agency (CIA) gathers its own statistics and (paradoxically) publishes this information openly for all to use.

The matter is not trivial. In a modern society, improving the overall level of economic performance is perhaps the single most important job of every government. All governments attempt to 'keep score,' in other words, to assess their performance against measurements of the well-being of their people. Many governments, especially democratic ones, rise and fall on the fortunes told by economic data.

In this chapter you will look at some methods of keeping score and evaluate the values and limitations of such data.

In Chapter 1, you looked at the circular flow model of the economy showing the movement of resources and money through the economy. In that simplified model, the economy was roughly divided into two types of market, with two types of economic agents interacting (households and firms). In the goods and services market, households bought goods and services, and in exchange paid money to the firms. In the market for factors of production, firms buy land, labour, capital and entrepreneurship from households. Households, in a free market economy, own these factors, and thus earn income in the form of rent, wages, interest and profits, respectively. Money flows in one direction while goods, services and factors of production flow in the other.

The model helps to reinforce a few critical ideas about the nature of a modern economy. First, that for every transaction, a payment for one side is income to the other. It also follows that interruptions to the factor market will affect the demand for goods and services. For example, a decrease in profits will reduce incomes to households, who will then spend less in the product market.

The basic concepts of the circular flow model are as follows.

- In the product market, households are exchanging money payments for the goods and services provided by companies.
- In turn, firms are buying the factors of production (land, labour, capital, and entrepreneurship) from households. When they do so, they make factor payments in the form of rent, wages, interest and profits, respectively.

Additional elements

We can now introduce additional elements into the model to make it more realistic.

The previous model was self-contained but the new model will acknowledge that there are other actors in the system and that money exits and enters the system in a variety of ways. Money that exits the system is referred to as 'leakages,' while money that enters the system is called 'injections.'

The government sector: taxes and spending

Probably the single largest actor not included in the old model is the government. The government has a profound impact on even the most avidly free market economies. Governments draw tax money from the population, a leakage of income out of the model. However, that money should eventually re-enter the model as government spending on everything from salaries to infrastructure. (Even if we assume that some of the money is

lost through corruption, it may also eventually re-enter as consumer spending.) This idea, that the flow of money never truly escapes the model, is one that holds true with the other new actors in the model.

The foreign sector: imports and exports

The previous model assumed a closed economy, hardly a realistic notion in a world of increasingly globalized trade. If we assume that some of the money spent in either the factor or product market is spent on imported goods, then that income will leak from the system. However, roughly the same amount of money should enter in the form of exports sold to other countries. This tendency towards a balance of import and export flows is explained in more detail in Chapter 23. For now, it is sufficient to acknowledge the leakage and injection that takes place with the addition of the foreign sector to the model.

The financial sector: savings and investment

Some consumers save a portion of their money, rather than spend it. Savings would slow down the flow of expenditure and eventually income. However, money that is saved in banks is made available to borrowers. These borrowers then inject the savings back into the economy in the form of investment, whether as capital goods or by the purchase of housing by households. Thus the leakages of savings re-enter the system through loans made by the financial sector.

Figure 11.1 illustrates the new, more complicated circular flow model, one that includes injections and leakages via three sectors: the government, foreign and banking sectors. Injections are insertions of money into the circular flow and include government spending, export purchases, and investments. Leakages are the diversions of money outside the circular flow and occur when the government collects taxes, imports are purchased, or when people save money. Figure 11.1 shows the government sector taking taxes away from firms and households, then injecting the money into the flow again. It shows imports leaking money out of the economy, while exports inject it back in. It shows savings leaking out of the economy, while investment from the savings inject it back in.

To access Worksheet 11.1 on the circular flow model, please visit www.pearsonbacconline.com and follow the onscreen instructions.

Figure 11.1
Circular flow model with leakages and injections.
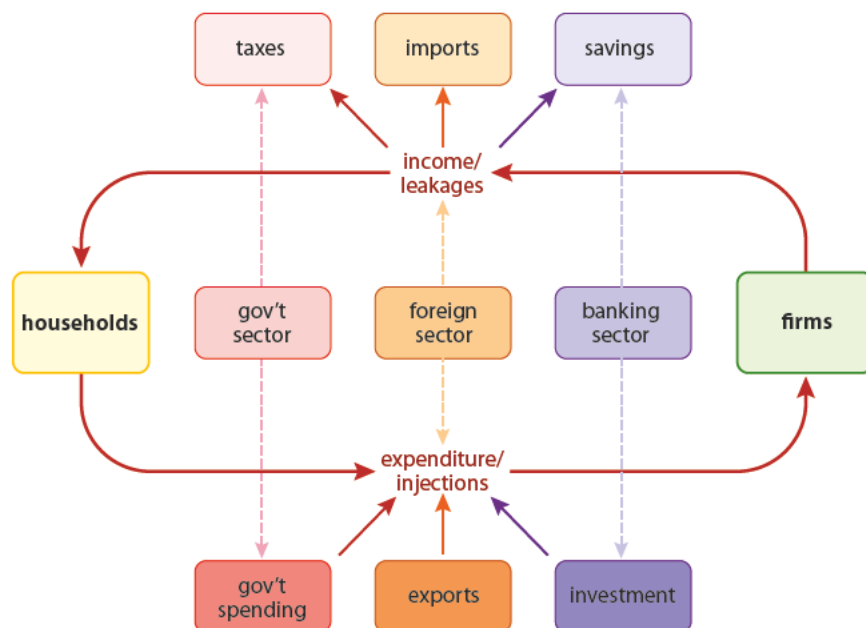
While the new model is still a simplified one, it makes an allowance for some realities. If one sector leaks more than it injects, the flow merely becomes smaller. For example, if imports are greater than exports, the flow may be reduced. If government spending, an injection, is greater than taxes in any given year, the flow will increase. Of course, in that event, most governments will borrow money to do the spending. So it is likely that, in some future year, taxes will be more than spending to pay off the debt. Although there is a tendency for the leakages and injections to be equal, in the real world it is unlikely that they will be at any particular time.

11.2 The measurement of economic activity: GDP, GNP and GNI

Learning outcomes
- Distinguish between GDP and GNP/GNI as measures of economic activity.
- Distinguish between the nominal value of GDP and GNP/GNI and the real value of GDP and GNP/GNI.
- Distinguish between total GDP and GNP/GNI and per capita GDP and GNP/GNI.
- Examine the output approach, the income approach and the expenditure approach when measuring national income.
- Evaluate the use of national income statistics, including their use for making comparisons over time, their use for making comparisons between countries and their use for making conclusions about standards of living.
- Explain the meaning and significance of 'green GDP', a measure of GDP that accounts for environmental destruction.
- (HL only) Calculate nominal GDP from sets of national income data, using the expenditure approach.
- (HL only) Calculate GNP/GNI from data.
- (HL only) Calculate real GDP using a price deflator.

The circular flow model illustrates the essential idea that all the spending in the economy will roughly equal all the income received. The identity of output as equivalent to the value of income may at first seem odd, or an overly tidy result. However, when viewed at the level of an individual transaction, the identity becomes clearer. Consider the purchase of an apple from your local market for $1. This price represents the value of the output to you, the consumer. To the seller, it represents income. Some portion of that $1 goes to the grower, transporter, wholesaler and final market. This income may go to pay wages, to profits, even to rent. Thus, we can say that spending on output must, at the same time, represent income to the factors of production.

When economists set out to add up the value of a country's economic output, they have an enormous task. The equivalence of expenditure to income guides them as they seek to check the validity of their conclusions. With this in mind, economists have three main methods of counting national income:

- the spending (expenditure) approach
- the income approach
- the output approach.

National income accounting is a term that describes a set of principles and standards used by countries to measure their production and income.

> Gross domestic product (GDP) is the value of all final goods and services produced in a country within a given time period.

Each of these seeks to ascertain the value of output or income in a given year, in the hopes of quantifying the level of activity in the economy. Each approach seeks to measure the country's gross domestic product (GDP) – the total value of all final economic production in a country in a given year.

The expenditure approach

The expenditure (spending) method counts the total spending on final new goods and services in a given year. Final goods are ready for consumption; this category does not include goods that will be input goods or are raw materials for other production. Apples bought at the grocery store count as final goods, apples sold to a baker for apple pie are not counted until they are sold in their final form. This approach places such spending into four broad categories:

- **Consumption (C).** Consumption includes the durable and non-durable goods and services purchased by private individuals and households.
  - *Durable goods*: these are generally defined as goods that last more than one year. Large appliances like refrigerators and televisions, as well as automobiles, are considered durable goods.
  - *Non-durable goods*: goods that do not last as long as a year are considered non-durable goods. Rapidly consumed goods like food, magazines, health and beauty products, soaps and detergents, are all examples of non-durable goods.
  - *Services*: services are actions performed by a firm. Legal services, insurance, sales firms, healthcare and education are all examples of services counted in GDP statistics.

- **Investment (I).** Investment refers to spending by firms and households.
  - *By firms*: on capital goods like equipment, buildings, machinery.
  - *By households*: on housing and new construction. This is included because housing has resale value, unlike most other private consumption, so buyers view it more in terms of personal investment.

- **Government spending (G).** Government spending is all spending on government purchases, which includes salaries for workers as well as capital goods spending. Not included are transfer payments. Transfer payments (tax revenue redistributed to pensioners, veterans and the unemployed) do not represent any new production and are thus excluded.

- **Net Exports (X – M).** Net exports count all exports as an inflow and thus an increase in GDP while subtracting imports as an outflow and a decrease in GDP. Therefore, it can be expressed as:

  Net exports = export revenues (X) – import payments (M)

  The expenditure approach can be expressed as:

  $$GDP = C + I + G + (X - M)$$

An example of the expenditure method is shown in Table 11.1. This shows the spending totals for each sector in the US economy for 2009. For the US, a free market economy, the largest spending sector is consumption. This is typical of free market economies. Next is government spending, then private investment, and net exports. Net exports is expressed as a negative number (–386 billion USD), which means that the US imported that much more than it exported in that year.

TABLE 11.1 EXPENDITURE APPROACH: US, 2009	
Expenditure category	**Billions USD**
personal consumption expenditure (C)	10 001
gross private domestic investment (I)	1 590
government expenditures (G)	2 914
net export goods and services (X – M)	–386
gross domestic product	*14 119*

US Bureau of Economic Analysis, 2010

The income approach

The income approach to national income accounting attempts to count GDP through the market view of the circular flow of income. In other words, if all spending on goods and services must be income to the firms and individuals receiving payment, it must be possible to arrive at an accurate GDP number by counting the income received in a given year.

The income approach roughly approximates to the returns for factors of production described in Chapter 1. Wages, interest, rent and profits are the factor payments made for labour, capital, land and entrepreneurship, respectively. Table 11.2 shows the income approach to national income accounting for the US in 2009. These numbers give us a net national income of $10 993 billion. Added to this total are business taxes (since they represent production) and fixed capital consumption (another term for depreciation – an accounting term that reflects the drop in value for assets as they become used or worn). Capital is consumed so some spending goes to the replacement of that capital. Some minor statistical adjustment is also made. The total is equivalent to the GDP number arrived at by the expenditure method in Table 11.1. This confirms the equivalence that enables GDP to be counted via the expenditure approach because, for each transaction, the expenditure is income to the factors of production.

TABLE 11.2 INCOME APPROACH: US, 2009	
Income category	**Billions USD**
compensation of employees (i.e. wages) (W)	7 819
rents (R)	274
interest (I)	982
proprietors' income (P)	1 012
corporate income taxes	255
dividends	612
undistributed corporate profits	39
national income	*10 993*
indirect business taxes	1 081
consumption of fixed capital	1 861
net foreign factor income	5
statistical discrepancy	179
gross domestic product	*14 119*

US Bureau of Economic Analysis, 2010

The output approach

The output approach takes a completely different view when adding the overall level of economic activity. Like the other approaches, the output approach seeks to ascertain the total value of all final goods and services produced in a year. When adding production, however, it would be easy to double count by counting goods that are intermediate goods and then counting the final product. To avoid this, economists attempt to identify the value added at each stage of the production process.

For a simple example, let's consider the production of a car, for which an astonishing number of small parts and components are required. Starting from the beginning, raw materials of metals and plastics are created. Many auto parts suppliers take the raw form of these goods and shape them into something useful. This is the value added by that producer. The car-maker then assembles all the parts into a finished car, adding significant value along the way. Table 11.3 shows how double counting could lead to inflated GDP results.

TABLE 11.3 OUTPUT APPROACH *VS* DOUBLE COUNTING	
Output approach: value added/euros	**Addition of all expenditures: double counting/euros**
(a) labour 900	(a) labour 900
(b) parts 6500	(b) parts 6500
(c) engineering and research 3000	(c) engineering and research 3000
(d) marketing and advertising 1200	(d) marketing and advertising 1200
(e) value added by car company 1400	(e) final selling price 13 000
total = a + b + c + d + value added = 13 000	total = a + b + c + d + final price = 24 600

Using the output approach, the contribution at each level of production is counted. With the approach shown on the right, each level is counted but then the final selling price is counted rather than just including the value added. The result is nearly double that found using the output approach.

Economists seek to assess the value added at each level and add that to GDP. Table 11.4 shows the output approach to national accounting for the US in the year 2009. Here the totals reflect the final new production by industry. The final total approximates the totals for the other approaches, after some adjustment for statistical discrepancy.

TABLE 11.4 OUTPUT APPROACH: US, 2009	
Output category	**Billions USD**
agriculture, forestry, fishing, hunting	99.6
mining	196.1
utilities	184.3
construction	518.6
manufacturing	1 215.2
transportation, warehousing	337.9
wholesale trade	706.1
retail trade	812.4
information	423.2
professional and business services	1 684.8
finance. insurance, real estate, rental and leasing	1 901.5
educational, healthcare, social assistance	1 244.8

Output category	Billions USD
arts, entertainment, recreation, accommodation, food services	453
other services	352
government	1 897.2
rest of world	146.3
national income	*12 173*
capital consumption	1 861
statistical adjustment	85
gross domestic product	*14 119*

US Bureau of Economic Analysis

Why measure economic performance?

The compilation of good economic data is not easy. It requires enormous administrative work, as well as persistent and rigorous mathematical analysis. It can also be quite expensive. The US government's primary agency for national income accounting, the Bureau of Economic Analysis, spends nearly $100 million dollars a year to do this job. A logical question is whether this kind of information is worth that kind of money or, as an economist would say, is the opportunity cost too high? There are three main reasons for measuring economic performance.

- **Information is political power**. Accurate data gives people the ability to understand or interpret their own experience of the economy. This kind of information may help people understand fiscal policies that affect their lives. It also empowers voters in democratic countries to assess the effectiveness of their leaders and make more informed voting choices. In a year when it seems as though everyone knows someone who has lost their job, it is useful to know that unemployment is statistically much higher than usual. And voters can make judgements based on this information.

- **Evaluation of economic performance**. Policymakers and economists of all kinds can use the data to evaluate the overall performance of the economy. Making good policy to affect the economy depends on good information as the basis for those decisions. This is a dimension of positive (rather than normative) economics that everyone agrees on – the need for accurate data. Furthermore, when agencies openly publish the methods used to obtain the data, it allows experts to determine the full value of the information.

- **Making policy adjustments**. Politicians regularly refer to this kind of economic data in order to craft effective legislation. For example, lawmakers who want to soften the impact of major job losses will want to know the areas of greatest loss, the types of worker affected most often, and other relevant data that a good information-gathering bureau can provide. With strong data, policymakers can better predict the effectiveness of a given policy proposal.

> Gross national product (GNP) is the market value of all the products and services produced in a time period by the labour and capital supplied by the residents of a country.

GNP *vs* GDP

We defined GDP as the total value of all final economic production in a country in a given year. But we haven't yet explored what is actually meant by 'country'. GDP measures production within the borders of a country, regardless of who owns the factors of production. Thus, Ireland's GDP may count the production of many English-owned firms that have factories or outlets in Ireland. And Irish firms operating in England add their production to English GDP.

Gross national product (GNP) attempts to measure the flow of income based on actual ownership of the factors of production. GNP statistics do this by subtracting from GDP any payments to foreign factors of production. At the same time, it adds any factor payments from domestically owned factors of production located in other countries. In our Irish example, Irish production in England would be subtracted from English GDP and added to Irish GDP to help arrive at Irish GNP. The term for this is 'net property income' from abroad, which takes the sum of income from domestically owned assets abroad, minus the income from foreign-owned assets within the country. It is possible to summarize the method of accounting for GNP as:

GNP = GDP + net property income from abroad

Table 11.5 illustrates the calculation necessary to arrive at GNP totals. In this case, income receipts are a net positive (in other words, they add to the overall income of the US).

TABLE 11.5 GROSS NATIONAL PRODUCT: US, 2009	
Category	**Billions USD**
gross domestic product	14 119.0
plus: income receipts from US firms in the rest of the world	629.8
minus: income receipts from foreign-owed assets in the US	−483.6
gross national product	14 265.3

US Bureau of Economic Analysis

The data above can be shown as a flow of income across borders. For GNP, the ownership of production factors is paramount, and receipts of income are measured to gain an accurate understanding of the income flows experienced by a country. Figure 11.2 shows how US income earned in the rest of the world (ROW) flows back to the US. At the same time, to get the net effect, US GNP figures must subtract the income receipts of firms in the US but owned by the rest of the world.

Gross domestic product refers to all production *domestically*, or within the geographical area. Gross national product suggests that *nationality of ownership* is paramount for this measure. Countries that have a much higher GNP than GDP are likely to have workers or firms overseas who send income back to home country accounts. Correspondingly, the presence of foreign workers and firms, and the profits and income they repatriate, is

Figure 11.2
GDP – net income = GNP.
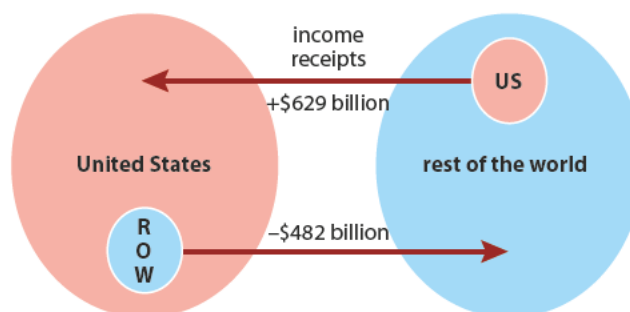
lower by comparison. Countries with higher GDP than GNP may have significant foreign presence, in either workers or companies. Therefore, they suffer a net income loss when GDP is compared to their GNP. Net income is reduced by the outflow of foreign-earned income on the country's soil.

Net national product (NNP)

Economists also manipulate the data to better understand the quality of a country's economic performance. In reality, part of a country's production goes to the replacement of capital goods that have been used or are wearing down. This does not actually count as a contribution towards new production, and so may overestimate the magnitude or impact of the GNP numbers.

For example, the reinforcement of a major river dam may be counted as the provision of goods and services. The effect, however, is to maintain a level of service that already existed. The wearing down of capital goods is called depreciation. Economists have complicated methods of determining the degree to which a sector of the economy may be paying to repair or replace old capital goods. This measure appears in Tables 11.2 and 11.4 as 'consumption of fixed capital' or 'capital consumption.' When economists subtract these numbers from the overall output, they are trying to assess the level of truly new production.

Net national product can therefore be calculated by deducting the capital consumption from the gross national product.

net national product = gross national product – capital consumption

So, for the US in 2009,

US net national product (2009) = 14 265 billion – 1861 billion = 12 404 billion

Thus, when spending on the replacement of old goods and services is factored out, the total level of truly new goods and services spending is revealed. Why is this important? In some years, spending on depreciation can be quite high. In those years, it's possible that new investment is comparatively low. It is new investment, in particular, that creates new productive capacity. Therefore, the net numbers for both GNP and investment give economists a notion of how strong this economy will be in future years, not just the current one.

> Net national product (NNP) is the market value of production supplied by labour and capital supplied by the residents of a country, minus the depreciated value of capital goods.

HL EXERCISES		

8   **a**   Using the table below, calculate GDP using the expenditure approach.

CATEGORY	BILLIONS USD
government spending on goods and services	900
transfer payments	320
gross private domestic investment	410
income from foreign employment	750
taxation	340
consumption	950
imports	330
exports	150
net property income from abroad	–270
saving	60

    b   Now calculate GNP/GNI.

Nominal *vs* real GDP

Economists hope to determine the actual level of output of cars, houses, clothing, medical services and everything else produced in a year. Because we count this output by tabulating the transaction prices charged at the time, price changes can distort attempts to measure actual output. Economists seek to distinguish between the nominal value of output as it is shown in current prices (which may be inflated or deflated), with 'real' output. Real GDP refers to measures of output that factor out price changes and should show a more accurate measure of the true output from one year to the next.

For example, consider a car manufactured and sold for $20 000 in a given year. One year later, exactly the same car is manufactured and sold for $25 000. Simple mathematics tells us that the price has increased by 25%, but nothing about the car is actually 25% greater than in the previous year. So a nominal measure of GDP for the second year would count this 25% increase in price as a contribution to national income, when really it is only an increase in the price of the good. This is how price increases from inflation could cause GDP to be overestimated, causing us to think the economy is doing better than it is in reality.

When taking account of goods and services in their current prices, economists use the term 'nominal.' Nominal GDP is simply the value of goods and services produced in a country in a given year, expressed in the value of the prices charged for that year. In the example above, the new car would have added $25 000 to nominal GDP, providing an artificially high estimate of how much output actually grew.

- Price level increases (inflation): nominal GDP exaggerates value of output compared to real output.
- Price level decreases (deflation): nominal GDP underestimates value of real output compared to actual output.

Nominal GDP is the value, in current prices, of all final goods and services produced in a country within a given time period.

Real GDP is the value, in constant prices, of all final goods and services produced in a country within a given time period, usually measured against prices of predetermined base year.

Per capita GDP

While real GDP adjusts for price changes, economists use another measure to adjust for population size. After all, we would expect countries with large populations to have large economies: their supply of labour resources and human capital can be a tremendous advantage. At the same time, it is important for a country to be growing enough economically to keep pace with the growth of its population. Table 11.6 shows the GDP rankings of the top five economies by sheer size for 2009.

TABLE. 11.6 GDP COUNTRY RANKING, 2009	
Country	**Total GDP/trillions USD**
US	14.2
Japan	5.0
China	4.9
Germany	3.3
France	2.6

Per capita GDP is an average based on the national income of the country divided by the country's population.

Note that the Japanese and Chinese economies are approximately equal in size at about $5 trillion per year (2009 was the last year that China was ranked behind Japan). We could thus mistakenly infer that the Japanese and Chinese have roughly the equivalent material standard of living. This conclusion would ignore the fact that China divides that income between 1.2 billion more people than Japan does.

A simple mathematical adjustment provides a more accurate picture. By dividing GDP by the population size, we arrive at a *per capita* (per head) income for the country. *Per capita* GDP is the amount of national income divided by the population size. It gives us a better sense of the approximate standard of living in a country than total GDP does (Table 11.7).

TABLE 11.7 A CROSS-COMPARISON OF SOME OF THE LEADERS IN TOTAL GDP AND *PER CAPITA* GDP, 2009			
Country (*per capita* rank)	**Total GDP/trillions USD**	**Country (total rank)**	***Per capita* GDP/USD**
1 US (6)	14.2	1 Luxembourg (68)	105 350
2 Japan (14)	5.0	2 Norway (24)	79 089
3 China (86)	4.9	3 Denmark (29)	55 992
4 Germany (13)	3.3	4 Ireland (37)	51 049
5 France (12)	2.6	5 Netherlands (16)	47 917

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You can see that among the leaders in total GDP, none rank in the top five in *per capita* GDP and only the US is in the top 10. China ranks 86th in the *per capita* GDP list, suggesting that its enormous GDP is averaged out among an equally enormous population. Among this group, only China ranks as a developing country. You should note that among the *per capita* leaders, all are relatively small countries and all are in Europe.

Clearly, real GDP *per capita* gives us a better picture of how productive a country is on a per person basis. However, an average measure like *per capita* GDP can hide as much as it reveals. Income is actually distributed unequally, sometimes dramatically so. In many countries, a far-above-average level of income among a small elite is the norm, while the vast majority of the population live on much less than the average. In far too many places, people live on less than $1 per day. So, while *per capita* information provides us with more information about a country's economic performance, and allows us to better compare one country to another, it tells us little about the income distribution within the country itself.

Country groups by income

International aid and development agencies such as the World Bank have attempted to categorize the world's countries by income level. The World Bank has set benchmark levels of income to distinguish between high-, upper-middle-, lower-middle-, and low-income countries. The stated aim of the World Bank is to promote the economic development of countries in the bottom three categories to increase their standards of living and to further other development goals (economic development is covered in more detail in Chapters 26–29). Briefly put, development refers to the standard of living that is typical in a country, and includes income, education levels, health and life expectancy.

As one might expect, income level and development status are highly correlated: most of the richest countries tend to have the highest development levels. But the correlation is not perfect. Many countries have incomes that suggest a development level far greater than has actually been achieved. And some countries have done well enough in the categories of education and health to supersede the disadvantage of a low income level.

Tables 11.8a–d (overleaf) show the World Bank grouping of countries according to *per capita* income levels (GNI *per capita*). The criteria for the four levels are:

- low-income economies – GNI *per capita* $995 per year or less
- lower-middle-income economies – GNI *per capita* $996 to $3945
- upper-middle-income economies – GNI *per capita* $3946 to $12 195
- high-income economies – GNI *per capita* $12 196 or more.

ⓘ Some of the richest countries in the world are among the nations with the most unequal distribution of income. China, the US and Brazil have very large economies producing vast amounts of output, but with massive inequalities in income distribution. At the other extreme, some of the poorest countries have the highest levels of income equality. Pakistan, Bosnia and Bulgaria are all in this bracket (income equality is explored in Chapter 16).

TABLE 11.8a WORLD BANK COUNTRY INCOME: LOW-INCOME COUNTRIES (GNI < 995 USD)		
Afghanistan	Guinea	Nepal
Bangladesh	Guinea-Bissau	Niger
Benin	Haiti	Rwanda
Burkina Faso	Kenya	Sierra Leone
Burundi	Korea, Dem Rep.	Solomon Islands
Cambodia	Kyrgyz Republic	Somalia
Central African Republic	Lao PDR	Tajikistan
Chad	Liberia	Tanzania
Comoros	Madagascar	Togo
Congo, Dem. Rep	Malawi	Uganda
Eritrea	Mali	Zambia
Ethiopia	Mauritania	Zimbabwe
Gambia, The	Mozambique	
Ghana	Myanmar	

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TABLE 11.8b WORLD BANK COUNTRY INCOME: LOWER-MIDDLE-INCOME ECONOMIES (996 TO 3945 USD)		
Angola	India	São Tomé and Principe
Armenia	Iraq	Senegal
Belize	Jordan	Sri Lanka
Bhutan	Kiribati	Sudan
Bolivia	Kosovo	Swaziland
Cameroon	Lesotho	Syrian Arab Republic
Cape Verde	Maldives	Thailand
China	Marshall Islands	Timor-Leste
Congo, Rep.	Micronesia, Fed. Sts.	Tonga
Côte d'Ivoire	Moldova	Tunisia
Djibouti	Mongolia	Turkmenistan
Ecuador	Morocco	Tuvalu
Egypt, Arab Rep.	Nicaragua	Ukraine
El Salvador	Nigeria	Uzbekistan
Georgia	Pakistan	Vanuatu
Guatemala	Papua New Guinea	Vietnam
Guyana	Paraguay	West Bank and Gaza
Honduras	Philippines	Yemen, Rep.
Indonesia	Samoa	

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TABLE 11.8c WORLD BANK COUNTRY INCOME: UPPER-MIDDLE-INCOME ECONOMIES (3946 TO 12 195 USD)		
Albania	Dominican Republic	Namibia
Algeria	Fiji	Palau
American Samoa	Gabon	Panama
Antigua and Barbuda	Grenada	Peru
Argentina	Iran, Islamic Rep.	Romania
Azerbaijan	Jamaica	Russian Federation
Belarus	Kazakhstan	Serbia
Bosnia and Herzegovina	Lebanon	Seychelles
Botswana	Libya	South Africa
Brazil	Lithuania	St. Kitts and Nevis
Bulgaria	Macedonia, FYR	St. Lucia
Chile	Malaysia	St. Vincent and the Grenadines
Colombia	Mauritius	Suriname
Costa Rica	Mayotte	Turkey
Cuba	Mexico	Uruguay
Dominica	Montenegro	Venezuela, RB

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TABLE 11.8d WORLD BANK COUNTRY INCOME: HIGH-INCOME ECONOMIES (> 12 196 USD)		
Andorra	Germany	New Caledonia
Aruba	Gibraltar	New Zealand
Australia	Greece	Northern Mariana Islands
Austria	Greenland	Norway
Bahamas, The	Guam	Oman
Bahrain	Hong Kong SAR, China	Poland
Barbados	Hungary	Portugal
Belgium	Iceland	Puerto Rico
Bermuda	Ireland	Qatar
Brunei Darussalam	Isle of Man	San Marino
Canada	Israel	Saudi Arabia
Cayman Islands	Italy	Singapore
Channel Islands	Japan	Slovak Republic
Croatia	Korea, Rep.	Slovenia
Cyprus	Kuwait	Spain
Czech Republic	Latvia	Sweden
Denmark	Liechtenstein	Switzerland
Estonia	Luxembourg	Trinidad and Tobago
Equatorial Guinea	Macao SAR, China	Turks and Caicos Islands
Faeroe Islands	Malta	United Arab Emirates
Finland	Monaco	UK
France	Netherlands	US
French Polynesia	Netherlands Antilles	Virgin Islands (US)

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The usefulness and accuracy of GDP data

Does wealth make one happy? This age-old question arises quite appropriately when the question of GDP and well-being is raised. In other words, to what degree does a higher GDP *per capita* mean a better quality of life? Economists use the term 'welfare' to describe a way of speaking about the quality of life. We would assume that, *ceteris paribus*, more income is better than less income. And so we could easily conclude that countries ranked according to *per capita* income levels could be ranked in the same order for welfare.

However, it is possible to argue that GDP masks our view of a country's true welfare. Some have contended that GDP has little relevance for the everyday person. Economists have noted that national income accounting sometimes exaggerates well-being, and sometimes underestimates it. And sometimes, it misleads in unpredictable ways.

GDP overestimates well-being

GDP exaggerates well-being in the following ways.

- **Adding clearly negative social behaviours and transactions as net positives for GDP.** These include the environmental damage from many kinds of production. Furthermore, the money spent to jail criminals, fight wars, and consume unhealthy products all add to GDP figures, without contributing much to overall welfare.
- **Under-reporting the loss of natural resources**. The degradation of rainforests is more likely to count as increased production than the despoiling of potentially valuable resource bases and watersheds. Strip mining of metals, the destruction of endangered species, and other environmentally harmful endeavours count as adding to GDP, though their long-term consequences may be devastating.

Green GDP

One interesting and potentially groundbreaking benchmark for measuring the performance of an economy is the concept of 'Green GDP'. Green GDP seeks to estimate a country's aggregate output while factoring in any output losses created by environmental degradation. The approach seeks to establish a monetary value to soil erosion, water pollution, loss of biodiversity, and contributions to climate change. The approach is controversial because losses from environmental damage are very difficult to estimate accurately (Chapter 6). The concept received a large publicity boost when Wen Jiabao, China's premier, announced in 2004 that Green GDP would replace traditional GDP measures. However, a few years later China's government dropped the focus on Green GDP due to arguments among Chinese officials over the estimated losses. Despite this change of focus, it is expected that attempts to frame economic growth in terms of sustainability (of which Green GDP is an example) will continue as pressure on global resources continues to grow.

GDP underestimates well-being

GDP underestimates well-being in the following ways.

- **The fact that people are living longer is not included**. Longer life-expectancy is a universal goal among all countries. Most countries have seen their life expectancies climb. GDP does not tell this story.
- **Black and underground market activity is not included**. For some countries, the estimated value of black market or parallel market activity is quite high. The income generated in these markets is not counted in final GDP numbers.

What can a tiny kingdom high in the Himalaya teach us about economic well-being? The Kingdom of Bhutan, under its revered King Jigme Dorji Wangchuk, began measuring gross national happiness (GNH) in 1976. The country focused its government growth and development policies on various areas of wellness, instead of on the output of goods and services. The areas of wellness measured under GNH include environmental, physical, mental, workplace, social, political and economic wellness.

HOW BIG IS THE BLACK MARKET?	
Country	**Estimated shadow economy/%GDP, average 1990–93**
Developing economies	
Africa	
Nigeria and Egypt	68–76
Tunisia and Morocco	39–45
Central and South America	
Guatemala, Mexico, Peru and Panama	40–60
Chile, Costa Rica, Venezuela, Brazil, Paraguay and Colombia	25–35
Asia	
Thailand	70
Philippines, Sri Lanka and Malaysia	38–50
Hong Kong and Singapore	13
Transition economies	
Central Europe	
Hungary, Bulgaria and Poland	20–28
Romania, Slovakia and Czech Republic	7–16
Former Soviet Union	
Georgia, Azerbaijan, Ukraine and Belarus	28–43
Russia, Lithuania, Latvia and Estonia	20–27
Developed economies	
Greece, Italy, Spain, Portugal and Belgium	24–30
Sweden, Norway, Denmark, Ireland, France, the Netherlands, Germany and UK	13–23
Japan, US, Austria and Switzerland	8–10

International Monetary Fund

- **Unpaid output is not counted**. In other words, GDP only counts paid work. Volunteer efforts, which can be considerable in some countries, are not counted. Housework and childcare done by mothers or fathers, while clearly desirable socially, are not counted. Furthermore, the work of poor farmers in subsistence economies is not counted, since these families will eat the product of their labour, rather than sell it. GDP figures show countries with subsistence economies to be poorer than perhaps they really are.
- **GDP adds market transactions, regardless of the quality of output**. Technological and managerial techniques are expected to improve the choice, quality and safety of most of our material goods and services. These improvements are unseen by GDP figures, which merely report the type of output and the purchase price value of the product. For example, consider the calculators that many students use in their maths classes. To replicate the collective computing power of these small, inexpensive machines in a single computer would require a machine the size of a room, costing thousands of dollars.

GDP lacks information

GDP does not provide enough information. Below are examples of why not.

- **The composition of the output is a mystery**. Does the economy produce large amounts of demerit goods, such as weapons or cigarettes, or spend money controlling the damage of natural disasters and criminal activity? Or instead does the economy

Can a natural disaster be good for a country's GDP? In March 2011, a massive earthquake struck off the coast of Japan, triggering a tsunami that wiped out dozens of communities along Japan's northeast coast. There are now estimates that the disaster may lead to an increase in Japan's GDP of hundreds of billions of dollars. Does such destruction really create economic welfare? Or is there something flawed about how we measure it?

have more hospitals and doctors than average, with greater access to education? Raw GDP numbers do not communicate the types of production, or their value to society.

- **GDP does not measure many aspects of quality of life.** Community activity that includes participation in groups beyond the family (e.g. social clubs, volunteer participation, church groups, sports or outdoor activities) have been linked to greater life satisfaction. Faith in government, trust in the law and the courts, a sense of mutual responsibility among citizens, all these are desirable qualities for any country, but are unreported by national income data.
- **GDP provides no information about the distribution of income.** In other words, GDP cannot tell us who gets what. Income distribution can be very divergent, with a large gap between rich and poor. Furthermore, there is no guarantee that those at low income levels are experiencing growth along with growth in GDP. While GDP may grow, individuals at the lowest levels of income may experience decreased standards of living.
- **GDP, as commonly reported in the news, does not account for purchasing power.** This caveat is explained in detail below.

In 1984, the newly launched Apple IIC computer sold for $1295. In today's money, that would be over $3000. For $3000 today, you can buy a top-of-the-range Mac desktop or high-end Macbook. Of course, you'd get a machine with millions of times the computing power of the 1984 model. How do GDP figures account for the change in the quality of computers over the decades? Or do they?

Robert Kennedy, a US Senator, ran for President and made the following protest about the over-importance of national income accounting numbers.

Too much and too long, we seem to have surrendered community excellence and community values in the mere accumulation of material things. Our gross national product ... if we should judge America by that – counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for those who break them. It counts the destruction of our redwoods and the loss of our natural wonder in chaotic sprawl. It counts napalm and the cost of a nuclear warhead, and armoured cars for police who fight riots in our streets. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children.

Yet the gross national product does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages; the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage; neither our wisdom nor our learning; neither our compassion nor our devotion to our country; it measures everything, in short, except that which makes life worthwhile. And it tells us everything about America except why we are proud that we are Americans.

Speech at the University of Kansas, 1968

- List some of the ways Kennedy argues that GDP overestimates the national welfare.
- List some of the ways that social welfare is not measured by GDP at all, according to Kennedy.
- What kind of argument is Kennedy making?
- Do you agree with this argument? Why?
- Would your parents agree with this argument? Why?
- Which of our ways of knowing (sense perception, reason, emotion and language/symbols) do GDP statistics appeal to?
- Which ways of knowing does Kennedy's assertion appeal to?

Purchasing power parity comparisons

Of course, when doing any national income accounting, the statisticians involved tabulate output and incomes in the local currency. But comparisons between Norwegian kroner and Thai baht would be meaningless; the figures need to be translated into a single currency – the US dollar.

While this translation makes comparisons more useful, the spending power of money in Norway may be very different from that in Thailand. Resources, goods and services may be more expensive in Norway than in Thailand, which means that more income may be needed to enjoy the same standard of living as in Thailand.

To more accurately reflect the buying power of any amount of income, and so to better assess the standard of living in a country, economists use a comparison called purchasing power parity (PPP). PPP is based on the law of one price, which states that an identical good in one country should cost the same in another country, and that the exchange rate should reflect that price. (The implications this has for the way we look at exchange rates are covered in Chapter 22.) For our purposes here, PPP is a tool to assess more accurately the standard of living available for a given amount of income in a country.

For example, the Norwegian equivalent of $100 (Nk588) may buy a certain amount of food, perhaps three pizzas. The Thai baht equivalent of $100 (THB2994) may buy six pizzas, because staple goods are cheaper in Thailand. This means that every $100 of income earned in Norway will buy less in goods and services than the same amount in Thailand. Therefore, Norway's high GDP *per capita* (Table 11.7) may overrate the standard of living there.

When the purchasing power is factored into national income measures, it produces a refined view of the GDP data. Table 11.9 shows how the *per capita* GDP leaders in Table 11.7 are adjusted for purchasing power in their countries. In each case, PPP adjustments reduced the *per capita* GDP. All of these are West European countries, where the cost of living tends to be higher.

TABLE 11.9 MORE DEVELOPED COUNTRIES: *PER CAPITA* GDP ADJUSTED DOWNWARDS WITH PPP ACCOUNTING

Country	GDP *per capita*/thousands USD	GDP *per capita* PPP/thousands USD	Rank
Luxembourg	105 350	84 003	1
Norway	79 089	55 672	3
Denmark	55 992	36 762	13
Ireland	51 049	41 278	6
Netherlands	47 917	40 715	7

Table 11.10 shows examples of several countries whose *per capita* GDP is revised upwards when purchasing power is taken into account.

TABLE 11.10 LESS DEVELOPED COUNTRIES: *PER CAPITA* GDP ADJUSTED UPWARDS WITH PPP ACCOUNTING

Country	GDP *per capita*/thousands USD	GDP *per capita* PPP/thousands USD
China	3744	6 838
Romania	7500	14 198
India	1134	3 275
Ethiopia	345	936
Russia	8800	18 945

In the case of less developed countries, many are shown as having GDP *per capita* PPP greater than their nominal GDP values. This suggests that when ranked against other countries nominally, their potential standard of living is underestimated. What these countries also share is some level of underdevelopment. In some, like Ethiopia and perhaps India, the vast majority of people live in conditions of absolute poverty. In others, like Romania and Russia, portions of the country are underdeveloped, although the country itself is considered a lower-middle-income country.

Economists pay attention to PPP-adjusted GDP levels to better understand the attainable quality of life, and to compare one country with another in this regard.

Calculations (HL only)
Using price indices to determine real GDP

To solve the problem created by nominal GDP accounting (nominal *vs* real GDP, page 244), economists have developed methods to adjust the numbers to reflect real output. This is done by factoring out the changes in price levels for any given year, whether they are increases or decreases. To get a clear sense of how prices have changed over a given period, a price index is constructed for a set of goods. This index tracks changes in the prices of the same goods, every month, year by year. When prices rise, the index number increases; as prices decrease, it falls. A full explanation of how price indices are created is given in Chapter 14, page 302.

Briefly put, the 'basket' of goods depends on the type of price changes being monitored. Most countries track consumer prices. A consumer price index follows prices for the goods typically consumed by an urban household. It includes spending on rent/mortgage, transport, food, clothing, medical care, and entertainment, among many other things. Another type of index, often called the GDP deflator, watches price changes across all goods in the economy.

Because prices are relative measures, economists arbitrarily pick one year as a starting point. This is called the base year. Changes in price for all goods and services are measured against the benchmarks established in the base year. When the basket prices are compiled again, the final numbers are expressed as a change in percentage compared to the base year.

For example, the year 1 (base year) index is established as 100. If prices in year 2, the year after the base year, have increased overall by 5%, the year 2 index number will be 105. If prices were to increase further and the year 3 index was 107, it would mean that prices increased by 7%, compared to the base year. Again, index numbers reflect changes in prices measured against base year prices.

The GDP deflator and real GDP

To accurately measure real output, it is necessary to use a price index to factor out any changes in prices hidden by nominal GDP, price changes that might distort our picture of the nation's production. The GDP deflator, because it measures prices across the economy, is the index created to accomplish this.

It is called a deflator because the more common experience of most economies is some type of price inflation. So, normally, this index will deflate nominal GDP to a smaller number that reflects the actual output. This price-adjusted number is called real GDP, because inflation (or deflation) has been factored out, and the number better reflects the true measure of goods and services produced that year. The formula for calculating real GDP is:

$$\text{real GDP} = \frac{\text{nominal GDP}}{\text{GDP deflator}} \times 100$$

So, assume, for example, that in year 1, nominal GDP is $500 billion and the GDP deflator is 100. In year 2, nominal GDP is $560 billion and the GDP deflator is 103 (reflecting a 3% increase in prices over year 1), how much would GDP have really increased?

$$\text{real GDP year 2} = \frac{560}{103} \times 100 = \$543.6 \text{ billion}$$

So, the nominal GDP of $560 billion in year 2 has been deflated to the real GDP of $543.6 billion. Similarly, nominal GDP for every year is either deflated or inflated using the GDP deflator. Figure 11.3 (overleaf) shows how this might be visualized.

Figure 11.3
Nominal GDP to real GDP.
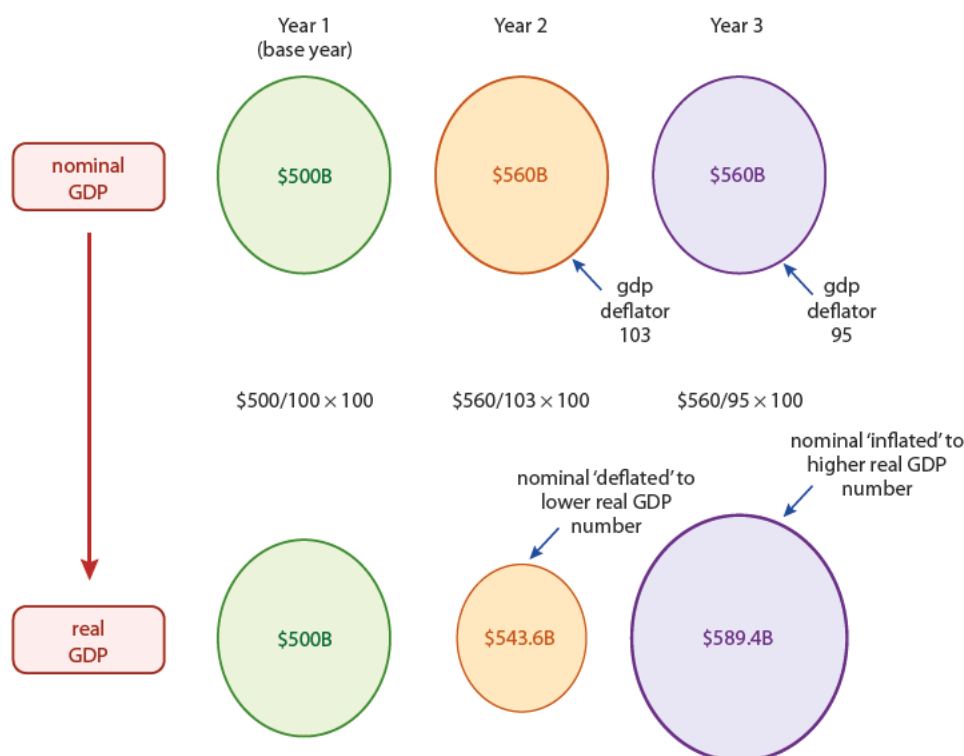
- The green bubbles represent the base year situation. Nominal GDP is divided by the base year index number (100) and multiplied by 100, leaving it unchanged.

- The orange bubbles represent year 2. In year 2, the nominal GDP is $560 billion. The price index of that year (103) shows some price inflation, so the nominal GDP requires deflating. The formula calculations reveal that the real GDP is $543.6 billion.

- The purple bubbles represent year 3. In year 3, nominal GDP is the same as in year 2, $560 billion. However, it appears that the price level of the economy has decreased significantly compared to years 1 and 2. As a result, the real GDP is inflated by the GDP deflator index, revealing a rather higher real GDP of $589.4 billion.

Real GDP growth rate

Using only nominal numbers, a relatively small amount of inflation or deflation can alter the way we view the economy. A rise of nominal GDP by 2% could, in reality, be a recessionary decrease of GDP when inflation is running at 3%. In real terms, the economy would have actually shrunk by 1%. With this in mind, economists are likely to use real GDP or real GNP numbers when comparing one economy to another, or the performance of a single economy from year to year.

EXERCISES
Calculate real GDP for the following examples.
9   Nominal GDP: $431 billion; index (GDP deflator): 115
10   Nominal GDP: $1.5 trillion; index (GDP deflator): 106.5
11   Nominal GDP: $900 million: index (GDP deflator): 97

Calculating rates of growth or decline

How well is your country's economy actually doing? To answer that question, most people will compare recent performance to the previous year or the past few years. However GDP is counted, what matters most is that there is progress, or economic 'growth.' Growth is defined as an increase in real GDP from one year to the next. It is found by using a rate of change equation.

The rate of change in anything can be calculated by dividing the change in a value by the original value and multiplying the result by 100. Take for instance, the rate of change in your height over the last year. If last year, you were 175 cm tall, and this year you are 180 cm tall, the rate of change in your height is simply the change in height from last year to this year, divided by your height last year, multiplied by 100. So, to find the rate of change in your height, you would solve the equation:

$$\text{Rate of change in height} = \frac{180 - 175}{175} = 0.028 \times 100 = 2.8\%$$

Your height increased by 2.8% over the last year.

The same formula can be used to calculate the rate of change in anything. We used a similar calculation to determine elasticities, since the formula for elasticities requires that we compare the percentage changes in prices and the percentage changes in quantities. To review, percentage change of a variable (x) is always found using the following equation:

$$\text{Percentage change in } x = \frac{\text{New value of } x - \text{initial value of } x}{\text{initial value of } x} \times 100$$

Using this simple equation, we can find the percentage changes in important macroeconomic indicators, such as real gross domestic product (Chapter 15) and the price level (Chapter 14). Thereby, we can determine the economic growth rate of a country between one period of time and another, or we can calculate the rate of inflation by measuring the percentage change in a price index over time.

Use the equation above for measuring percentage changes to complete the following exercise.

EXERCISES				

12 Calculate the values for the yearly GDP growth rate and yearly inflation rates for years 2–5 in the table below.

YEAR	REAL GDP/ BILLIONS	GDP GROWTH RATE	PRICE INDEX	INFLATION RATE/%
1	543	–	100	–
2	560		105	5
3	551		109	
4	559		123	
5	615		104	

Economic growth is deemed important enough to be a macroeconomic policy goal for most governments. But not all countries are equal when it comes to growth. A study by Columbia professor Jeffery Sachs has found that there is an inverse relationship between the *per capita* income level of a country and the rate of growth, meaning poor countries grow more rapidly than rich ones. Why do you think this might be?

11.3 The business cycle

Learning outcomes
- Explain, using a business cycle diagram, that economies typically tend to go through a cyclical pattern characterized by the phases of the business cycle.
- Explain the long-term growth trend in the business cycle diagram as the potential output of the economy.
- Distinguish between a decrease in GDP and a decrease in GDP growth.

Short-term results

The business cycle is a term used to describe the fluctuations of national income from expansion to contraction to recovery. It can also be associated with changes in price levels.

Every three months, government agencies report many of the statistics we have discussed so far. It is quite common to hear something like 'The economy grew by 1.3% on an annual basis in the first quarter of this year.' This means that the economy grew, compared to the same period last year, and if that trend continues, the overall growth rate would be 1.3%. These kinds of results are immediate, and do provide policy makers and investors with a rough idea of how the economy is performing.

Economies tend to rise and fall, sometimes with warning and at other times rather suddenly. The fluctuations of GDP, and the important changes in employment that go with it, are often called the business cycle because there sometimes appears to be a pattern of increase and decrease, followed by another increase and then decrease. However, as Figure 11.4 shows, a more appropriate term might be the business roller-coaster.

Figure 11.4
The business cycle.
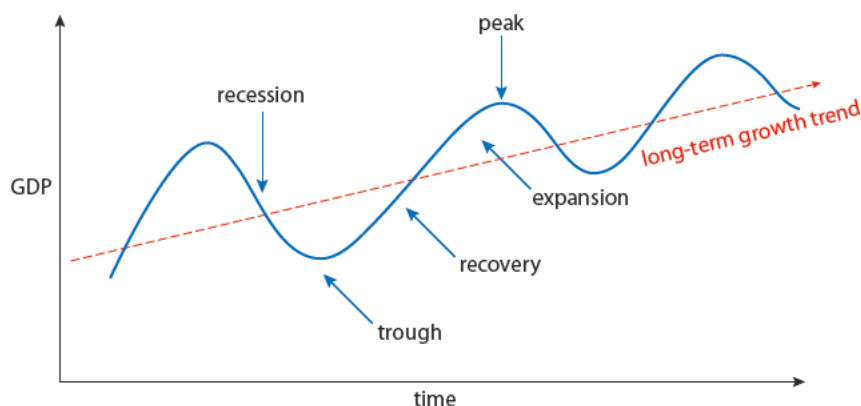
Economic growth, as you now know, is an increase in the GDP from one year to the next. But sometimes, the economy shrinks. A recession is defined as two consecutive quarters of declining national output. In other words, if the economy contracts over a six-month period, it is classified as a recession.

The casual reader of news may fail to make an important distinction between a recession (a decrease in the *size of the economy*) and decrease in the *rate of growth*. For example, when the economy grows at 4% one year and at 2.5% the next, the economy has still grown, just at a decreased rate. To qualify as a recession, the 'growth' rate must be negative (e.g. −1%) over six months.

Why is this distinction important? The term 'recession' carries significant power over consumer and market confidence. When there is danger that the economy is going to

slip into recession and actually shrink, the news is met with concern by businesses and governments. Less economic activity means there will be fewer workers required to produce because less output requires fewer workers. This raises the fear of unemployment and workers losing their jobs because there's not enough activity in the economy. It is at these points that policymakers usually try to change policy and attempt to help the economy in some way.

The lowest point of a recession is called the recessionary trough. Nobody really knows exactly when this point is reached until output has begun to recover and growth has resumed. Hopefully, the economy will quickly enter a recovery period. Recovery is defined as an increase in GDP from a recessionary level to match the level of output produced before the recession. The economy is getting back to where it was before the contraction.

Should the economy grow beyond its previous level of output, it is called expansion. For most countries, expansion happens in short bursts, rather than a steady level of growth. When these bursts hit an apex (just before a recession) it is called the peak. Again, no one really knows (until afterwards) when a peak has been reached, and economists speculate about the length of any given economic boom period.

The specific ways an economy can go from recession to recovery, and from recovery to expansion to recession again, are covered in detail in the chapters that follow. What is important to note here is that short-term fluctuations, the highs and lows of the roller-coaster, can be quite dramatic. Many believe that it is the job of policymakers to 'smooth out' the peaks and troughs, to allow for more economic stability whenever this is possible.

Just as important, however, is that the roller-coaster moves generally upwards. Look again at Figure 11.4 and note the trend line that runs through the peaks and troughs. The trend line suggests that, over the long term, the economy is growing. This may mean an improvement in the standard of living. Or it may not, if the growth in population is faster than the growth of GDP, or if the income is going to only the richest few. However, whatever the distribution or the population, for the population of a country to improve its quality of life, growth is a necessary ingredient. As you will discover later in our discussion of economic development, growth is a necessary, but not sufficient, condition for a better life.

To learn more about the business cycle, visit www.pearsonhotlinks.com, enter the title or ISBN of this book and select weblink 11.3.

What is the empirical evidence for the existence of the business cycle? How do we decide whether this evidence is sufficient?

To access Quiz 11, an interactive, multiple-choice quiz on this chapter, please visit www.pearsonbacconline.com and follow the onscreen instructions.

PRACTICE QUESTIONS

1   Distinguish between GDP and GNP/GNI as measures of economic activity. (10 marks) [AO2]

2   Explain how the circular flow of income functions as a system with leakages and injections.
(10 marks) [AO2]

3   a   Explain the process by which nominal GDP is calculated and distinguish it from real GDP.
(10 marks) [AO2], [AO4]

    b   To what extent do measures of GDP accurately estimate national well-being?
(15 marks) [AO3]

4   a   Analyse the use of GNP *per capita* to compare living standards in different countries.
(10 marks) [AO2]

    b   Assess the value of two other measures which might be used to compare living standards.
(15 marks) [AO3]

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