



Discovering Economics

8

Greg Parry

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8th edition

Greg Parry Steven Kemp

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Discovering Economics

8th edition

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Preface

This text is written for the Economics ATAR (Australian Tertiary Admission Rank) course for year 11 students in Western Australia. It provides an introduction to the exciting and relevant world of economics. The text covers key concepts in both microeconomics and macroeconomics. Microeconomics is concerned with individual decision-making for both consumers and producers. Microeconomics studies how resources are allocated in the economy. Macroeconomics is a study of the business cycle and economic growth.

Economic issues now dominate the world agenda. Economic literacy is therefore essential for all students no matter what further study or career they undertake. We believe that it is important for economics to be promoted as a method of thinking logically about a wide range of problems. It is hoped that students will recognise the need to be well informed about current economic issues, and be able to relate this to the economic theory presented in the text.

Our wives and children have discovered the meaning of one of the most important concepts in economics during the time we have devoted to preparing this book (opportunity cost) and deserve thanks for their patience and understanding.

Greg Parry and Steven Kemp

Discovering Economics

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What is economics?

Learning Objectives

In this chapter you will learn about:

- *the meaning of economics*
- *scarcity and the economic problem*
- *the distinction between microeconomics and macroeconomics*
- *the concept of opportunity cost*
- *the economic decision making process*
- *the importance of economic models*
- *the production possibility frontier (PPF) model*
- *the characteristics of a market economy*

The meaning of economics

Economics is the most important subject you will ever study! Economics is also the most useful subject you will ever study! Economics will provide you with important insights into how the world operates and will also help you in making decisions throughout your entire life. In fact every decision you make is an economic decision. Economics is important because it permeates every aspect of life. Economic issues are everywhere. Consider, for example:

- the Covid-19 pandemic
- climate change
- petrol prices
- university entrance scores
- interest rates
- the value of the \$AUD

Why did the Covid pandemic cause a global recession? Why is there a shortage of hospital beds in a country as wealthy as Australia? Why do you need an entrance score to gain a place at university? Will I get a job when I graduate? Why are some countries poor and others rich? Why do some people earn more income than others? Should there be a price on carbon emissions? It is impossible to escape economic issues and that is why everyone should have some basic economic literacy in order to understand and participate in today's economic world.

What is the subject matter of economics? Economics deals with two basic facts - first, people are faced with **limited resources** and second they have **unlimited wants**. This is referred to as the basic **economic problem**. The economic problem is on the one hand a problem of **scarcity** and on the other, a problem of **choice**. It is a problem of scarcity because there are simply not enough resources to satisfy an infinite number of wants. Individuals have basic wants of food, clothing, and housing. They also have other wants including transport, entertainment, and leisure. In economics we say that resources are scarce relative to wants. **Economics** can now be defined as the study of how people allocate their scarce resources to satisfy their unlimited wants.

Scarcity is the most fundamental concept in economics! Almost everything is scarce - food, cars, water, iPhones, computers and vaccines! Anything that has a price is relatively scarce. Free goods are not relatively scarce and do not have a price. The air that you breathe is currently free but perhaps in the future it may have a price. Global warming and climate change is a good example of the economic problem. The atmosphere has over time become a scarce commodity. Carbon dioxide emissions are continuously pumped into the atmosphere by industry, agriculture and households. Almost all production and consumption involves the use of fossil fuels - driving cars, food production, factory output and using

Economics is the study of how people allocate their limited resources to satisfy their unlimited wants.

electricity for lights and household appliances. The world has relied on carbon based energy resources such as coal, oil and natural gas. The use of these resources imposes a major environmental cost in terms of increased greenhouse gases in the atmosphere which raises global temperatures and changes world climate.

It is important to understand that the word scarcity in economics does not have the same meaning as the dictionary definition. For example, cars are plentiful in Australia (they are not physically scarce) - in 2022, over one million new cars were sold in Australia. However, an economist would say that cars are relatively scarce because they are not free - everyone who wants a car may not necessarily be able to afford one. Cars are not given away for free to anybody who wants one! This applies to most goods and services. There are some government services which are provided free but the cost of these services are paid for out of tax revenue - public health and public education, roads and footpaths are examples. So even these goods are scarce.

It is important not to confuse the concept of scarcity with the word shortage. Almost everything is scarce - everything you buy that has a price is scarce. A shortage occurs when the supply of something is limited. Cars are a scarce economic good, but there is not a shortage of cars in Australia. Scarcity is also not the same thing as poverty. Poverty is a lack of income to meet basic economic needs. Rich and poor nations alike suffer from the economic problem. The richest person in the world may be able to satisfy all their basic needs but they will still suffer from a limited amount of time.

Economics is the study of the economic problem - it is a study of scarcity and a study of choice

The economic impact of the Covid pandemic

By 2021, the pandemic had reached every country in the world. Globally there were over 250 million cases and over 5 million deaths (September 2021). In Australia there were around 100,000 cases and 1200 deaths. The pandemic resulted in a global recession with significant falls in national income accompanied by many job losses and business closures. The IMF estimated that the global economy shrunk by over 4% in 2020. The decline was the worst since the Great Depression of the 1930s.

Governments imposed tight restrictions on domestic and international travel in order to minimise the spread of the virus. Masks and 'social distancing' became the new normal. Millions of workers were put on government-supported job retention schemes as parts of the economy, such as tourism and hospitality, came to a near standstill. In most countries, the health sector was placed under extreme pressure as case numbers soared. Governments had to allocate more resources into the health sector which reduced spending in other sectors. Central banks in most countries, including Australia, slashed interest rates in order to make borrowing cheaper and encourage spending to boost the economy. Hospital beds, oxygen supplies and Covid vaccines were suddenly relatively scarce. A timely reminder that the economic problem is as relevant as ever.

Figure 1.1 Definitions of economics

Adam Smith	<i>"Economics is an enquiry into the nature and causes of the wealth of nations".</i>
Wikipedia	<i>"Economics is the social science that studies the production, distribution, and consumption of goods and services."</i>
Alfred Marshall	<i>"Economics is a study of mankind in the ordinary business of life it is on the one side a study of wealth; and on the other, the more important side, a part of the study of man".</i>
John Maynard Keynes	<i>"Economics is a method rather than a doctrine; an apparatus of the mind, a technique of thinking which helps its possessor to draw correct conclusions".</i>
Paul Samuelson	<i>"Economics is the study of how people and society choose to employ scarce productive resources, which could have alternative uses, to produce various commodities, and the distribution of these commodities among people and groups".</i>
Milton Friedman	<i>"Economics is the science of how a particular society solves its economic problems".</i>
Jacob Viner	<i>"Economics is what economists do".</i>
Joan Robinson	<i>"The purpose of studying economics, is not to devise a set of ready-made answers to economic problems, but to learn how to avoid being deceived by economists"</i>
International Encyclopedia of Social Sciences	<i>"Economics is the study of the allocation of scarce resources among unlimited and competing uses".</i>

The second aspect of the economic problem is the problem of choice. Given that scarcity exists for all people, consumers, producers and society must decide which wants they will satisfy. Should I spend my \$20 going to the movies, purchasing songs from itunes, or buy a lotto ticket? Should the government spend more money on health, education or the environment? Making choices when confronted by scarcity involves a trade-off.

Every society must make choices about what goods and services should be produced, how these goods and services will be produced and who will receive the goods and services. These are referred to as the three basic questions that any economic system must answer:

- what to produce?
- how to produce?
- for whom to produce?

One way to describe the subject matter of economics is that it is concerned with the production, distribution and consumption of goods and services. In other words, economics is concerned with the allocation of society's scarce resources

and the distribution of income. Figure 1.1 lists several definitions of economics. Most of these definitions focus on the problem of scarcity.

Adam Smith (1723-1790) is regarded as one of the founders of economics, in recognition of his 1776 work entitled *“An Inquiry into the Nature and Causes of The Wealth of Nations”*. Smith extolled the virtues of the free market economy as being an efficient way to deal with the economic problem and highlighted the importance of specialisation. A simple definition of economics is that it is the study of how people and society deal with the basic problem of scarcity. In other words, *economics is the study of how people allocate their limited resources to satisfy their unlimited wants*. Economics is a **social science** because it uses the scientific method to investigate and analyse human behaviour. Economists develop and use economic models to formulate theories about how people make decisions. People have unlimited wants and the resources or factors of production to satisfy these wants are limited. Resources are therefore said to be scarce relative to wants - we simply do not have enough of them to satisfy the infinite number of wants. Read the definitions in figure 1.1 and identify the common elements.

Economic matters affect all people at all ages, and in all walks of life. As Alfred Marshall noted, economics is a study of the ordinary business of life - how to allocate time between work, leisure and study, and how to spend income. Another famous economist, John Maynard Keynes, regarded economics as more of a thinking process rather than as a body of knowledge. Economics provides a very useful framework for making decisions when confronted with scarcity.

Types of resources

Economists identify three general types of **resources**, or **factors of production**:

- natural resources
- human resources
- capital resources

Natural resources are the “gifts of nature” - resources such as air, water, minerals, energy resources such as coal and oil, and soil and vegetation. Basically any resource that is supplied from the natural environment. **Human resources** refers to the quantity and quality of the labour force. Human resources can be divided into **labour** (the physical or mental effort applied in the production of a good or service) and **enterprise** (the coordination and management of production by an entrepreneur). Enterprise also represents the ideas and skills which are needed to create new goods and services.

Capital refers to the man-made resources which assists human resources in the production of goods and services. In economics, capital refers to physical capital and not financial capital. Physical capital is the ‘tools of trade’, the machinery and equipment that is required to produce goods and services. Examples of capital include the pen used by a journalist to write a story, an accountant’s computer,

a truck used to haul ore at a mine site and a crane that is used to help construct a building. An important type of capital is **social overhead capital** - this is the basic infrastructure of the economy, such as transport and communications, power and water supply, schools and hospitals. This essential infrastructure is usually supplied by the government.

Capital plays an important role in a modern economy. In economics, the creation of new capital goods is referred to as **investment**. Investment is not the purchase of shares or putting money into an interest bearing deposit. Investment is the creation of new machinery, new buildings, and new roads. Investment is seen as the 'engine of economic growth'. Modern industrial economies are characterised by high rates of investment. Providing workers with more and better capital equipment helps to increase labour productivity and raise living standards.

Microeconomics and macroeconomics

The subject matter of economics is usually subdivided into microeconomics and macroeconomics. **Microeconomics** deals with the economic problem from an individual or 'micro' point of view. The prefix 'micro' refers to a small perspective. Microeconomics attempts to understand how consumers and producers make decisions. Microeconomics studies how markets and prices work to allocate resources between all the competing industries in the economy. At the heart of microeconomics is the theory of demand and supply. Part One of this text (chapters 1-5) covers the most important aspects of microeconomics.

Macroeconomics deals with the economic problem from society's point of view. The prefix 'macro' refers to a large perspective. Macroeconomics is concerned with the performance of the whole economy. It focuses on total economic activity in terms of total production, total employment and the overall price level. The two most important parts of macroeconomics concern the theory of economic growth and business cycles. Economic growth is important because it determines a nation's standard of living. Economies also experience fluctuations in economic activity - the business cycle - which affect a country's rate of inflation and unemployment. The 'king' of economic indicators is GDP - Gross Domestic Product. This measures the total value of final goods and services produced in an economy. The other two key macroeconomic indicators are the inflation rate and the unemployment rate.

Review Quiz

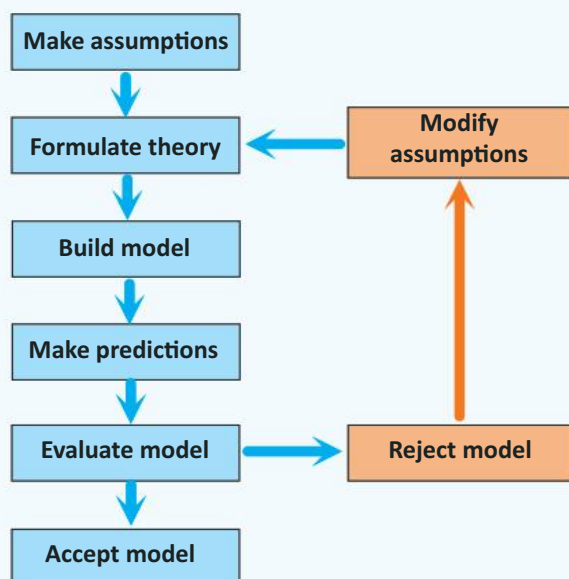
1. **Define economics.**
2. **What is the economic problem?**
3. **What are the three basic economic questions?**
4. **What are the three main types of resources?**
5. **Distinguish between microeconomics and macroeconomics.**

The science of economics

Economics is a **social science**. It studies the behaviour of people and the choices they make in response to the economic problem. Economics is a decision making science - it is particularly concerned with analysing and explaining decisions concerning production, consumption and resource use. Economics differs from the physical sciences, such as chemistry and physics, in that it cannot conduct controlled experiments. It does, however, use a logical set of processes (the **scientific method**) to identify the principles that govern economic behaviour in society.

The scientific method begins with observation and hypothesis. An economist might want to analyse household petrol consumption over time. Some important variables affecting petrol consumption would be the price of petrol, consumers' income, and the price of other related goods, such as cars and public transport. The effect of each independent variable on petrol consumption must be analysed separately to determine its relative importance. For example, we could hypothesise that people purchase more petrol when its price falls - a negative relationship; or that people buy more petrol when the price of cars fall. Our hypotheses are valid only if other independent variables are kept constant. This is an example of the **ceteris paribus** assumption. This is a Latin term which means 'all other things constant'. We could conclude that the price of petrol and the quantity of petrol consumed is a negative relationship, as long as other variables affecting petrol consumption do not change.

Figure 1.2 Economic models



Assumptions are often used to simplify the real world. Theories are the result of observations of economic actions - they describe cause and effect relationships. Economic models are simplified descriptions of theories about the way the economy works. A good model provides accurate explanations of the relationships between different variables.

Economic theory concerns explaining cause and effect between two or more variables. If variables A, B and C all affect variable Y, we must first investigate the effect of variable A by holding B and C constant; then we would analyse the effect of variable B by holding A and C constant and then variable C by holding A and B constant. We are using the *ceteris paribus* assumption to isolate the cause and effect of each separate variable. Economists develop models to derive their theories about how the economy works.

An **economic model** is a simplified representation of economic reality showing the relationship between certain economic variables. Using simplified models enables economists to determine cause and effect. The test of a 'good' model is its ability to predict behaviour. Economic theories focus on the most important variables that determine economic behaviour. This is referred to as abstraction. All unnecessary detail is removed so that the model represents a simplification of reality. A simple analogy of a model is a map. A road map includes only the essential information required to enable a traveller to get from one destination to another. As a traveller's model, the map simplifies the task of getting from point A to B. Figure 1.2 summarises how the scientific method is used to build models in economics. The usefulness of an economic model or theory lies in its ability to predict events accurately. If the model's predictions are verified through observation and data collection, then the model is considered a good one. If not, then the model must be rejected and reformulated.

Economists assume that people are rational and respond to incentives.

One of the important assumptions used by economists to explain human behaviour is that of **rational self-interest**. This means that economic decisions are based on a person following a logical process in order to compare the costs and benefits of decisions. A decision is considered rational as long as the benefit exceeds the cost. I will not purchase a good unless the benefit I get is greater than my cost. Price is a convenient way to measure and compare benefits and costs. If the price of a good rises, then for some people the higher cost will exceed their expected benefit and they will not consume the good. People will respond to incentives that affect the cost and benefits of a particular action. For example if the penalties for committing crime increase, then *ceteris paribus*, we would expect a decrease in crime. Economists believe that rational self-interest is a very good predictor of human behaviour. In fact, the model of demand and supply that is used to determine price in competitive markets is an excellent application of the cost/benefit approach.

Positive and normative economics

Economists not only develop economic theories and models to explain economic behaviour but they also formulate economic policy. Testing and developing economic theory is known as **positive economics**. Essentially, positive economics is concerned with 'what is' in the economy. Economics also deals with 'what should be' which involves personal opinion and value judgments. This is the domain of **normative economics**. Economic policy, while based on economic theory also

involves normative economics. This is why economists will often disagree about economic policy. Positive economic statements can be tested objectively. What is the current unemployment rate? What would happen if tariffs are removed from imported cars? What effect will a sales tax have on the wine industry? The answers to questions such as these are the subject of positive economics because they are testable using economic data.

A positive statement can be proven to be true or false

Normative statements, on the other hand, are subjective statements which reflect opinions rather than facts, so they cannot be tested objectively. Normative statements often state 'what should be.' A normative statement involves a **value judgment** - an opinion that one situation is preferable to another. Opinions might appear logical, but they include a personal viewpoint which cannot be readily tested. Is the unemployment rate too high? Should the government protect domestic industry from foreign competition? Should the government tax carbon emissions? Each of these is a normative question - they invite an opinion. The two statements below highlight the difference between positive and normative perspectives. Economists can test positive statements, but cannot test normative statements because they are value judgements.

A normative statement is an opinion or a value judgment

- *"...if the government increases the sales tax on tobacco, people will purchase fewer cigarettes."* This is a positive economic statement and can be tested. It is logically derived from 'the law of demand,' which states that people purchase less of a commodity when its price rises.
- *"...the government should increase the tax on cigarettes."* This is a normative statement made by a person who believes that higher cigarette taxes would be a good way to reduce tobacco consumption and improve the health of the population.

It is the role of the economist to make positive statements about economic behaviour. Positive statements can be tested and used to build theories and models which can then be put into practice in developing policies from which everyone in the community can benefit. Economists can also express their opinion about economic issues and economic policy by making normative statements.

Review Quiz

1. *What is an economic model?*
2. *Explain the meaning of the 'ceteris paribus' assumption?*
3. *When is a decision considered to be rational?*
4. *What is meant by 'positive economics'? Provide two examples of a positive economic statement.*
5. *What is meant by 'normative economics'? Provide two examples of a normative economic statement.*

Opportunity cost

Every day, individuals make hundreds of choices - what to wear, how to get to school or work, what to buy for lunch, whether to study or go to training for sport. Make a list of five decisions you have made today that involved a tradeoff. What decisions did your family make today that involved a tradeoff? What federal or state government decisions were reported in the media? What was the opportunity cost in each case?

Scarcity, choice and opportunity cost

The economic problem is the problem of **relative scarcity** - resources are limited relative to society's unlimited wants. The economic problem applies everywhere, to everyone and for all time. It applies to individuals and to the community. It even applies to the wealthiest of individuals, such as Mark Zuckerberg, the cofounder of the social-networking website Facebook. Even though Mark is a billionaire, he still faces a time constraint and he still must make choices. The economic problem also applies to wealthy economies such as Australia. There are thousands of doctors in Australia, yet people are still forced to wait for elective surgery at public hospitals. It is important not to confuse scarcity with poverty. Poverty can be reduced and even eliminated over time as a country's standard of living increases. But rising living standards cannot eliminate the problem of scarcity. The economic problem is ongoing and can never be ultimately solved. Once we satisfy one want, there will always be another to take its place.

The environment was once viewed as a **free good**, but as world population has increased, environmental goods have become more scarce. Many species of plants and animals are close to extinction as the pace of economic development has increased. In Australia, the demand for water has increased relative to supply. Most capital cities in Australia have imposed water restrictions in order to cope with the increasing scarcity of water. Part of the reason for the shortage of water is

There is no such thing as a 'free lunch!'

The expression "there is no such thing as a free lunch" reflects the relationship between scarcity and opportunity cost. If the government staged a free concert in the city, does that mean there is no cost? While the concert may be free for people to attend, from society's perspective, resources have been used to stage the concert. These scarce resources could have been used to provide other goods and services. Just because the concert has a 'zero' price does not make it a 'free good' - there is still an opportunity cost.

that the price of water has been kept very low. An economist would say that this gives the wrong signal or incentive to consumers - water is viewed as a relatively free good. If the price of water was increased in Australia to reflect its true scarcity value, then people would use it more carefully and water restrictions would no longer need to be imposed.

Simply stated, the economic problem means that there is not enough of everything for everybody! Relative scarcity means we are constantly forced to make choices between alternative uses - individuals decide how to allocate their income; societies must decide which goods and services will be produced and which resources will be used. The role of the economist is to study how and why people and groups make choices when confronted by relative scarcity. Making choices involves a trade-off. Spending \$20 to go to the movies means that you cannot spend it to do other things.

Every decision involves a choice between one course of action and another. In other words, every choice involves a **trade-off**, which means that every choice involves a cost. We often think of the cost of a good or service in dollar, or monetary terms, but this does not give a true indication of the true cost. The true or real cost of any decision should measure the value of the alternatives which have been given up. **Opportunity cost** is the term used to represent the real or economic cost of a decision. It is best defined as the value of the best alternative that you forego. For example, the \$1,000 used to purchase a new mobile phone could have been used to buy a tablet or notebook. Opportunity cost can be measured in monetary terms but it is important to think of it in terms of the actual opportunities that have been given up. By choosing the mobile phone, we have foregone the opportunity to purchase other goods, such as a notebook. Opportunity cost also includes the value of time. The saying “time is money” relates to opportunity cost. Should I do my household chores such as cleaning or should I pay someone to do them? It depends on how much I value my time.

Opportunity cost is the value of the best alternative foregone

The opportunity cost of a university degree

What is the opportunity cost of a university degree?

Suppose a student spends \$15,000 in HECS fees and textbooks for each year of study. Rather than going to university the student could have earned \$45,000 per year working in hospitality. The annual cost of rent, food, clothing and petrol while studying is estimated at \$15,000 per year. What is the total opportunity cost of attending university for a three year degree? Do we include all these costs? We include the costs of fees and textbooks and the opportunity cost of not working, but we do not include the costs of rent, food etc since these would occur whether the student was attending university or not.

Opportunity cost of money spent on fees and texts	\$45,000
Opportunity cost of university time (three years working)	\$135,000
Total opportunity cost over three years	\$180,000

The value of time is an important part of opportunity cost. The opportunity cost of going to the movies includes more than just the price of the movie ticket! It includes the value of the two hours that you give up to watch the movie. If McDonalds announced that on a particular day they would give away free hamburgers, does this mean that the opportunity cost of consuming a hamburger would be zero? The answer is no - while the monetary cost is zero, you would have to sacrifice your valuable time waiting in the very long queue. Who would be more likely to stand in the queue - a student or a business executive? You would expect to see more students because the value of their time would be far less than someone earning a high salary. Suppose you are choosing between three different alternatives: A, B or C. If you choose A then the opportunity cost is either B or C, whichever is ranked highest.

Review Quiz

1. *Why will the economic problem always be a part of life?*
2. *Why are most things relatively scarce?*
3. *Why do choices involve trade-offs?*
4. *Define opportunity cost.*
5. *Why is there no such thing as a free lunch?*

Check your understanding

Greg makes \$100 an hour as a golf instructor. He must take two hours off work (without pay) to go to the dentist to have a tooth filled. The dentist charges \$150. The opportunity cost of Greg's trip to the dentist is

- a. *\$100*
- b. *\$150*
- c. *\$200*
- d. *\$350*

Answer: Opportunity cost is the value of what you give up to do something. In this case Greg gives up 2 hours of work which equals \$200. But he also gives up \$150 for his dental work, so the total opportunity cost of his trip to the dentist is \$350.

The economic decision making process

How do economists make decisions about allocating society's scarce resources? They compare the benefits of using resources against the cost. For example, the following table lists the benefits and costs associated with allocating resources to public hospitals. Each hospital costs \$50 million to build, while the benefits of adding more hospitals increases but at a declining rate.

No. of Hospitals	Total Benefits \$m	Total Costs \$m	Net Benefits \$m
1	100	50	50
2	180	100	80
3	240	150	90
4	280	200	80
5	300	250	50

For example, the total benefits of one hospital equals \$100 million, the total benefits of two hospitals is \$180 million, and for three it is \$240 million. Why don't the benefits increase at a constant rate? Its simply because as you consume more of something the extra or additional benefit you get declines. It is a principle that applies to everything that you consume.

Its called the **principle of decreasing marginal benefit**. The fourth column in the table calculates the net benefits from each hospital - the difference between total benefits and total costs. Notice where the net benefits are largest. What is the correct or optimal number of hospitals? It is where the net benefits are largest - with 3 hospitals, net benefits equal \$90 million. Should we keep allocating resources as long as total benefits exceed total costs? Not necessarily - it all depends on whether net benefits increase. Should we build five hospitals? No, because net benefits decrease to \$80 million. From an economics perspective we should keep allocating resources until we maximise net benefits. That is why the efficient number of hospitals in this example is three. Because resources are scarce, then we should allocate them in such a way as to get the best value from their use. Net benefits are maximised at \$90 million with three hospitals.

Economists like to use **marginal analysis** when making decisions about resource use. This mean calculating the marginal or additional benefit of each new hospital and compare it with the marginal cost (MC) - see the table below. Note that the marginal benefit of additional hospitals falls. The marginal benefit (MB) of the first hospital is \$100 million, the MB of the second hospital is \$80 million and the MB of the third hospital is just \$60 million. The marginal cost (MC) of each hospital is constant at \$50 million. It makes sense to allocate resources as long as the marginal benefits (MB) exceed the marginal costs (MC). This occurs with three

Marginal analysis compares the additional benefits derived from an activity with the extra cost incurred

hospitals - MB equals \$60 million and MC equals \$50 million. It is inefficient to build the fourth hospital because the MB (\$40 million) is less than the MC (\$50 million). Comparing costs and benefits at the margin is a distinguishing feature of economic analysis. The cost benefit framework is a simple but very effective method to make decisions when allocating scarce resources.

No of Hospitals	Marginal Benefits \$m	Marginal Costs \$m
1	100	50
2	80	50
3	60	50
4	40	50
5	20	50

Check your understanding

Given the following estimates of the benefits and costs associated with allocating resources to public schools, what is the optimal or efficient number of schools according to economic theory?

No. of schools	Total Benefits	Total Costs
10	\$12 million	\$6 million
20	\$20 million	\$12 million
30	\$27 million	\$18 million
40	\$31 million	\$24 million

Answer: The efficient number of schools is 30. Why? Because this is where net benefits (TB - TC) are maximised: \$27m - \$18m = \$9m.

With 10 schools net benefits = \$6m, with 20 schools net benefits = \$8m and with 40 schools net benefits = \$7m.

The production possibility frontier

An important economic model that economists use to illustrate the economic problem and the concept of opportunity cost is the **production possibility frontier** (PPF) model. The PPF shows all the combinations of goods and services that can be produced by an economy given the available resources and the level of technology. The model has some important assumptions:

- resources are fixed
- technology is fixed
- the economy produces just two goods - pizzas and cars

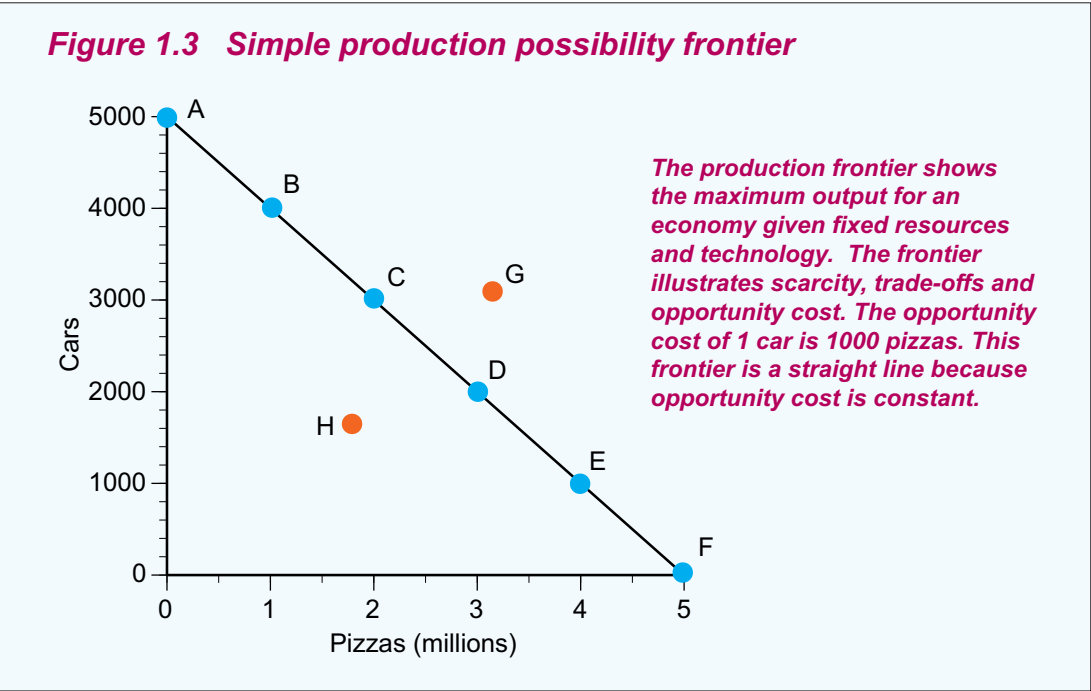
The table opposite illustrates the combinations of pizza and car production using the economy’s scarce resources. If we convert this information into a graph then we obtain the production possibility frontier or curve. This is shown in Figure 1.3.

Possibility	Pizzas (million)	Cars
A	0	5000
B	1	4000
C	2	3000
D	3	2000
E	4	1000
F	5	0

The production possibility frontier illustrates the basic economic problem - scarcity and choice.

Car production is measured on the vertical axis and pizza production is measured on the horizontal axis. The economy can produce anywhere along the frontier from point A to point F. At point A, all resources are being used to produce cars (5,000) and pizza production is zero. At point F, all resources are being used to produce pizzas (5 million) and car production is zero.

Notice the frontier illustrates the trade-off between producing pizzas and cars. To produce more pizzas, car production must decrease. This is because of scarcity - in other words, the frontier has a negative slope. The frontier also provides a measure of opportunity cost. The opportunity cost of producing each 1 million units of



pizzas is 1 thousand cars. Alternatively, the opportunity cost of producing each 1,000 cars is 1 million pizzas. What is the opportunity cost of just 1 car? The answer is 1,000 pizzas.

Alternatively we can determine the opportunity cost of producing just 1 pizza - it is 0.001 car. In this simple example, the opportunity cost along the frontier is constant and the PPF is a straight line. Can we produce at a point like G, outside the frontier? The answer is no, because we do not have enough resources. A point like H which is inside the frontier is attainable but it is inefficient. A point such as H would be associated with unemployed resources. It would be possible to increase the production of both goods, so point H is inferior compared to points on the frontier.

A movement along the frontier measures the opportunity cost of changing production.

Will the PPF always be a straight line? Only if the opportunity cost between the two goods is constant. The normal shape for the PPF is to be 'bowed' outwards. This is because the opportunity cost of increasing the production of one good in an economy with scarce resources normally increases. It is referred to as the **law of increasing opportunity cost**. Constant opportunity cost means that resources are equally suited to producing all types of goods. In our example, it would mean that our resources are equally suited to producing both cars and pizzas. This would be highly unlikely. In reality, some resources would be better at making pizzas, while other resources would be more suited to manufacturing cars. When the productivity of resources differs between types of goods, then the PPF will be 'bowed' outwards. This is illustrated in the second example below.

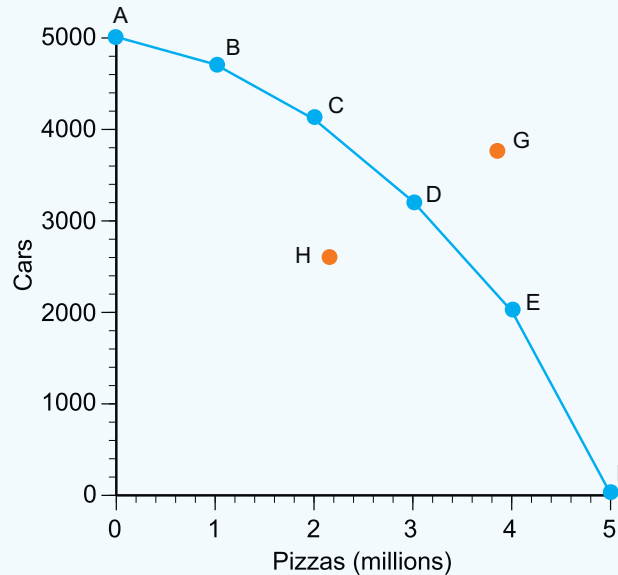
Possibility	Pizzas (millions)	Cars
A	0	5000
B	1	4600
C	2	4000
D	3	3000
E	4	1600
F	5	0

In this case the opportunity cost of the first 1 million pizzas is 400 cars (point A to B). But from point B to C the opportunity cost of the next 1 million pizzas increases to 600 cars, and from point C to D it increases to 1,000 cars. The opportunity cost of the fifth million pizzas is 1600 cars. This demonstrates the law of increasing opportunity cost - as production increases, the opportunity cost increases.

Figure 1.4 illustrates the typical 'bowed' out production frontier. Is there a best point to be on the production frontier? Any of the points A to F can be regarded as best, since each of these points is production efficient - resources are not being wasted. Ultimately, society must choose which combination of pizzas and cars it

Figure 1.4 The law of increasing opportunity cost

This PPF is bowed outwards because of the law of increasing opportunity cost. As more pizzas are produced, the opportunity cost increases since resources are not equally productive at producing both cars and pizzas.



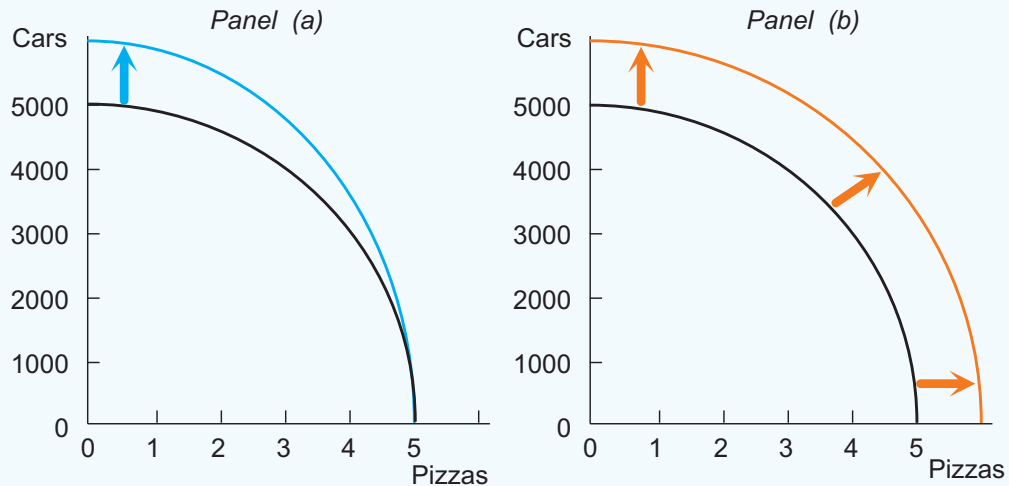
wants to consume. The particular combination of pizzas and cars that maximises net benefits for society is known as the economically efficient point. Will society automatically choose this point?

This is a very important question and we will be able to show that a free market economy will automatically produce at this point. Opportunity cost is involved in every single economic decision we make, so the production frontier is an important economic model. Imagine that the goods shown in figure 1.4 were not pizza and cars, but schools and hospitals. The principle still applies - to be able to build more schools, the government would have to forgo some hospitals. Every decision involves an opportunity cost because resources are scarce and there will always be a **tradeoff**.

What happens to our model if we relax our initial assumptions regarding resources and technology? Figure 1.5 illustrates two possibilities. In panel a, the curve has shifted outwards along the car axis, perhaps as a result of an increase in the quantity of resources available for car production or the introduction of new technology in manufacturing cars. If instead there was an advance in pizza technology, then the frontier would move out along the horizontal axis. Panel b illustrates an outward shift of the whole frontier which means that more of both goods can be produced. There must have been an increase in the quantity or quality of resources that affects the production of both cars and pizza. Over time, it is normal for an economy's production frontier to shift outwards as resources, such as the labour force and capital stock increase.

Figure 1.5 Changes in the PPF

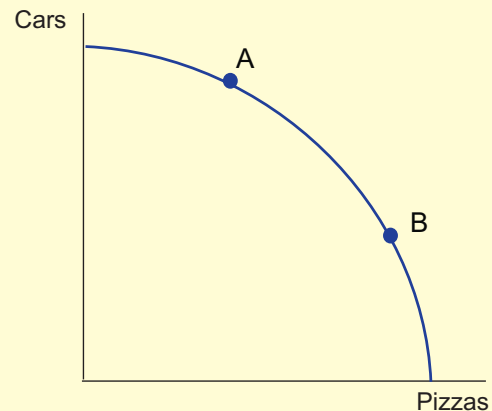
Panel (a) shows an improvement in production technology for cars - the frontier shifts along the car axis only. Panel (b) shows an increase in the quantity of resources (both labour and capital) - the whole frontier shifts out to the right.



Check your understanding

Refer to the PPF model below. Are the following statements TRUE or FALSE?

1. Point A shows a possible combination of pizzas and cars that can be sold.
2. The movement from point A to point B shows the opportunity cost of producing more cars.
3. If the unemployment rate increased, the PPF would shift inwards.
4. An improvement in technology for producing pizzas will cause the whole PPF to shift to the right.



Answers - see page 19

Answers

1. **FALSE** - point A represents the quantity of pizzas and cars that can be produced.
2. **FALSE** - the movement from point A to B shows the opportunity cost of producing more pizzas.
3. **FALSE** - an increase in unemployment will not shift the frontier, instead the economy will move from a point on the frontier to a point inside the frontier.
4. **FALSE** - the frontier will shift outward along the pizza axis but not shift the frontier on the car axis.

Economic growth

The production possibility frontier can be used to illustrate economic growth. Economic growth refers to an increase in the capacity of an economy to produce goods and services. Economic growth is represented by a shift of the production frontier to the right. Economic growth can occur as a result of an increase in the quantity of resources or an improvement in their quality. For example an increase in the labour force results from population growth. The stock of capital equipment increases over time as firms invest in machinery and the construction of new factories and buildings. The creation of a new iron ore mine will increase the quantity of natural resources. How do the quality of resources improve? Productivity is a measure of quality - how much output is produced from a given set of inputs. Labour productivity is measured as output per worker. Labour productivity will increase through higher levels of education and training. The quality of capital resources such as machinery can be improved through the application of technology.

When economies produce more goods and services it enables a higher standard of living which is the ultimate economic objective. But pursuing economic growth also involves a tradeoff - a tradeoff between present and future consumption. If we use most of our resources to produce consumer goods today, then that will mean potentially less consumption for the future. Sacrificing some current consumption enables resources to be diverted and used to produce capital goods. Reducing current consumption increases savings which can be channeled into investment. Investment is seen as the 'engine' of economic growth. Investment is the creation of capital goods. Capital goods are man made goods that are used in the production process. They include machinery, factories, computers and transport networks. Higher economic growth enables higher future living standards but there is an opportunity cost - lower consumption today.

**Economic growth
will cause the PPF
to shift to the right**

Figure 1.6 below compares the economic growth rate of countries with their growth rate of investment over a 22 year period, from 2000 - 2022. The scatter plot reveals a strong positive correlation between the two. This means that as investment increases, so does the rate of economic growth. Figure 1.7 helps to illustrate this tradeoff between present and future consumption. The PPF model below illustrates the choice between producing consumption goods or capital goods. If an economy chooses to locate at point A, where more resources are devoted to producing consumption goods, then the frontier only moves a short distance to the right. This reflects a lower rate of economic growth. If the economy instead chooses point B on the initial PPF, then, over time, the frontier moves much further to the right, indicating a faster rate of economic growth. In other words choices made today can have a significant impact on future living standards.

Review Quiz

1. *State the three assumptions of the PPF model.*
2. *Why does the frontier have a negative slope?*
3. *What is the law of increasing opportunity cost?*
4. *What can cause the PPF to shift to the right?*

Figure 1.6 Investment and economic growth

The graph below shows a scatter-plot of countries showing their average annual growth in output and their average growth in investment. It would appear that there is a strong positive relationship between the two - countries that invest in capital resources have higher rates of economic growth.

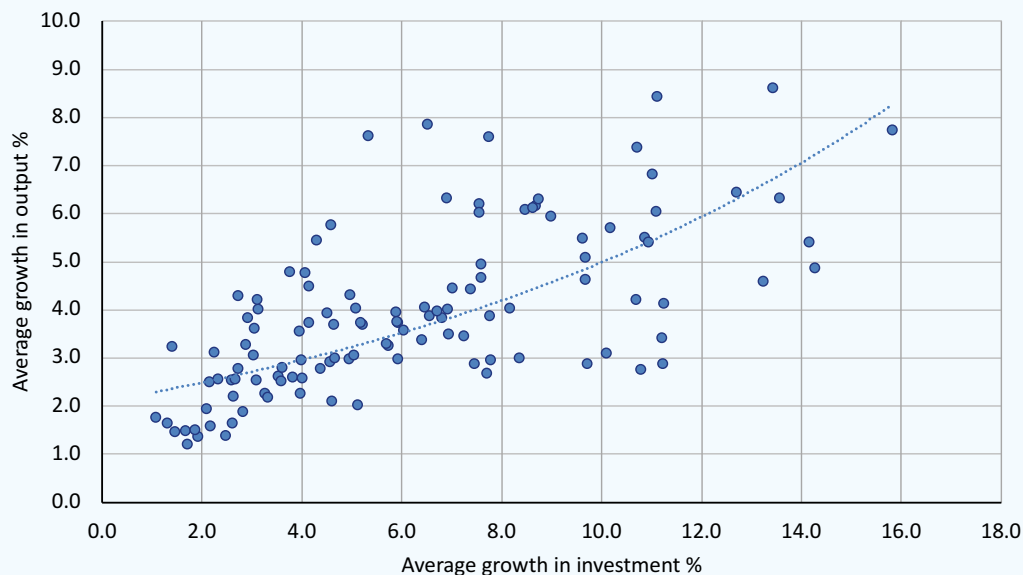
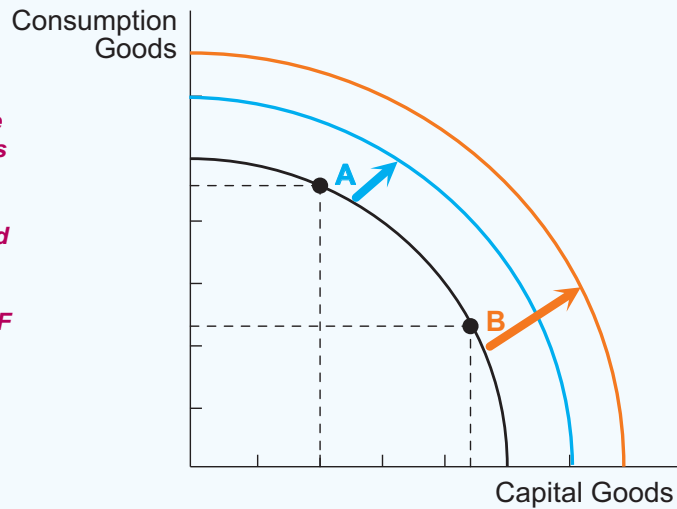


Figure 1.7 Capital goods and economic growth

If an economy chooses to produce at point A, its future economic growth will be less than for an economy that chooses point B. At point B, more resources are allocated to capital goods which promote economic growth. By choosing point B, the PPF moves much further to the right than for the economy located at point A.



The market economy

Like individuals and groups, nations also face the economic problem. Collective wants such as education, health and public transport are unlimited, but resources are still relatively scarce. Thus a choice must be made as to which wants will be satisfied. An **economic system** is the way in which a country's resources are allocated to deal with the economic problem. It includes the institutions such as law and order, rules and regulations, and accepted practices for the production and distribution of goods and services.

An economic system must answer three basic questions concerning the economic problem. These questions are:

- what and how much to produce?
- how to produce?
- for whom to produce?

These questions determine the allocation of resources in the economy and the distribution of income. Should society allocate most of its resources to consumer goods in order to maximise present living standards or should society allocate more resources to capital goods? Should the government provide public hospitals and schools? Should society allow private ownership of resources (capitalist system) or should the state own all resources (socialist system). Should market forces be allowed to allocate resources using the price system, or should a planning authority make all decisions. These are important questions which determine the type of economic system a nation will choose to resolve the basic economic problem of scarcity.

In some economies, resources are owned privately and all decisions are made by the owners of resources acting in their own self-interest. These characteristics describe a **free enterprise** or **capitalist economy**. Capitalist economies, such as Australia and the United States are predominantly free market economies. Most decisions concerning the production of goods and services is determined by free market forces. An economy in which resources are owned by the state and decisions are made by a planning authority is called a **command** or **planned economy**. Socialist economies include North Korea, Cuba and China.

Economies can also be characterised by the methods of decision-making they use to answer the above three questions. A pure market economy is one in which the forces of supply and demand determine the what, how and for whom questions. The 'invisible hand' was the term Adam Smith used to describe how a market allocates resources between competing uses. In a market economy, the consumer is considered sovereign or king since their spending determines what is produced. In a market economy, shortages and surpluses are rare since prices will always adjust to 'clear the market'. Market economies are considered to be the most efficient because prices reflect relative scarcity. This means that goods and services will be produced in the 'right' quantities at the 'right' time. A disadvantage of a market economy is that certain goods will be under produced such as public health and public education. Competition in a market ensures that firms that innovate will survive.

The what, how and for whom decisions in socialist economies are made by a central authority which regulates production and distribution for the benefit of all members of society. In a planned economy, a large bureaucratic system is needed to address the three basic economic questions. This makes planned economies very inefficient compared with a market economy.

Most economies today combine elements of both market and planned economies and can therefore be called **mixed economies**. Private markets are very efficient at allocating resources for most goods and services but governments can also play an important role in providing for many social goods and services such as health, education and law and order. In economies such as Australia, the United States and Japan, markets allocate resources for most goods and services such as food, housing, clothing, motor vehicles, entertainment and recreation. In these economies, private markets account for around 70 per cent of total production. In Australia, the government plays an important role in reducing income inequality and helping the disadvantaged by providing free public health and education. In some European economies such as France and Sweden, the government plays a larger role in allocating resources accounting for around 40-45 per cent of total production. The government sector accounts for the other 30 per cent of total production and this is evident in the public health, education, law and order and defence sectors. Figure 1.8 compares some of the main features of a market versus a planned economy.

Market economies thrive on competition, boosting innovation and economic growth

In a mixed economy both the government and the private sector determine the allocation of resources.

Figure 1.8 A market versus a planned economy		
	Market Economy	Planned Economy
Ownership of resources	Private	State
Decision making	decentralised - by the market	Centralised - by the government
Incentives	Self interest and profit	None
Prices and wages	Coordinated by the market	Set by the government
Shortages and surpluses	Rare	Common
Income distribution	Greater income inequality	Greater income equality
Production efficiency	High	Low
Consumer choice	High	Low
Personal freedom	High	Low
Standard of living	High	Low

Review Quiz

1. What is the role of an economic system?
2. State the three questions an economic system must address.
3. Distinguish between a market and a planned economy.
4. What are the key features of a mixed economic system?

2



Demand and Supply

Learning Objectives

In this chapter you will learn about:

- *the role of markets*
- *the law of demand*
- *the factors affecting demand*
- *the law of supply*
- *the factors affecting supply*
- *the concept of market equilibrium*
- *the concepts of market clearing, shortages and surpluses*
- *the effect of changes in demand and supply on market equilibrium*

The role of markets

Economic systems exist to deal with the economic problem. An economic system tries to coordinate the production and distribution of goods and services to satisfy the wants of society. Economic systems vary from 'free market' to 'planned', but regardless of the type they must all answer the following fundamental questions:

- **What** goods and services will be produced and in what quantity?
- **How** will the goods and services be produced in terms of production technique and types of resources?
- **For whom** will the goods and services be produced?

In this chapter, we outline how these questions are answered in a market economy. Markets are one way to coordinate economic activity - they allocate resources in order to resolve the economic problem. Markets help to allocate scarce resources to satisfy the many competing wants in an economic system. Markets coordinate economic activity and provide incentives for both consumers and producers. Economists believe that markets are an efficient way to deal with the economic problem because they do not require any resources to function. The market coordinates decisions between buyers and sellers in a decentralised way. Markets work because when people engage in exchange, they benefit.

A **market** is said to exist when buyers and sellers exchange goods, services or resources. A market consists of three important elements:

- buyers (demand)
- sellers (supply)
- something to exchange (a good, service or resource)

A market is also characterised by voluntary exchange. This means that buyers and sellers are not forced to participate in exchange, but do so willingly. This is important because buyers and sellers might meet face-to-face, but could also exchange goods and services by mail, telephone, or the internet. Buyers and sellers may also deal with one another through an intermediary or middle-man, as happens in the stock market, where transactions are usually handled by brokers on behalf of their clients. **Product markets** deal with the buying and selling of goods and services. In a product market, consumers represent the demand side of the market, while producers or firms represent the supply side. Firms produce goods and services and sell them to households (consumers). **Factor markets** deal in the buying and selling of factors of production or resources such as the labour market, the capital market and natural resource markets. In a factor market, households sell their resources to firms. In a factor market, households represent the supply side of the market, while firms represent the demand side.

In a product market buyers and sellers exchange goods and services

Markets can also be classified according to the intensity of competition in the market. A **competitive market** is characterised by:

- a large number of buyers and sellers
- firms are price takers
- very similar (homogeneous) products
- easy entry into the market (no barriers to entry or exit)

In a competitive market, price is determined by the interaction between buyers and sellers. No individual buyer or seller can influence the market price - this means that there is no market power. Firms are called **price takers** because they must take the price that is established by the market. There are many examples of competitive markets - agricultural markets, fruit and vegetables, cafes and hair dressing salons. The small business sector satisfies many of the assumptions of a competitive market. Any market with a large number of relatively small firms selling very similar goods and/or services and with easy entry conditions is a competitive market. A market that is not competitive is called an **imperfect** or non-competitive market. An imperfect market is characterised by:

- a small number of firms
- product differentiation
- firms are price setters - they have market power
- entry into the market is restricted

A monopoly market is an extreme type of imperfect market with just one dominant firm. An oligopoly is a market with a few dominant firms. Firms with market power can set their own price - they are called **price makers**. An imperfect market is characterised by product differentiation where firms try to make their products 'look different' in the eyes of consumers and use barriers to entry to make it difficult for new firms to enter the market. In Australia there are many examples of imperfect markets. Coles and Woolworths are a virtual duopoly in the grocery market. The mobile phone services market is a classic oligopoly dominated by three firms: Telstra, Optus and Vodafone.

The role of prices

In the market system the three key economic questions are answered by the price mechanism - the interaction of buyers and sellers in the market. In a market economy, the consumer is king (consumer sovereignty), meaning that consumers determine what will be produced, and how much will be produced. Consumers signal their tastes and preferences to producers by casting their dollar votes when they buy goods and services. Producers respond to changes in demand signalled by consumers. For example, if striped shirts become more popular than plain shirts, then shirt producers would increase the production of striped shirts and reduce the output of plain shirts. In the motor vehicle market sales of SUVs have soared while sales of large sedans have slumped as a result of changes in consumer tastes.

In the market economy, the how to produce question is answered by producers. Like consumers, producers are guided by the principle of self interest. To operate profitably, firms have to operate efficiently and minimise costs. Producers will compare the prices of inputs when deciding what techniques of production to use. The market system provides an incentive for the producer to become more efficient and lower costs in order to increase profits. Price also determines the 'for whom' question. The rewards of production reflect the price which the market is willing to pay for resources. Wages and salaries are the reward for labour; owners of natural resources receive rent; the owners of capital receive dividends (or interest in the case of money capital); and the owners of entrepreneurial skills receive profits. The amount of income earned by resource owners generally reflects the scarcity of the resource they have provided. Skilled workers, for example, are paid a higher wage than unskilled workers. Doctors and engineers will receive a higher income than clerical staff or sales staff. Musicians and entertainers such as Taylor Swift and Ed Sheeran earn millions of dollars because of their special skills.

We will now turn our attention to how competitive markets determine prices. We will focus on the most important model in microeconomics - the model of demand and supply.

The demand side of the market

Demand refers to the buying intentions of consumers. The quantity demanded of a good or service is the quantity that consumers are willing and able to purchase, at a particular price and at a particular time. Demand is not the same thing as a want. Many people may want a luxury yacht, but only a few are willing and able to purchase the yacht. Demand refers to the actual buying intentions of consumers. I might want a Ferrari, but I actually purchase a Mazda 3 because that is what I can afford.

An important law in economics is the **law of demand** - as the price of a good rises, people buy less of it, *ceteris paribus* (holding other factors constant). The law of demand describes a negative relationship between price and quantity demanded. What is the explanation for the law of demand? There are two important reasons.

- The **income effect** - when the price of a good rises, consumers are not willing to buy as much of the good because their real income or purchasing power has decreased. If you have \$100 in income and the price of a pizza is \$10 then your real income is 10 pizzas. If the price of pizzas increases to \$20, then your real income halves to just 5 pizzas. When your real income falls you are poorer and therefore you will purchase less. The income effect works in both directions - when the price of a good falls, your real income rises and you will purchase more.

- The **substitution effect** - when the price of one good rises, other goods become more attractive to buyers because they are relatively cheaper. An increase in price will cause consumers to switch to relatively cheaper substitutes. For example, an increase in the price of pizza will cause some consumers to switch to other types of fast food. On the other hand, a decrease in the price of pizza, will now make substitute goods relatively more expensive and consumers will purchase more pizza.

The law of demand applies to all goods and service

Notice that both the substitution effect and the income effect work together to reinforce the law of demand. Are there any exceptions to the law of demand? The simple answer is No! The law of demand holds for all goods and services - as long as the **ceteris paribus** (keeping other factors constant) condition holds. Don't be fooled by people who claim that there are exceptions to the law of demand. For example, it is often argued that if a consumer buys an expensive brand rather than a cheap brand, this violates the law of demand. This is incorrect because we are dealing with two different goods. The consumer may use price as a signal of quality and have a preference for the more expensive brand. To break the law of demand, the consumer when given a choice of buying the same good at two different prices chooses to pay the higher price. When buying a good, would you refuse a discount? Of course not! There are no exceptions to the law of demand.

Of course, the law of demand varies in strength between different types of goods depending on the strength of the income and substitution effects. For example, the law of demand for petrol will be relatively weak. There are few close substitutes for petrol. If the price of petrol increases, consumers will find it difficult to substitute away from petrol. The law of demand for orange juice, on the other hand, will be much stronger. There are many close substitutes for orange juice such as apple, pineapple and grape juice. If the price of orange juice increases, then consumers can readily substitute into another fruit juice.

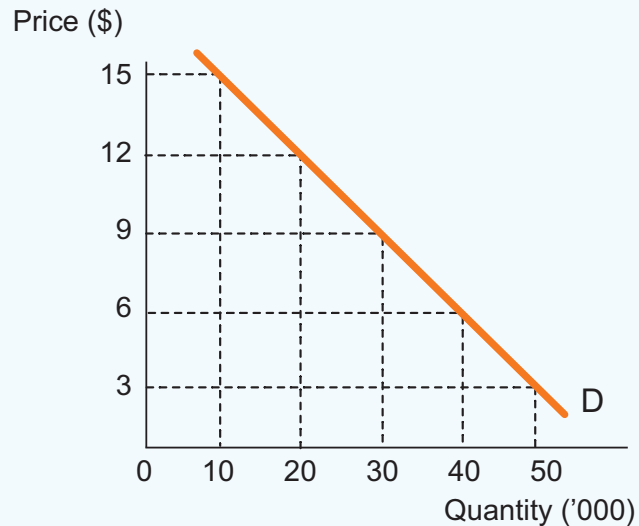
A demand curve has a negative slope - as price rises, quantity demanded falls

Figure 2.1 shows a demand schedule and a **demand curve** for pizza. A demand schedule is simply a table showing the quantity demanded of a good consumers are willing to purchase at various prices. Figure 2.1 shows the weekly quantity of pizzas that consumers are willing to buy at various prices. It is called a market demand schedule because it is the summation of all the individual consumers in the market. As we would expect, rational consumers are willing to buy more pizzas at lower prices than they are at higher prices. We can convert the data from the schedule to a graph known as the market demand curve for pizza. The graph's axes represent price on the Y axis, and quantity demanded on the X axis. Note that the demand curve is negatively sloped (downward sloping to the right) reflecting the law of demand. As price falls, quantity demand rises and when price rises, quantity demanded falls. There are other factors apart from price, which may affect the demand for a good or service. These are all the factors that were held constant (*ceteris paribus* conditions) in deriving the demand curve.

Figure 2.1 The demand curve

The demand schedule and graph illustrate the law of demand - price and quantity demanded are negatively related, ceteris paribus. As price rises, quantity demanded falls; as price falls, quantity demanded rises.

Demand schedule	
Price (\$)	Quantity demanded
15	10000
12	20000
9	30000
6	40000
3	50000

**Review Quiz**

1. What are the characteristics of a market?
2. Describe the feature of a competitive market.
3. State the law of demand.
4. What is the substitution effect?
5. What is the income effect?
6. Why does the demand curve have a negative slope?

Non-price factors affecting demand

What are the key factors, other than price, that can affect demand?

Levels of disposable income

Your level of income determines your budget - what you can and cannot afford. Consumers will normally purchase more of a good when their income increases. Most goods in the economy are referred to as normal goods. A normal good is defined as one where demand increases as income increases. Most goods and services are normal goods. An inferior good is a good where demand decreases as income rises. An example of an inferior good is a very low quality product such as a 'plain wrap' or 'home' brand product.

The price of related goods

On most occasions, consumers can choose between a number of goods and services which satisfy the same wants. These are referred to as **substitutes**. For example, there is a wide range of fast food products on the market other than pizza. Consumers can choose from chicken, hamburgers, kebabs, noodles, or fish and chips - the list is very long and varied. If the price of pizza rises, the quantity demanded of pizza will fall and consumers will increase their demand for other types of fast food. There are many other examples of substitute goods such as tea and coffee, butter and margarine, orange and apple juice.

Many goods are also consumed with other goods - these goods are called **complements**. For example, computers require software; filing cabinets require document folders; cars require petrol; and the playing of tennis requires courts, racquets and balls. You might like to consume pizza with garlic bread or with a bottle of coke. If the price of pizza rises, the quantity demanded of pizza will fall, and the demand for complements, such as garlic bread will decrease. Similarly, a rise in the price of computers will lead to a decrease in the demand for software while a decrease in the price of cars will lead to an increase in the demand for petrol.

Tastes and preferences

The tastes and preferences of consumers are an important determinant of consumer demand. The advertising industry plays an important role in affecting consumers' preferences and spending habits. Consumers have quickly embraced the new products/services of the digital age - from smartphones to Facebook and Uber. Sales of CDs quickly declined as consumer preferences shifted towards streaming services such as Spotify. Similarly, demand for DVDs has declined as consumers switched to Netflix, Disney+ and Amazon Prime. Many consumers now demand more environmentally friendly 'green' and organic products.

Expectations of consumers

If people expect conditions to change in the future, they may make decisions now rather than postpone them. For example, if the price of petrol is expected to rise in the future, then consumers will have an incentive to increase their purchases now to beat the price rise. This is rational behaviour. Expectations of a future price rise will increase demand now and shift the demand curve to the right. If you expected the price of petrol were to fall next week, then you would decrease your current demand and wait for the price to fall.

Demographic factors

The size and age composition of the population can have an important bearing on the pattern of demand. A growing population increases the market size for all goods and services whereas a change in the age profile will affect specific goods and services. For example, as the Australian population ages, the demand for child

care facilities will decrease relative to the demand for retirement facilities. There is a growing demand for ocean cruises as the population ages and more people enter retirement age.

Changes in demand

We distinguish between two types of changes in demand:

- a movement along the curve - caused by a change in price.
- a shift of the entire curve - caused by a non-price factor.

These changes are shown in figure 2.2. A change in the price of the good itself will lead to a movement along the demand curve. A change in price will cause a change in quantity demanded. For example, an increase in the price of a good will cause a decrease in quantity demanded whereas a fall in price will cause an increase in quantity demanded (panel A). It is important to remember that when price changes, we move along the curve. A change in price cannot shift the curve.

Changes in any of the other non-price (*ceteris paribus*) factors affecting demand will cause a shift in the entire demand curve. When non-price factors change, the result is a new demand curve. There are two types of shifts - an increase in demand occurs when the demand curve shifts to the right; a decrease in demand occurs when the demand curve shifts to the left (refer to panel B in figure 2.2).

Figure 2.2 Changes in demand

A. A change in price causes a movement along the curve e.g. a rise in price decreases quantity demanded (and vice versa).



B. Increases or decreases in demand are shifts of the entire curve, caused by a factor other than the price of the good.



An increase in demand, for example, might result from any of the following events:

- an increase in consumer income for a normal good
- a decrease in consumer income for an inferior good
- a fall in the price of a complementary good
- an increase in the price of a substitute good
- a change in tastes and preference in favour of the good
- the expectation that price will rise in the future
- an increase in the number of consumers in the market

Review Quiz

1. *True or false - a decrease in price will cause an increase in demand.*
2. *What is the difference between a normal good and an inferior good?*
3. *Provide an example of two substitute goods and two complements.*
4. *Outline two factors that could cause an increase in the demand for coffee.*
5. *Outline two factors that could cause a decrease in the demand for pizza.*
6. *How will demand change if consumers expect price to rise in the future?*

Check your understanding

What is the difference between an increase in demand and an increase in quantity demanded?

If you were the manager of a small cafe and you wanted to increase the demand for your takeaway coffees which of the following options should you choose?

1. ***Reduce the price of a takeaway coffee***
2. ***Reduce the price of a complementary good e.g. a muffin***

While both options will increase the sales of takeaway coffees, option 1 will result in a movement down along the demand curve - an increase in quantity demanded. But option 2 will cause a shift of the demand curve for takeaway coffee to the right.

So only option 2 will result in an increase in demand!

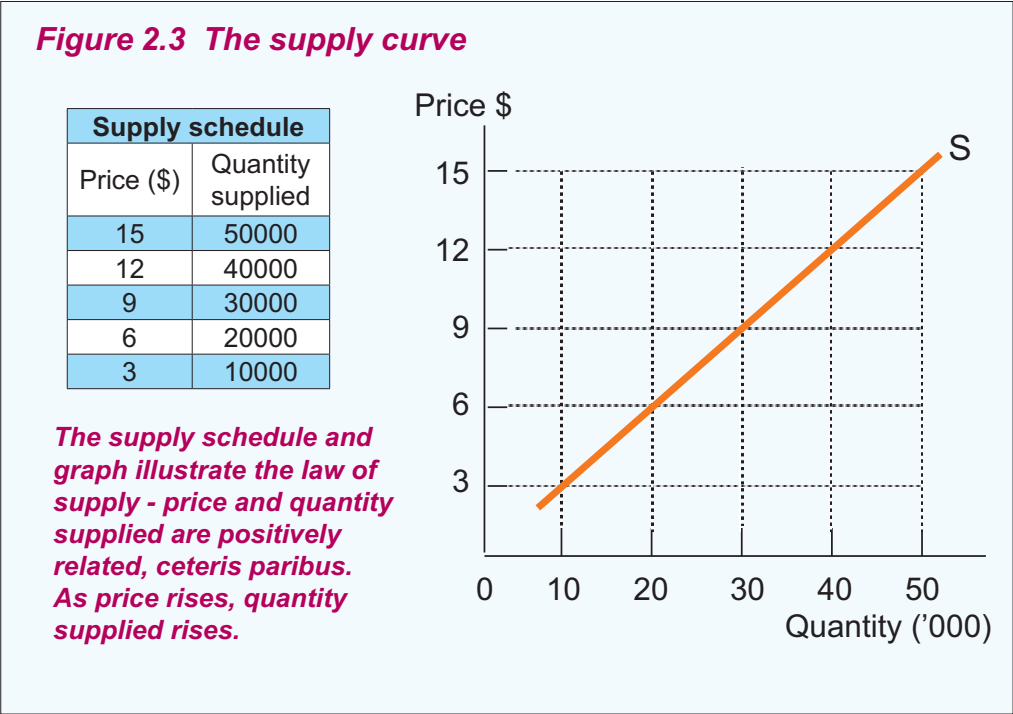
The supply side of the market

Supply represents the sellers or producers side of the market. **Supply** is the amount of a good or service that producers are willing and able to sell at a particular price and at a particular point in time. The relationship between the quantity supplied and the price of a good is a positive one. The law of supply states that as the price of a good or service rises, the quantity supplied will also rise. Notice that this is opposite to the law of demand. The law of supply also assumes that all non-price factors that may affect supply are held constant - the ceteris paribus assumption.

Price and quantity supplied are positively related - as price rises, qty supplied rises

What is the economic reason for the law of supply? Rational, self-interested producers would prefer to sell their output at a high price than at a low price because of the profit motive. If you are selling a good or service you would prefer to sell at the highest price possible. When firms increase their output they may also find that their production costs may increase which would require price to rise to maintain their profit margin.

Figure 2.3 depicts the supply schedule and the **supply curve** for pizzas. A supply schedule is simply a table showing the quantity supplied of a good producers are willing to sell at various prices. Figure 2.3 shows the weekly quantity of pizzas that producers are willing to sell at various prices. It is called a market supply schedule because it is the summation of all the individual producers in the market.



As we would expect, rational producers are willing to sell more pizzas at higher prices than they are at lower prices. We can convert the data from the schedule to a graph known as the market supply curve for pizza. Note that the supply curve is positively sloped, reflecting the law of supply - as price rises, quantity supplied will also rise.

Non-price factors affecting supply

There are other non-price factors which can affect the supply for a good or service. These are all the factors that were held constant (*ceteris paribus* conditions) in deriving the supply curve. The most important factors are the costs of production; technology; prices of other goods the firm can produce; the number of sellers; and expectations of producers.

Costs of production

The price of resources such as labour, capital and raw materials determine the firm's costs of production. A supply curve can be thought of as a cost curve for the firm. Usually, a firm's largest costs are wages and salaries and the cost of purchasing raw materials. An increase in production costs will mean that for a given price, the firm will decrease its production. This will cause the supply curve to decrease - to shift to the left. When production costs rise, market price will also increase.

Technology

Technology is knowledge about the techniques of production. If technology improves, then more output can be produced from the same quantity of resources. This means that the firm's costs of production will fall. Other things being equal, an improvement in technology will result in an increase in supply. The supply curve will shift to the right. The cost of many products including computers, household appliances and electronic devices has continuously fallen over time as a result of improvements in technology.

Number of sellers

If new sellers enter the market, then market supply will increase and the market supply curve will shift to the right. Sellers might be enticed to enter a market if profit opportunities are strong. More sellers increases competition in the market and usually results in a fall in the market price. When firms exit a market, then the market supply curve will shift to the left - a decrease in supply.

Expectations of producers

Suppliers expectations of future conditions will affect supply. If a higher price is expected in the future, then firms will decrease their current supply in order to take advantage of future higher prices. Firms will make decisions about investing in plant and machinery on expected future prices. Expected high prices for iron ore, for example, will encourage increased exploration.

Prices of other goods

Production is a process which involves combining productive resources to produce a final good. In many cases the same resources could be used to produce other goods. The producer will closely monitor movements in the prices of the goods they are capable of supplying so that they can take advantage of profit opportunities. In agriculture, for example a farmer may shift resources from wheat production to wool if the price of wool rises relative to wheat. A car manufacturer will decrease the supply of petrol cars if electric cars become more popular.

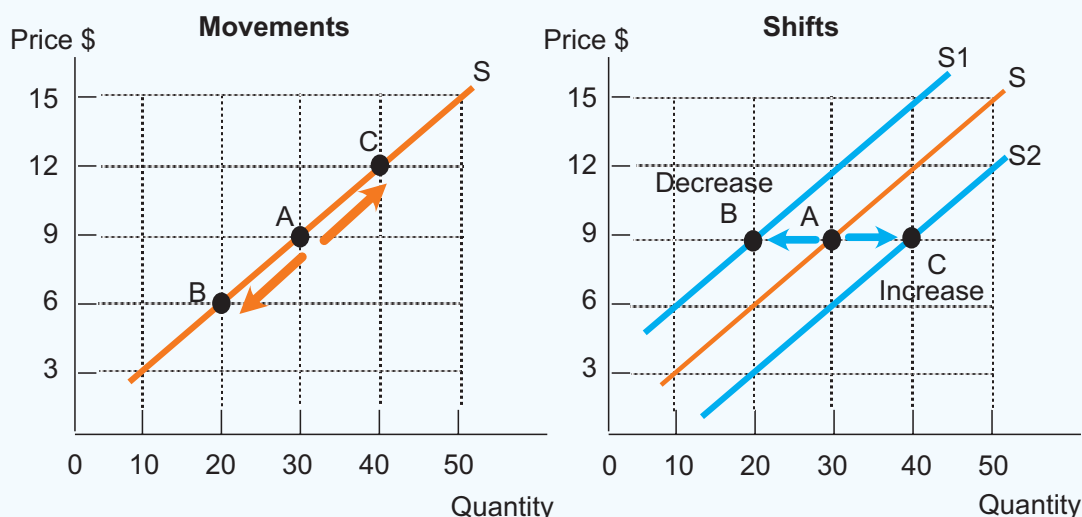
Changes in supply

There are two types of changes in supply:

- a movement along the supply curve - caused by a change in price
- a shift of the entire supply curve - caused by a change in a non-price factor

These changes are shown in figure 2.4. Changes in the price of the good itself will lead to a movement along the supply curve. A change in price causes a change in quantity supplied. An increase in the price of the good will cause an increase in the quantity supplied while a fall in price leads to a decrease in the quantity supplied.

Figure 2.4 Changes in supply



A change in price causes a movement along the curve. A rise in price increases quantity supplied, while a fall in price decreases quantity supplied.

Increases or decreases in supply are shifts of the entire curve, caused by a factor other than the price of the good.

It is important to remember that when price changes, we move along the curve. A change in price cannot shift the curve. Changes in any of the non-price factors affecting supply will cause a shift in the whole supply curve. These factors were all held constant when the initial supply curve was drawn. Allowing these factors to change will result in a new supply curve. There are two types of shift - an increase in supply occurs when the supply curve shifts to the right; a decrease in supply occurs when the supply curve shifts to the left. An increase in the supply of a good will result from any of the following events:

- an improvement in technology
- a decrease in production costs (input prices)
- the expectation that prices will fall in the future
- an increase in the number of producers in the market

Review Quiz

1. *State the law of supply.*
2. *Why would a seller prefer to receive a higher price than a lower price?*
3. *How would an increase in production costs affect the supply curve?*
4. *How would an improvement in technology affect the supply curve?*
5. *An increase in price will cause an increase in supply. True or false - explain.*

Equilibrium price and quantity

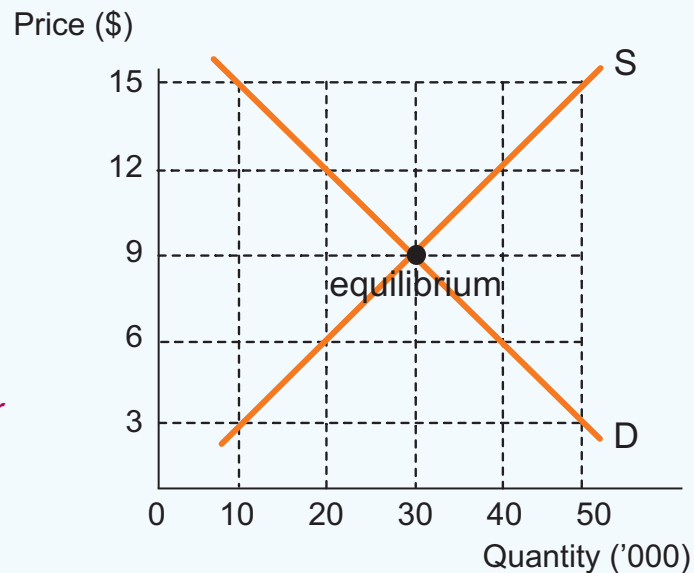
It is important to remember that a market consists of both buyers (demand) and sellers (supply). To determine the market price and quantity we combine the demand and the supply curve on the one graph. The price that clears the market is referred to as the **equilibrium price**. This is the price that balances the buying intentions of consumers with the selling intentions of producers. Figure 2.5 brings the two sides of the market (demand and supply) together. The equilibrium price and equilibrium quantity will be where quantity demanded equals quantity supplied. This will be the price where the demand curve intersects with the supply curve. At the equilibrium price, the amount that buyers are willing to buy is exactly equal to the amount that sellers are willing to sell. In our example of the pizza market, when the price for a pizza is \$9, buyers are willing to buy 30,000 and sellers are willing to sell 30,000. At any other price than \$9, there would be an imbalance between quantity demanded and quantity supplied.

What will happen if the market price is not at the equilibrium price? Will the market automatically adjust to the equilibrium price and quantity? Figure 2.6 shows the situation when the price is either above (panel A) or below (panel B) the equilibrium price. Suppose that the price of pizzas happened to be \$12.

Figure 2.5 Market equilibrium

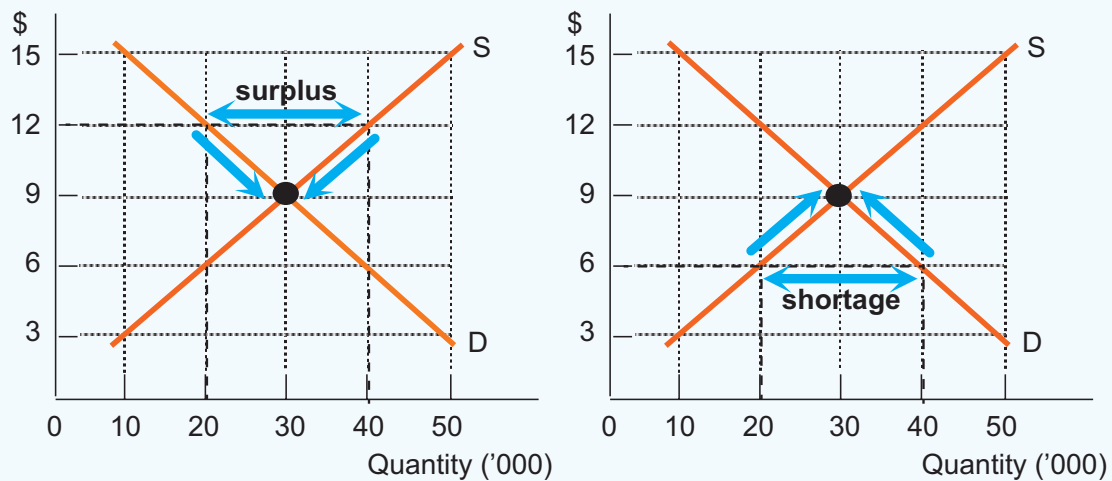
Price \$	Quantity demanded	Quantity supplied	Result	Effect on price
15	10000	50000	surplus	decrease
12	20000	40000	surplus	decrease
9	30000	30000	equilibrium	no change
6	40000	20000	shortage	increase
3	50000	10000	shortage	increase

The equilibrium occurs where the demand curve intersects the supply curve. At the equilibrium price, quantity demanded equals quantity supplied. The equilibrium price is \$9 and the equilibrium quantity is 30,000. At the equilibrium, there is neither a surplus nor a shortage.



At this price, sellers are offering a quantity of 40,000 for sale, while buyers only wish to purchase 20,000. There is an **excess supply** or **surplus** of 20,000 pizzas. The price is too high to clear the market. Sellers will want to eliminate the surplus by lowering prices. As prices fall, more consumers will want to purchase so that the excess supply will be eliminated. Notice that as price falls, consumers move down along the demand curve, while sellers move down along the supply curve. As long as there is a surplus, sellers will have an incentive to lower prices - the price will keep falling until it reaches the equilibrium price of \$9.

Suppose that the price of pizzas happened to be \$6. At this price, sellers are offering a quantity of just 20,000 for sale, while buyers wish to purchase 40,000. Now there is an **excess demand** or **shortage** of 20,000 pizzas. The price is too low to clear the market. Buyers will react to the shortage by bidding up the price. As the price rises, more sellers will want to supply pizza and the excess demand will be eliminated. Notice that as the price rises, consumers move up along the demand curve, while

Figure 2.6 Surpluses and shortages

sellers move up along the supply curve. As long as there is a shortage, sellers will have an incentive to increase prices - the price will keep rising until it reaches the equilibrium of \$9. Only when the price of pizzas is \$9 will quantity demanded exactly match quantity supplied - 30,000 pizzas. At this price there is neither a surplus nor a shortage. The market is said to be in equilibrium.

The word equilibrium means a state of balance or no tendency to change. Any price/quantity combination other than the equilibrium will automatically cause both the price and quantity to change in the direction of equilibrium. Excess supply forces prices down while excess demand causes prices to rise. These price adjustments are known in economics as the 'invisible hand' of the market - a term coined by Adam Smith. A more modern term is the **price mechanism**.

Prices are always adjusting in competitive markets in response to changes in demand and supply conditions. Changes to the market will create either temporary shortages or surpluses which will then cause price to change to re-establish a new equilibrium. The length of time required to eliminate shortages and surpluses though will vary from one market to another. In the share market, prices change very quickly to find a balance between buyers and sellers. The price of the Australian dollar in the foreign exchange market changes by the minute to balance supply and demand factors. In fruit and vegetable markets, prices adjust daily in response to supply and demand conditions. These are all good examples of competitive markets. As long as a market is able to operate freely, prices will always adjust to balance demand and supply.

Check your understanding

Which of the following will cause an increase in the supply of pizza?

- a. An increase in the price of pizza*
- b. An increase in consumer income*
- c. An increase in the number of consumers*
- d. A decrease in the price of pizza flour*

If you answered (a) you made a common mistake - a change in price cannot shift the supply curve, it will cause a movement along the curve.

Alternatives (b) and (c) are factors that will shift the demand curve for pizza, not the supply curve.

Alternative (d) is correct. A decrease in the price of pizza flour (an input) will reduce the cost of making pizza and this will result in an increase in the supply of pizza.

Review Quiz

- 1. What does equilibrium mean?*
- 2. How does a shortage occur in a market? What will happen to price?*
- 3. How does a surplus occur in a market? What will happen to price?*
- 4. How would an improvement in technology affect the supply curve?*
- 5. An increase in price will cause a decrease in demand - True or False?*

Changes in demand and supply

Why do prices in markets fluctuate? The reason is that either demand conditions change which shifts the demand curve or supply conditions change which shifts the supply curve. Remember, a given demand curve and supply curve will establish a unique equilibrium price and quantity, but if the demand curve or the supply curve shift, then a new equilibrium will be established. It is important to understand what happens in the market given a change in either demand or supply. The explanatory box on page 41 highlights the four stage explanation process to understanding changes in markets. We can refer to four types of changes to a market equilibrium, because both the demand curve and the supply curve can increase (shift to the right) or decrease (shift to the left):

- an increase in demand
- a decrease in demand
- an increase in supply
- a decrease in supply

For each of these changes, we want to analyse the impact on both equilibrium price and quantity.

Increase in demand

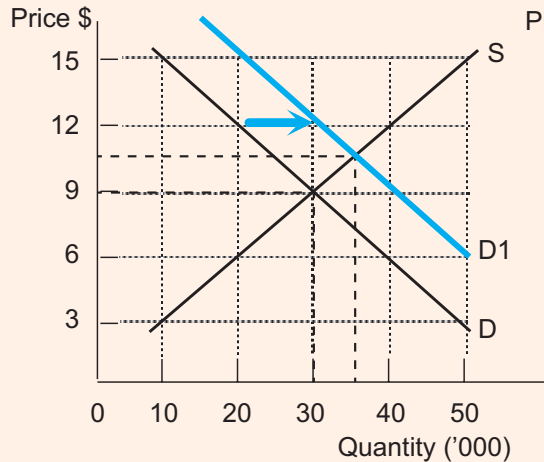
Imagine a new medical report that announced that pizza consumption improved your intelligence. This would lead to an increase in the demand for pizzas - the demand curve for pizzas will shift to the right, as consumers' preferences change (see Figure 2.7, panel A). At the original equilibrium price of \$9, quantity demanded will now increase to 40,000 which is 10,000 more than quantity supplied - in other words, there is now a shortage in the market. This excess demand for pizzas will cause the price to rise to a higher equilibrium where the new demand curve intersects with the supply curve. At the higher price of \$10.50, quantity supplied will increase to 35,000 while quantity demanded will fall from 40,000 to the new equilibrium of 35,000. So an increase in demand will result in an increase in both the equilibrium price and equilibrium quantity. Whenever you see rising prices and rising sales in a market, then you know that demand for the good is increasing.

Decrease in demand

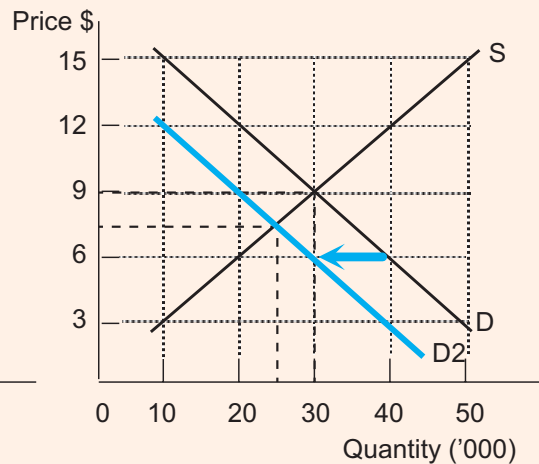
Imagine if it was reported that pizza consumption was a cause of cancer. Now consumers would change their preferences away from pizza. This would lead to a decrease in the demand for pizza - the demand curve for pizzas will shift to the left (see Figure 2.7, panel B). At the original equilibrium price of \$9, quantity demanded would fall to 20,000 which is now 10,000 less than quantity supplied at the original equilibrium - there is now a surplus in the market. This excess supply of pizzas will cause the price to fall to a lower equilibrium price of \$7.50. At the lower price, quantity supplied will fall to the new equilibrium quantity of 25,000. Whenever you see prices and sales falling in a market, then you can safely assume that demand for the product is decreasing.

Increase in supply

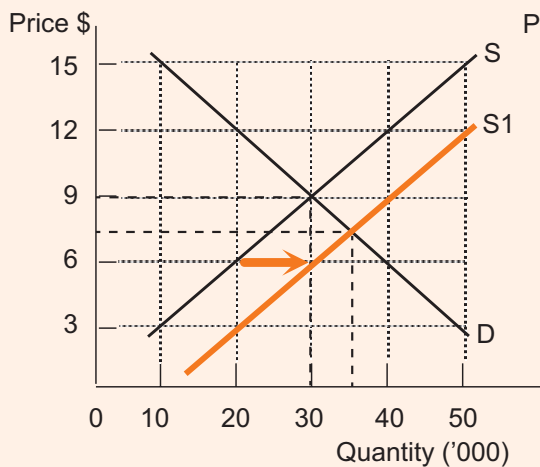
A change in production costs or technology are important factors that can shift the supply curve. Suppose that a new pizza oven is created which reduces the time to cook pizza, helping to lower production cost. This will cause the supply curve to shift to the right - an increase in supply (see panel C). Pizza producers will now be able to supply more pizzas for the same cost. At the initial price of \$9, producers now want to sell 40,000 - a surplus of 10,000. The excess supply will drive price down to the new equilibrium of \$7.50 and new quantity of 35,000. Whenever you see prices falling and quantity rising in a market, then you can safely assume that supply for the product is increasing.

Figure 2.7 Changes in equilibrium**A. Increase in Demand**

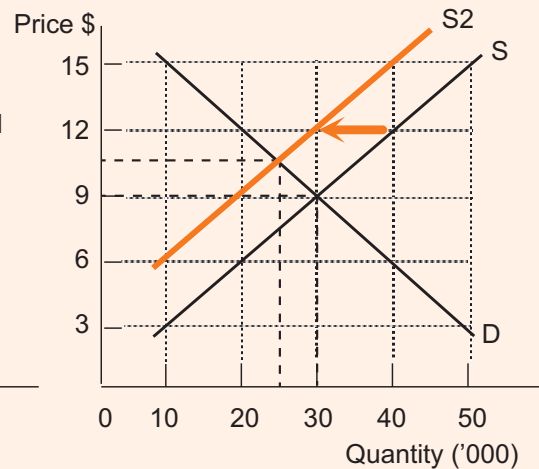
A. An increase in demand causes both equilibrium price and quantity sold to rise. Price has increased to \$10.50 and quantity has risen to 35,000 pizzas.

B. Decrease in Demand

B. A decrease in demand causes both equilibrium price and quantity sold to fall. Price has decreased to \$7.50 and quantity has fallen to 25,000 pizzas.

C. Increase in Supply

C. An increase in supply will cause a decrease in equilibrium price and an increase in equilibrium quantity - in this example, price falls to \$7.50, while quantity rises to 35,000.

D. Decrease in Supply

D. A decrease in supply will result in an increase in equilibrium price and a decrease in equilibrium quantity - in this example, price rises to \$10.50, while quantity falls to 25,000.

Understanding changes in equilibrium

We can get a better understanding of how changes in demand or supply affect market outcomes (price and quantity sold) using a 'four-stage' explanation method. This method can be used to analyse any given change to a market and predict what will happen to both equilibrium price and quantity.

Example 1: How does the market for apples react to a report that says "an apple a day keeps the doctor away"

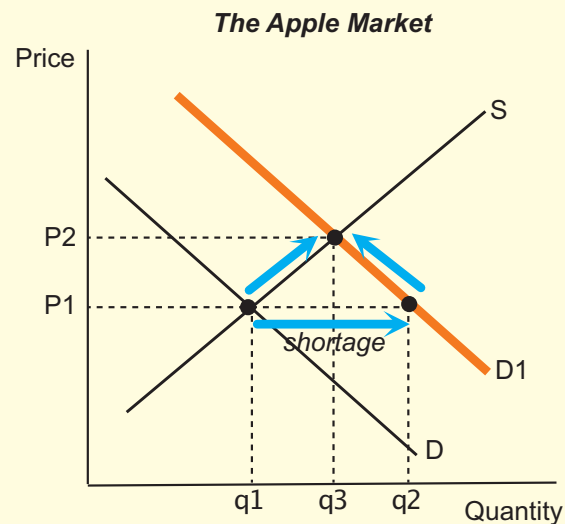
1.	Identify the cause of the change in demand or supply	Demand for apples increases (the D curve shifts to the right) because there is a favourable change in preferences
2.	Explain how the change causes a temporary shortage or surplus at the initial equilibrium	Increased demand creates a temporary shortage at the initial price
3.	Describe how market price reacts to the temporary shortage or surplus	Price always rises when there is a market shortage
4.	Describe how this causes a change in the quantity demanded or supplied	The increase in price causes an increase in Qs and a decrease in Qd as sellers and buyers react to the price rise

The apple market is in equilibrium at P_1 and q_1 . An increase in demand shifts the D curve to D_2 . At P_1 , Q_d increases to q_2 - but this creates a shortage = q_1q_2 . As price is bid up to P_2 , Q_s rises and Q_d falls to the new equilibrium of q_3 .

If there was a decrease in demand in a market, then there would initially be a temporary surplus - this would cause the price to start falling to clear the surplus.

Use the 4 stage explanation to analyse the following:

1. The market for bananas is adversely affected by a cyclone.
2. A news report warns of the negative health effects of consuming coffee.



Decrease in supply

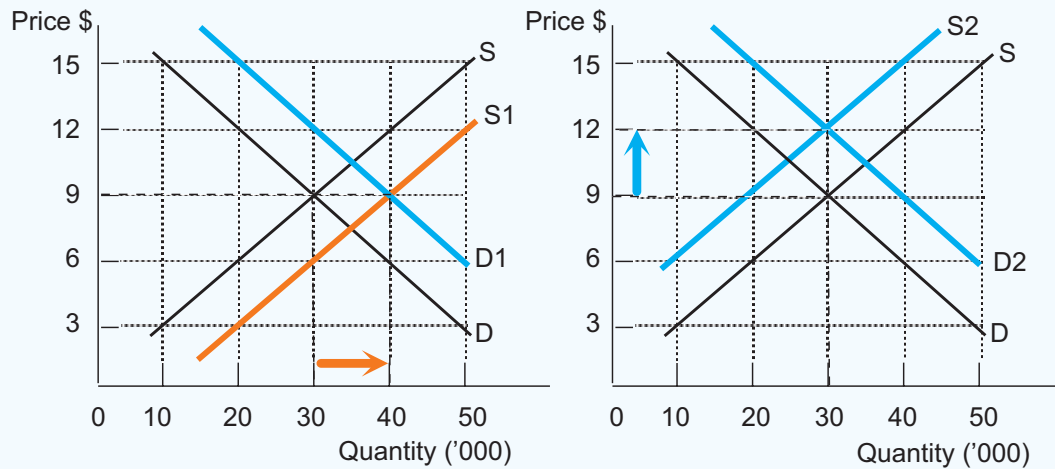
Suppose there was an increase in the price of mozzarella cheese - a key ingredient in producing pizzas. This would increase the cost of making pizza and would cause the supply curve to shift to the left - a decrease in supply (see panel D). Pizza producers will now be willing to supply less pizzas. At the initial price of \$9, producers now want to sell 20,000 but buyers want 30,000. The excess demand will drive price up to the new equilibrium of \$10.50 and new quantity of 25,000. The new equilibrium will be where the new supply curve intersects with the original demand curve. Whenever you see prices rising and quantity falling in a market, then you can safely assume that supply for the product is decreasing.

Simultaneous shifts in demand and supply

When a single curve shifts, our model of demand and supply makes it relatively easy to predict the movement in price and quantity. However, what will happen to equilibrium price and quantity if both curves shift at the same time? While this is more complex, our model can still be used to analyse the changes to price and quantity. For example, if we combine an increase in demand with an increase in supply (Figure 2.8, panel A), then the equilibrium quantity must increase, but the equilibrium price may rise, fall or stay constant - it is indeterminate. This is because an increase in demand pushes price up while an increase in supply pulls price down. What happens to price will depend on the relative shift of each curve. If the demand curve shifts more than the supply curve, then the equilibrium price will rise. If the supply curve shifts by more, then the equilibrium price will fall. In our example, both curves have shifted the same amount so that the equilibrium price has not changed.

Let's examine another case of a simultaneous shift. Panel B in Figure 2.8 shows the impact of an increase in demand combined with a decrease in supply. In this case equilibrium price must increase, but equilibrium quantity is now indeterminate. This is because an increase in demand increases quantity while a decrease in supply decreases quantity. Quantity may increase, decrease or remain constant - it will depend on the relative shifts of the curves. If the demand curve shifts more than the supply curve, then the equilibrium quantity will rise. If the supply curve shifts by more, then the equilibrium quantity will fall.

In our example, both curves have shifted the same amount so that the equilibrium quantity has not changed. Figure 2.9 summarises the effects on price and quantity of shifts in both demand and supply. Notice that when both curves shift, it is possible to only predict what will happen to either price or quantity but not both. Only if we have more information about the size of the relative shifts of each curve can we predict the outcome on both price and quantity. For example, if there was an increase in demand for pizza which was greater than a decrease in supply, then both price and quantity would increase.

Figure 2.8 Simultaneous changes

A. An increase in demand and supply will cause quantity sold to rise but the effect on price is indeterminate - in this example, Q has increased to 40,000 while P has remained at \$9.

B. An increase in demand and a decrease in supply will result in price rising but the effect on quantity is indeterminate - in this example, P has increased to \$12 while Q has remained at 30,000.

Figure 2.9 Predicting market changes

Type of Shift	Effect on Price	Effect on Quantity
Increase in demand and no change in supply	Increase	Increase
Decrease in demand and no change in supply	Decrease	Decrease
Increase in supply and no change in demand	Decrease	Increase
Decrease in supply and no change in demand	Increase	Decrease
Increase in demand and Increase in supply	Indeterminate	Increase
Increase in demand and Decrease in supply	Increase	Indeterminate
Decrease in Demand and Increase in Supply	Decrease	Indeterminate
Decrease in Demand and Decrease in Supply	Indeterminate	Decrease

Check your understanding

The model below shows the demand and supply curves for an energy company which sells electricity produced using renewable sources.

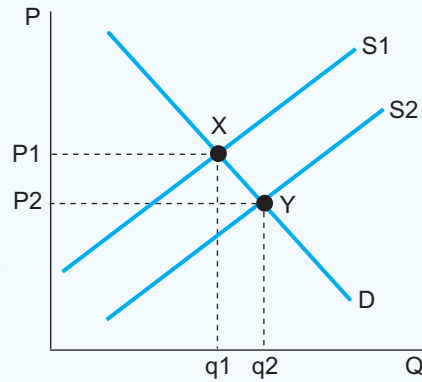
Which one of the following will shift the market equilibrium position from X to Y?

- (a) More consumers buying electricity.
- (b) A government subsidy paid to the company.
- (c) An environmental tax levied on the company.
- (d) An increase in wages of workers in the electricity sector.

If you answered (a) you made a common mistake - more consumers would cause a shift of the demand curve to the right.

Alternatives (c) and (d) will cause a decrease in supply - a shift of the supply curve to the left.

Alternative (b) is correct. A subsidy paid to the company will cause an increase in supply - a shift of the supply curve to the right.



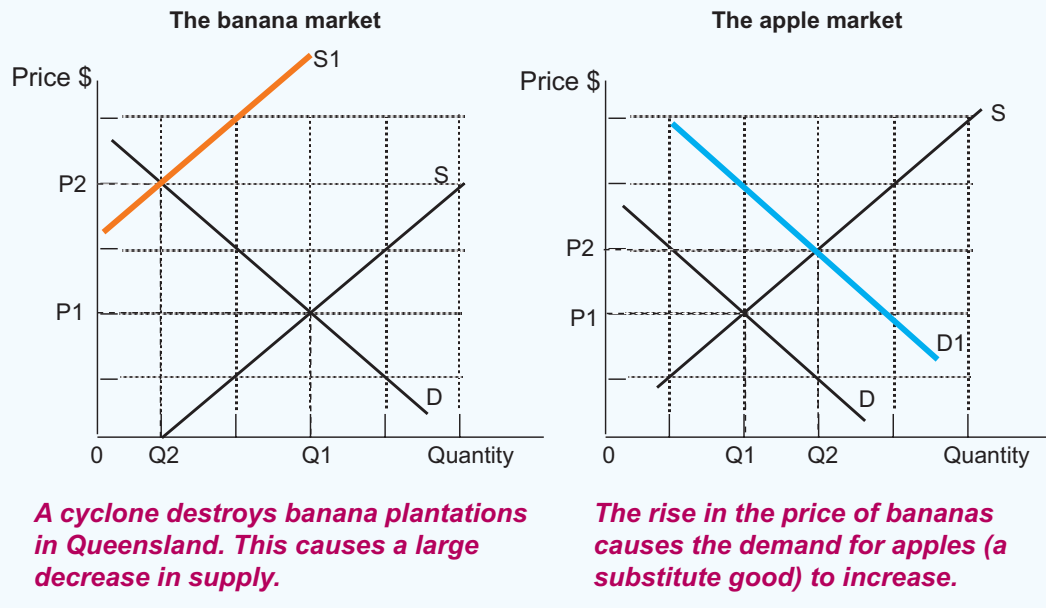
Review Quiz

1. What effect does an increase in demand have on market price and quantity?
2. What effect does an increase in supply have on market price and quantity?
3. If the demand for mobile phones increases but at the same time improvements in technology reduce production costs, what will happen to the equilibrium price and quantity? Use a model to explain.
4. What will be the effect of panic buying and supply disruptions on market price and quantity? Use a model to explain.

Case Studies

The banana and apple market

The Australian fruit and vegetable market is often affected by the cyclone season in Queensland - destructive winds and rain can destroy much of Queensland's crops resulting in shortages and high prices. The last cyclone to devastate Queensland destroyed a large part of the state's banana crop. Queensland accounts for over 90

Figure 2.10 Related markets

per cent of Australia's banana production. What would we predict would happen to banana prices and sales? Using our model of demand and supply we would show the effect of the cyclone as a large decrease in supply. This would result in a spike in banana prices and a significant fall in banana sales (Figure 2.10).

Is there a shift in the demand curve? If a news report told you that a cyclone was approaching, would eating bananas protect you from a cyclone? The answer is no - the demand curve for bananas does not shift! Do not make the mistake of thinking that if banana prices increase this will cause a decrease in the demand for bananas. It is important to remember that a change in price cannot shift the curve. What did banana consumers do in response to banana prices tripling? They obviously stopped buying bananas - as the price of bananas rose, quantity demanded fell because consumers looked for a substitute fruit. Is there a close substitute for bananas? The answer is yes - Australian consumers actually increased their purchases of apples! Apples certainly don't look or taste like bananas - they are generally red, round and crisp rather than yellow, long and squishy. But Australian consumers did switch to apples as their replacement fruit. In the apple market, there was a large increase in the demand for apples resulting in apple prices and sales both increasing. This is exactly what our model would predict.

Covid and the disappearing toilet paper

The Covid pandemic caused unprecedented disruption to everyone's life. The virus was global - spreading quickly to every country. One unusual feature associated with the pandemic was the panic buying and hoarding of toilet paper.

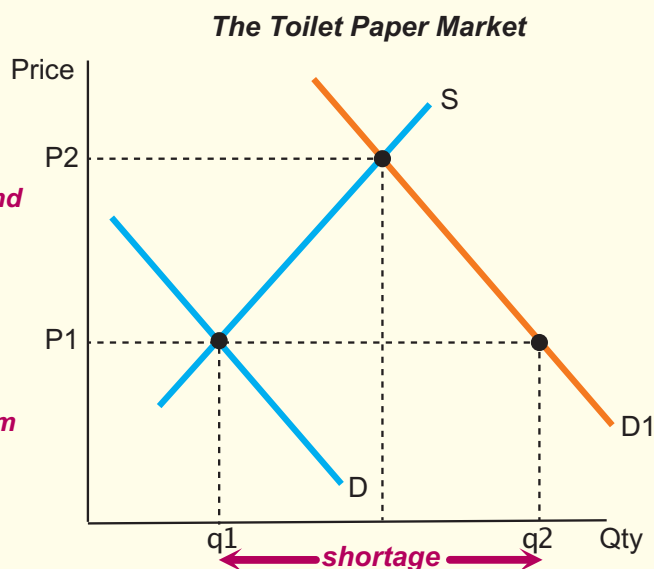
In Australia, a cafe began accepting rolls of toilet paper as payment — a cup of coffee exchanged for three rolls. In Hong Kong, armed criminals held up a supermarket - all they took was 100 rolls of toilet paper. Can our model of demand and supply help explain this bizarre behaviour?

One theory that behavioural economists point to is ‘herd behaviour’. This occurs when people make a decision based on the behaviour of others. If people suddenly see others rushing to buy toilet paper, then they will follow suit, even if it doesn’t make any sense. Consumers as a group, often have a strong sense to conform and copy the behaviour or choices of others. An individual may feel that the group (the herd) must be acting on information that they don’t possess. Media reports frequently showed images of shoppers hauling multiple shopping carts filled to the brim with toilet paper. The very sight of these images created a sense of urgency or panic for others to follow suit.

What was happening in the market for toilet paper? The panic buying led to a very large increase in demand for toilet paper - shelves were wiped clean! In a normal competitive market, price would quickly rise to eliminate the shortage. But supermarkets kept prices at the initial level for fear of being accused of ‘price gouging’. If price stays at the original price of P_1 in figure 2.11 there is now a massive shortage. If the market price was allowed to rise to P_2 to reflect the scarcity of toilet paper, then the shortage would disappear. The higher prices would prevent many consumers from hoarding the toilet paper. The higher price would cause quantity demanded to fall and quantity supplied to rise.

Figure 2.11 Toilet paper shortage

The Covid pandemic led to panic buying and hoarding of toilet paper. There was a massive increase in the demand for toilet paper. If price were allowed to rise to P_2 , there would be no shortage - the higher price would ration the available supply. But keeping prices at P_1 meant that toilet paper quickly disappeared from supermarket shelves.



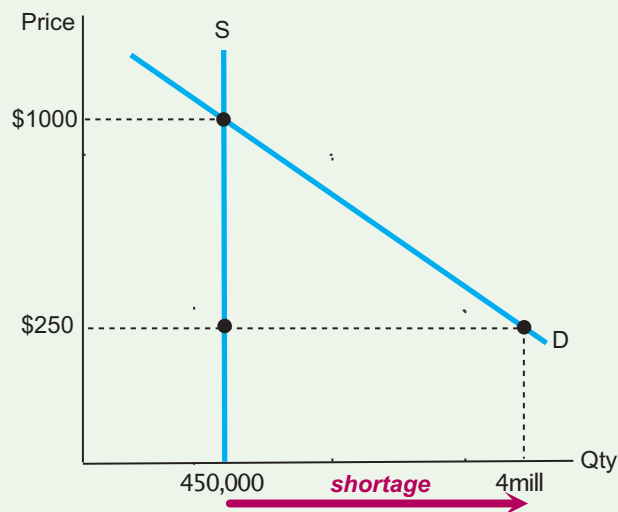
The market for Taylor Swift concert tickets

Whenever Taylor Swift concert tickets go on sale it causes a panic amongst the legions of her fans ('Swifties'). Her world Eras tour of 2023-24 has seen unprecedented demand for the limited number of tickets, with millions of fans missing out. The Australian leg of the tour in early 2024 has five shows - three at Sydney's Accor Stadium and two at the Melbourne Cricket Ground. The total number of tickets available for these five shows is 450,000. What's the problem you ask? Surely that's enough tickets to satisfy demand? Guess again - when tickets went on sale there was a queue of over four million wanting tickets - that's a whopping three and a half million shortage! No wonder that tickets sold out in minutes!

Figure 2.12 below uses the demand/supply model to show the Taylor Swift concert market. The supply of concert tickets is shown as a vertical line at the quantity of 450,000 - that's the fixed amount of tickets available. If the average price of a ticket is around \$250, then there is excess demand of over three million. In a normal market this shortage would cause market price to rise until equilibrium is reached, which could be at a price of \$1,000 per ticket! Concert promoters would not initially set prices at this level for fear of being accused of price gouging and alienating fans. One solution would be to increase the number of concerts - this would increase the supply curve and reduce the shortage. But this may be difficult if there are no extra dates available. There is another solution - it's called 'ticket scalping'. This is where somebody who has a ticket on sells it to another person who is willing to pay a higher price. Economists see no harm in ticket scalping - it's the market working to solve the critical shortage problem. Fans willing to pay a higher price are happy to do so and the original ticket holder is compensated for giving up their ticket. It's a case of win-win - everyone gains from the exchange.

Figure 2.12 Taylor Swift concert tickets

The supply curve is vertical because there is a fixed quantity of tickets. At the official ticket price there is excess demand resulting in a large shortage. Ticket scalpers can reduce this shortage by selling tickets to those who are willing to pay higher prices.



3



Elasticity

Learning Objectives

In this chapter you will learn about:

- *the concept of price elasticity of demand*
- *the measurement of price elasticity of demand*
- *the determinants of price elasticity of demand*
- *the link between price elasticity of demand and total revenue*
- *the concept of price elasticity of supply*
- *the determinants of price elasticity of supply*
- *the application of price elasticity of demand and supply to markets*
- *the importance of price elasticity of demand and supply for business and government*

The laws of demand and supply help to explain how consumers and producers interact in markets. Changes in demand and supply also help to explain the movement of prices. We can gain further understanding about demand and supply by knowing how responsive consumers and producers are to a given change in price. For example, if the price of pizza were to increase by 10 per cent, would consumers decrease their quantity demanded by more than 10 per cent, less than 10 per cent, or exactly 10 per cent? In other words, it is useful to know whether the law of demand (and the law of supply) is likely to be relatively strong or weak for different types of goods. This chapter takes us behind the demand curve and the supply curve to provide more detailed information about how much quantity demanded or quantity supplied responds to a given change in price. Economists use a concept called **elasticity** to provide this information. Price elasticity is a measure of the responsiveness or sensitivity of quantity to a change in price.

Price elasticity of demand

Price elasticity of demand is defined as the responsiveness of quantity demanded to a change in the price of the good or service. To help illustrate price elasticity of demand, suppose that the present price of a coffee (e.g. cappuccino) is \$4, and one million coffees are sold in Perth every week. What will happen to the quantity sold if the price rises by 10 per cent or \$0.40? We know from the law of demand that when price rises, quantity demanded falls. But by how much will sales fall?

As a Year 11 economist, would you predict that coffee consumption would fall by a large amount or a small amount after the 10 per cent price rise? Suppose that market research indicated that the \$0.40 price rise would lead to a fall in quantity demanded equal to 30,000 coffees per week. We need to know how large the fall in quantity was relative to the price increase. To do this we compare the percentage change in price with the percentage change in quantity. The quantity change is 30,000 which represents a 3 per cent ($30,000 / 1 \text{ million}$) change. So, a ten per cent price rise caused quantity demanded to fall by just 3 per cent! From this evidence we could conclude that the demand for coffee is not very responsive to changes in price. We would say that the demand for coffee is **inelastic** or not responsive.

We can calculate price elasticity of demand (E_d) using a number of methods. If we use the percentage change method, the formula is:

$$E_d = \frac{\text{percentage change in quantity}}{\text{percentage change in price}}$$

In our example, $E_d = 3\% / 10\% = 0.3$.

As long as the percentage change in quantity is less than the percentage change in price, the answer will be less than one and this indicates that demand is inelastic.

In this example, it was relatively easy to calculate the percentage change, but in other examples, the data may be more complex. In such cases, it is easier to use an alternate formula:

$$Ed = \frac{\Delta Q}{Q} / \frac{\Delta P}{P}$$

where Q = quantity demanded; P = price and the delta symbol Δ refers to 'change'.

The equation can be transformed to

$$Ed = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

Substituting the figures from the coffee example above,

$$\begin{aligned} Ed &= \frac{30,000}{1,000,000} \times \frac{4}{0.4} \\ &= 0.3 \end{aligned}$$

The answer is known as the **elasticity coefficient**. In this instance it means that a 1 per cent change in the price of coffee will lead to a 0.3 per cent change in quantity demanded. When the value is less than 1, it means that the law of demand is relatively weak - quantity demanded is not very responsive to a price change. Why not? It is usually determined by the substitution effect. Coffee is addictive and has few close substitutes. If the price of coffee rises then consumers cannot easily substitute away from the product. Demand will be relatively inelastic. Other goods with inelastic demand would be alcohol (beer wine, spirits), petrol and basic food products such as bread and milk. Notice that goods that are necessities will have few close substitutes and will therefore be inelastic. This means that quantity demanded responds weakly to a change in price.

The price elasticity coefficients are sometimes shown with a minus sign in front of them because quantity and price are negatively related. By convention we ignore the minus sign because we are only interested in the absolute number.

What about products that have relatively close substitutes. We would expect that quantity demanded would be more sensitive to a change in price. Suppose that the price of pizza were to rise relative to other fast food goods. Assume that the price of pizza were to increase from \$10 to \$11 and weekly pizza consumption decreased from 500,000 to 400,000. What would be the price elasticity of demand for pizza? Applying our formula:

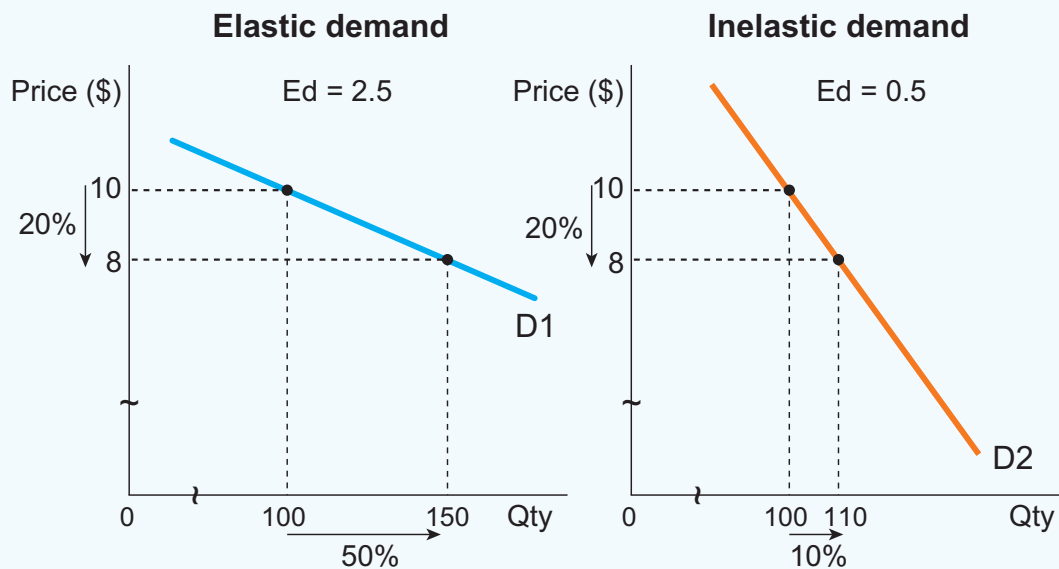
$$Ed = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

$$\begin{aligned} Ed &= \frac{100,000}{500,000} \times \frac{10}{1} \\ &= 2.0 \end{aligned}$$

What does the answer mean? It means that a 1 per cent change in the price of pizza results in a 2 per cent change in the quantity demanded; or a 10 per cent change in price leads to a 20 per cent change in quantity demanded. When the value of Ed is greater than 1, it means that the law of demand is relatively strong - quantity demanded is relatively responsive to a price change. In this case demand is said to be relatively **elastic**. The larger the elasticity coefficient, the more responsive demand is to price which indicates that there is likely to be many close substitutes.

Figure 3.1 compares a relatively elastic demand curve ($D1$) with an inelastic demand curve ($D2$). On both demand curves, price has fallen by 20 per cent - from \$10 to \$8. On demand curve $D1$, quantity increases from 100 to 150 - an increase of 50 per cent. But on demand curve $D2$, quantity increases from 100 to 110 - an increase of just 10 per cent. So $D1$ reflects an elastic demand with $Ed = 2.5$, while $D2$ reflects an inelastic demand with $Ed = 0.5$. The formula we have been using is called the **point method** because we are calculating elasticity from a specific point or price on the demand curve. In the case of the pizza example, we calculated elasticity for a price increase from \$10 to \$11. But what if we calculated the elasticity for a price decrease from \$11 to \$10 (quantity rising from 400,000 to 500,000)? Would we get the same answer? The answer is no! The answer changes because the value for P and Q in our formula will change:

Figure 3.1 Elastic and inelastic demand



$$Ed = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

$$\begin{aligned} Ed &= \frac{100,000}{400,000} \times \frac{11}{1} \\ &= 2.75 \end{aligned}$$

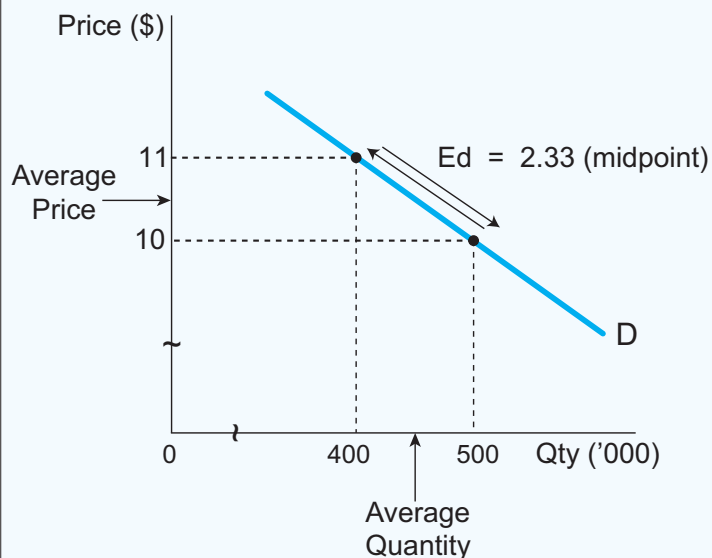
Using the simple point method gives two different answers depending on whether we are increasing or decreasing price. To avoid this confusion we use an averaging technique, called the **midpoint method**. In our formula we use the average or midpoint price and the average or midpoint quantity. This would mean that in our pizza example, the value for price would be \$10.50 (P_{ave}) and the value for quantity would be 450,000 (Q_{ave}). The two change variables (ΔP and ΔQ) stay the same.

Using the new midpoint formula:

$$Ed = \frac{\Delta Q}{Q_{ave}} \times \frac{P_{ave}}{\Delta P}$$

$$\begin{aligned} Ed &= \frac{100,000}{450,000} \times \frac{10.5}{1} \\ &= 2.33 \end{aligned}$$

Figure 3.2 The midpoint method



Price elasticity of demand measures the responsive of quantity demanded to a change in price. To measure the elasticity between \$10 and \$11 we use the midpoint formula - this means using the average price and the average quantity in the elasticity formula.

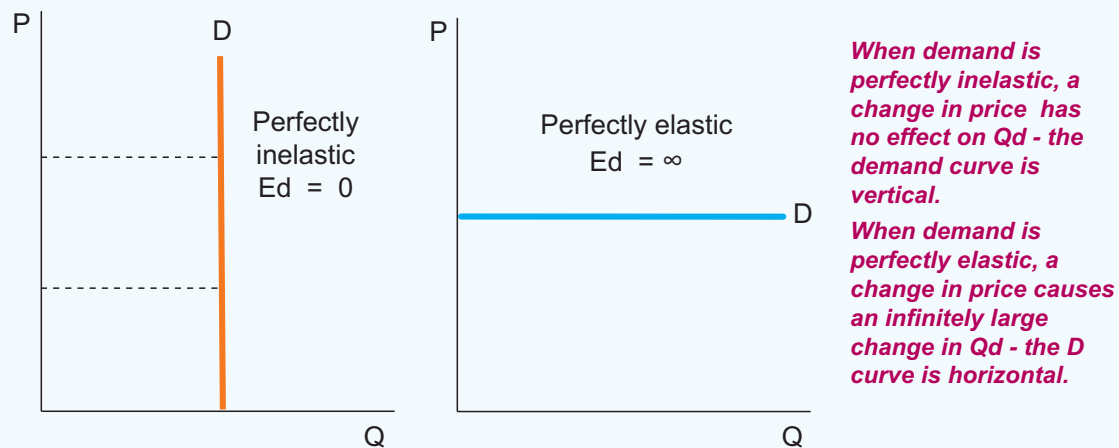
The advantage of using the midpoint formula is that the answer does not depend on which price we choose as the starting price - instead we are calculating the elasticity along the same segment of the demand curve. The midpoint method for calculating price elasticity is shown below in figure 3.2. This is usually the preferred method used by economists.

Along any normal downward sloping demand curve, price elasticity decreases as we move down the demand curve. In other words price elasticity falls as price falls. This makes sense if you remember the formula: $E_d = \Delta Q / \Delta P \times P/Q$. As price falls, quantity rises so that the P/Q value will decrease. Generally consumers are not that price sensitive to relatively inexpensive goods and are more price sensitive to expensive luxury goods. For example, if a good that costs \$1 increases by 10 per cent to \$1.10 it will not have much impact on the spending decisions of buyers. But if a good that costs \$5,000 increases in price by 10 per cent to \$5,500 it is likely to impact on buyers significantly.

In theory, the value of price elasticity of demand can range between zero and infinity. If price elasticity equals zero, then a change in price will have no effect on quantity demanded - demand is said to be **perfectly inelastic** ($E_d = 0$). In this case the good would have no substitutes. The demand for heroin by a drug addict or insulin for a diabetic would be examples of perfectly inelastic demand. If price increases, there is no change in quantity demanded - the law of demand in this case stops working. A perfectly inelastic demand curve is vertical. A horizontal demand curve is said to be **perfectly elastic** and price elasticity would equal infinity ($E_d = \infty$). An example of this would be a good with a perfect substitute - if the price of the good increases by one cent, consumers would stop buying the good and switch to the perfect substitute. Figure 3.3 shows these two special cases of price elasticity of demand. Notice that the slope of the demand curve can be used to convey whether demand is likely to be elastic or inelastic. Generally, the steeper the demand curve, the lower the elasticity (more inelastic) and the flatter the demand curve, the higher the elasticity (more elastic).

Review Quiz

1. Define price elasticity of demand.
2. How is price elasticity of demand calculated?
3. If price elasticity equals 2.5, this means that a 10% increase in price will cause quantity demanded to decrease by _____ %.
4. If price elasticity equals zero, then this would mean that when price changes quantity demand would change by _____ %.
5. If a good has many close substitutes, then demand is likely to be price _____ .
6. As price increases, the price elasticity of demand _____ .

Figure 3.3 Special cases of price elasticity**The meaning of price elasticity of demand**

Perfectly inelastic $E_d = 0$	Quantity demanded does not change - the D curve is vertical	Goods with no substitutes
Inelastic $E_d < 1$	Quantity demanded decreases by less than 1% - relatively steep D curve	Goods with few close substitutes
Unitary elastic $E_d = 1$	Quantity demanded decreases by exactly 1% - equally proportional D curve	Goods with some close substitutes
Elastic $E_d > 1$	Quantity demanded decreases by more than 1% - relatively flat D curve	Goods with many close substitutes
Perfectly elastic $E_d = \infty$	Quantity demanded decreases to zero - horizontal D curve	Goods with perfect substitutes

Covid and price elasticity

During the Covid period of 2020-21, many firms faced increasing costs due to supply bottlenecks and shortages of resources, including raw materials and skilled labour. Firms had to choose whether to absorb the higher costs and reduce their profit margins or raise prices and risk losing sales. Many firms that did raise prices found to their surprise that sales did not fall by that much - this translates into a low elasticity of demand (price inelastic). It appears that in times of stress and uncertainty, consumers become less sensitive to price increases and stay loyal to their regular brands. Shoppers who are less likely to want to spend time in a crowded shopping centre will be less inclined to shop around for a cheaper generic brand.

Price elasticity and total revenue

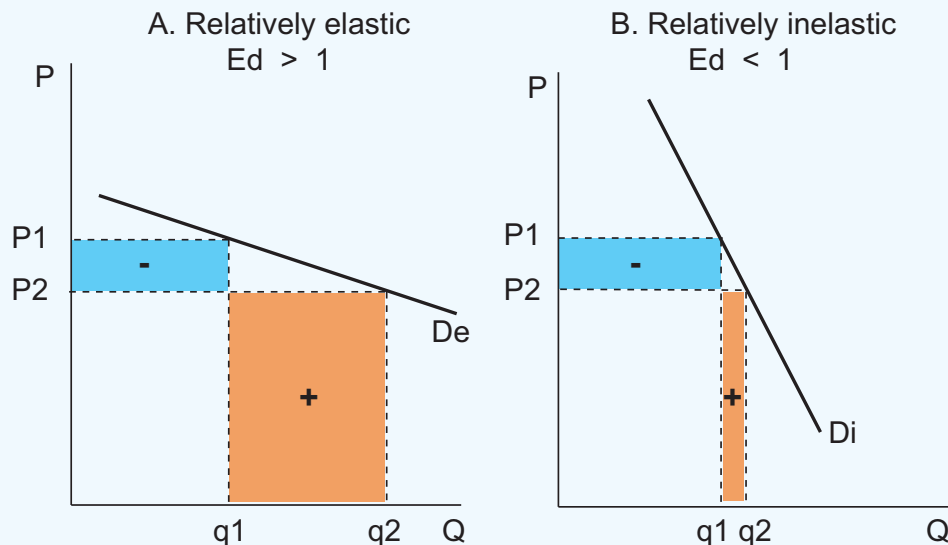
Price elasticity of demand is an important concept because of its link with the concepts of **total revenue** of business firms and **total expenditure** of households. Total revenue or total expenditure is simply price multiplied by quantity:

$$TR(TE) = P \times Q$$

Total revenue or expenditure can be measured using the demand curve. Figure 3.4 shows two demand curves - one that is relatively elastic (flat) and one that is relatively inelastic (steep). Total revenue (expenditure) is shown by the rectangle formed by price and quantity underneath the demand curve. If price falls from P1 to P2 then quantity demanded will increase from Q1 to Q2. But notice that the effect on total revenue is different. In panel (a) where demand is relatively elastic, total revenue has increased because the change in Qd is much greater than the change in price. In panel (b) where demand is relatively inelastic, total revenue has decreased because the change in Qd is much smaller than the change in price.

What would happen if we increased price? If demand is elastic, total revenue will fall, because the percentage decrease in Qd will be greater than the percentage increase in price. If demand is inelastic, then total revenue will increase - the fall in Qd will be smaller than the rise in price.

Figure 3.4 Price elasticity and total revenue



When price falls, revenue decreases by the (-) area and increases by the (+) area. In panel A, TR increases when P falls because demand is elastic. In panel B, TR decreases when P falls because demand is inelastic.

So the important conclusion is that if we know the price elasticity of a good, then we can accurately predict what will happen to a firm’s total revenue when it changes the price of its product. Why do firms have discount sales? Presumably to increase their revenue which means they think that the demand for their product must be elastic. What happens to total revenue (expenditure) if demand is unitary elastic and price changes? The answer is nothing, total revenue would not change. This is because if price increased by 10 percent, quantity demanded would decrease by exactly 10 per cent ($E_d = 1$).

Let’s summarise the relationship between price elasticity of demand and total revenue:

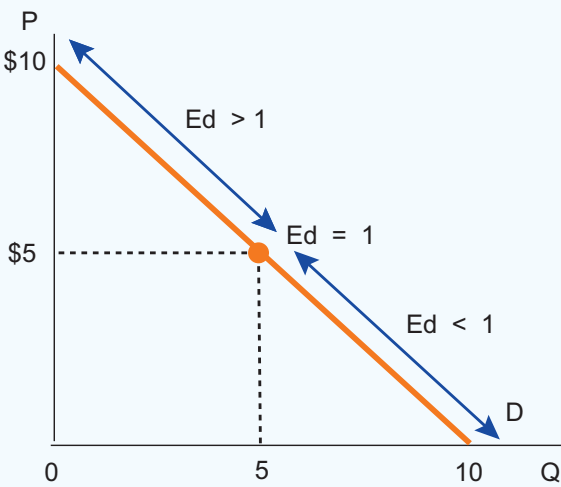
- *when D is elastic, price and total revenue move in opposite directions e.g. a rise in P decreases TR, while a fall in P increases TR*
- *when D is inelastic, price and total revenue move in the same direction e.g. a rise in P increases TR, while a fall in P decreases TR*
- *when D is unitary elastic, a change in P does not change TR*

Figure 3.5 depicts a linear demand curve and shows the relationship between price elasticity and total revenue as we move along the demand curve. At the top of the demand curve where the demand curve intersects the price axis, price elasticity equals infinity. At the bottom of the demand curve where the curve intersects the

Figure 3.5 Elasticity along a linear demand curve

As you move down along a linear demand curve, price elasticity falls. At the top of the D curve where quantity is zero, elasticity is infinite and at the bottom of the D curve where price is zero, elasticity is zero. At the midpoint of the D curve, elasticity is equal to one. This means that the top half of the demand curve is elastic, while the bottom half is inelastic.

\$ Price	Quantity demanded	\$TR	E_d
10	0	0	∞
9	10	90	9.00
8	20	160	4.00
7	30	210	2.33
6	40	240	1.50
5	50	250	1.00
4	60	240	0.67
3	70	210	0.43
2	80	160	0.25
1	90	90	0.11
0	100	0	0



Check your understanding

Question: A chemist increases the price of a new vitamin that promises to reduce wrinkles from \$15 a packet to \$25 a packet. Over the next three months sales decline from 1500 packets to 1350 packets. Is demand elastic or inelastic? Will the chemist's revenue increase or decrease?

Answer: Using the point method, calculate the price elasticity of demand.

$$\begin{aligned} E_d &= \frac{\Delta Q}{Q} \times \frac{P}{\Delta P} \\ E_d &= \frac{150}{1500} \times \frac{15}{10} \\ &= 0.15 \end{aligned}$$

Demand is very inelastic and the chemist's revenue will increase.

quantity axis, price elasticity equals zero. At the midpoint of the demand curve, price elasticity exactly equals one. Notice that we can now divide the demand curve into the elastic segment (the top half of the D curve) and the inelastic segment (the bottom half of the D curve). If a firm is located on the top half of the demand curve it can increase its revenue by lowering price, while if it was located on the bottom half it could raise total revenue by raising price. Where is total revenue maximised on the demand curve? The answer is at the midpoint - where demand is unitary elastic. Demand is price elastic between \$10 and \$5 - as price falls, total revenue increases from \$0 to \$250. Between \$5 and \$0, demand is inelastic - as price falls, total revenue decreases from \$250 to \$0. At the midpoint (\$5), demand is unitary elastic and total revenue is maximised at \$250.

The determinants of price elasticity of demand

The key factors determining whether a good is price elastic or inelastic are:

The availability of substitutes

The greater the number of close substitutes a good has, the more price elastic its demand. If the price of good X rises and it has many close substitutes, then consumers will be sensitive to the price change because they can easily switch to other products. The demand for goods that have few substitutes such as food or water would be very inelastic. Consider the example of petrol. The demand for petrol would be highly inelastic because it has few substitutes. Once you have bought a car with a petrol engine, then you must purchase petrol to use the car - you can't fill up your tank with tap water!

Whether the good is a necessity or a luxury

We would expect to find that necessity type goods such as basic items of food will be more price inelastic than luxury type goods such as jewelry, designer hand bags, and French champagne. Goods such as bread, milk and rice will be relatively inelastic in demand because these are essential food groups. Petrol and water would also be considered as necessities and would be relatively insensitive to price. Habit forming and addictive goods such as tobacco and alcohol are highly price inelastic because they are perceived as necessities by people who use them.

Definition of the market

The demand for a good in a broadly defined market will be more inelastic than the demand for a good in a narrowly defined market. For example, petrol is a broadly defined market whereas a particular brand of petrol is a narrowly defined market. The demand for a specific brand such as BP, Coles Express or Caltex, would be very elastic because each brand acts as a very close substitute. If a BP service station raised its price from \$1.40 to \$1.50 per litre, it would lose customers to a Coles service station nearby which left its price at \$1.40. We can generalise by saying that, for all goods, the price elasticity of a single brand is greater than the price elasticity of the good in general.

The proportion of income spent

Expensive goods are likely to be relatively price elastic because they take up a larger proportion of a consumer's income or budget. Cheaper, inexpensive items on the other hand, will be relatively price inelastic. For example, if the price of a coffee were to increase from \$4 to \$5 - a 25 per cent increase, it is unlikely to cause a significant decrease in the quantity demanded of coffee. However, if the price of a large screen television were to increase by 25 per cent (from \$3000 to \$3750) we would expect this price increase to have a greater proportional effect on quantity demanded.

Time

If consumers have time to respond to a price change, then demand will be more price elastic. In the **immediate run**, demand for most commodities will be relatively inelastic because consumers do not have the time to adjust their consumption or find substitute products. As the time period increases though, it becomes easier to change consumption patterns and so demand becomes more elastic. The **short run** is defined as the period when consumers can partially adjust their behaviour - they have some time to search for a substitute good. In the **long run**, consumers can fully adjust to the change in market conditions. When petrol prices jump to very high levels, most consumers cannot change their consumption in the immediate run - they still have to fill their tank in order to drive to work. But if the price of petrol remains high over a longer period, then people will be able to respond and adjust their consumption by using public transport or switching to electric or hybrid cars.

Review Quiz

1. How does a firm calculate its total revenue?
2. Explain why total revenue increases when price decreases if demand is price elastic.
3. Would a firm prefer its product to be price elastic or price inelastic? Explain your answer.
4. Why is the availability of substitutes important in determining whether a good is likely to be price elastic or inelastic?

Price elasticity of supply

Price elasticity of supply measures the responsiveness of quantity supplied to a change in price. To calculate the formula for the price elasticity of supply, we use the same formula as for price elasticity of demand, except that we use quantity supplied instead of quantity demanded:

$$E_s = \frac{\% \text{ change in } Q_s}{\% \text{ change in price}}$$

Price elasticity of supply provides information about how quickly producers can respond to a change in price. It is measured as the percentage change in quantity supplied, divided by the percentage change in price. Similar to the formula for price elasticity of demand, price elasticity of supply can be written as:

$$E_s = \frac{\Delta Q_s}{Q_s} \div \frac{\Delta P}{P}$$

We normally transform this to:

$$E_s = \frac{\Delta Q_s}{Q_s} \times \frac{P}{\Delta P}$$

Price elasticity of supply measures the sensitivity of quantity supplied to a change in price.

If the percentage change in quantity supplied is greater than the percentage change in price, then supply is price elastic and the coefficient would be greater than one. For example, if the demand for pizzas increased causing the price to rise by 10 per cent and producers responded by increasing quantity supplied by 20 per cent, then the supply of pizzas would be price elastic and E_s would equal 2. If on the other hand, producers could only increase quantity by 8 per cent, then supply would be price inelastic and E_s would equal 0.8. The coefficient of price elasticity of supply can also range between zero and infinity. If E_s equals zero, price changes will have no effect on supply. Supply in this instance is said to be perfectly inelastic and the supply curve will be a vertical line.

The supply of Rembrandt paintings, for example, is perfectly inelastic - there is a fixed quantity of originals which cannot be increased. The number of seats at the Optus Stadium in Perth is fixed at 60,000 seats, so the supply of seats is perfectly inelastic. When comparing two supply curves, the steeper supply curve will always be relatively more inelastic. Figure 3.6 illustrates two supply curves intersecting at the same price and quantity (P_1 and Q_1). When price rises from P_1 to P_2 , quantity supplied rises for both supply curves, but by different amounts. The quantity change for supply curve S_i is much smaller than the quantity change for supply curve S_e . Supply curve S_i is said to be more inelastic compared with S_e .

The determinants of price elasticity of supply

The key factors determining the responsiveness of producers are:

Time

If the producer can respond quickly to a price change then supply will be price elastic. In the immediate run, it may be difficult for a producer to suddenly increase output, especially if inventories are low. Supply could even be perfectly inelastic (refer to figure 3.7). As time increases, producers will be able to obtain more inputs and expand output more easily and so supply will become more price elastic. In figure 3.7, as time increases, the supply curve becomes flatter and 'swivels' from S_1 to S_2 . In the long run, the firm has much greater flexibility and can increase the capacity of production. The supply curve 'swivels' again from S_2 to S_3 . The important point is that the supply for all goods and services becomes more elastic as time increases.

Figure 3.6 Price elasticity of supply

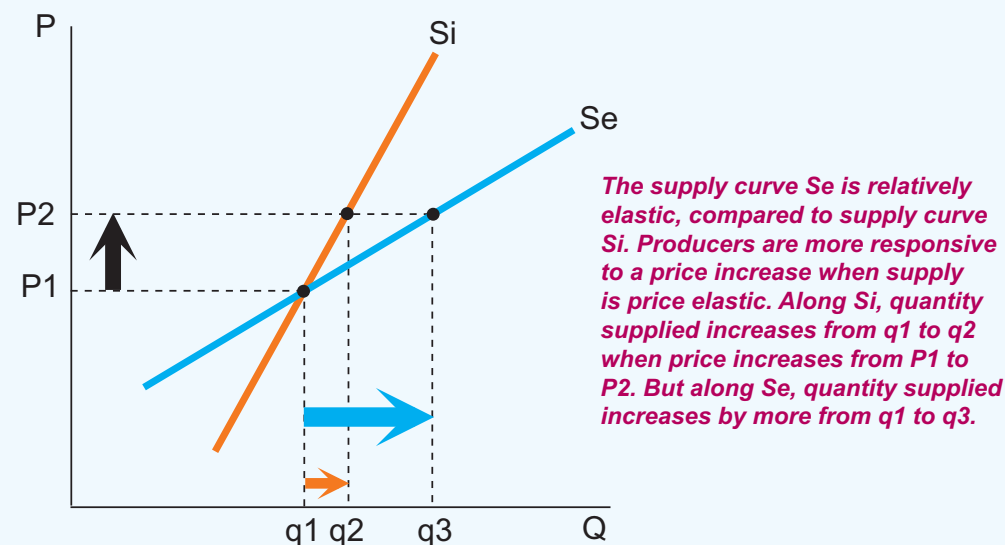
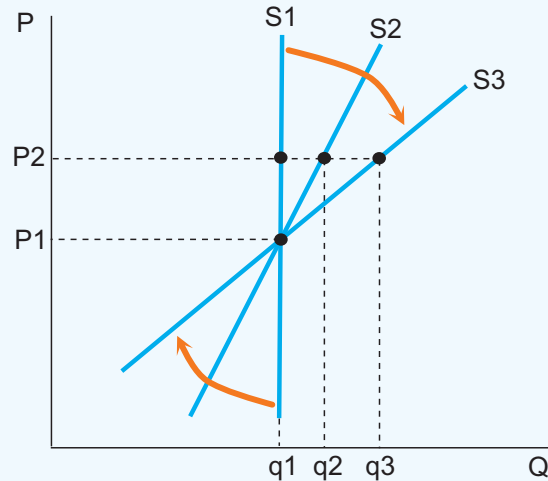


Figure 3.7 Time and price elasticity of supply

As time increases, supply becomes more elastic. What is the effect of an increase in price on quantity supplied?

In the immediate run (S1) producers cannot expand production in response to an increase in price. In the short run (S2) firms have more flexibility to respond to the higher price and expand production.

In the long run, firms have much greater capacity to increase quantity supplied.



Nature of the industry

The supply of agricultural products tends to be relatively price inelastic, while the supply of manufactured goods is more price elastic. Products such as wheat, wool and meat require a reasonable amount of time to produce (up to 12 months). If the price of wheat suddenly increases, farmers cannot quickly respond, they must wait for the next growing season. Manufactured goods on the other hand are relatively easy to produce. Firms can quickly expand the output of computers, tablets and mobile phones in response to an increase in price.

Ability to store inventories

Inventories refer to stocks that a producer keeps stored for future sale. If a producer has the ability to store or warehouse its goods, then it can respond fairly quickly to an a change in demand and so supply would be relatively elastic. Supermarkets are able to store non-perishable goods in large warehouses and ship them whenever a store runs out of product. Goods that are perishable, such as fresh fruit and vegetables, cannot be stored readily and so their supply would be relatively inelastic.

Review Quiz

1. **Define price elasticity of supply.**
2. **How is price elasticity of supply calculated?**
3. **If price elasticity of supply equals 2.5, this means that a 10% increase in price will cause quantity supplied to increase by _____ %.**
4. **If price elasticity equals zero, then this would mean that when price changes quantity supplied would change by _____ %.**

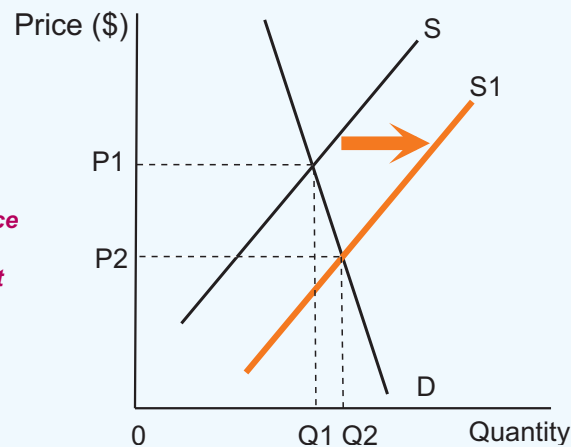
Applications of price elasticity

The concept of elasticity is very important in explaining how markets work and how consumers and producers respond to changes in both demand and supply. Consider the market for agricultural goods (Panel A in figure 3.8). The demand for these goods is relatively inelastic (steep D curve). Over time, supply increases due to improvements in technology and productivity.

Figure 3.8 Applications of price elasticity

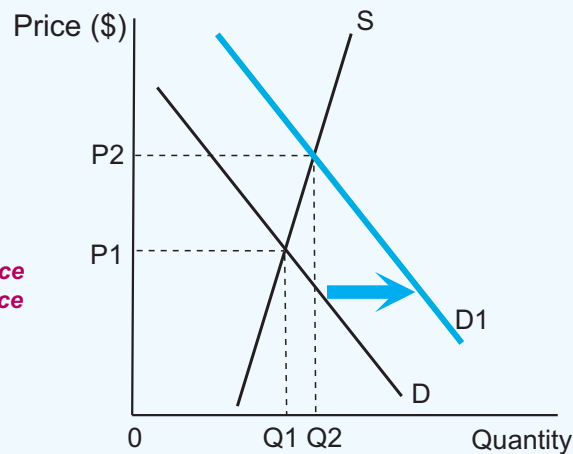
(a) Agricultural market

The demand for agricultural goods is relatively inelastic - the demand curve is relatively steep. When demand is inelastic, an increase in supply results in a large fall in price but only a small rise in quantity. Price falls from P_1 to P_2 , while quantity increases from Q_1 to Q_2 . Notice that an increase in supply in this market results in a fall in total income for farmers.



(b) Housing market

The supply of housing is relatively inelastic. This is because house construction may take from 6 to 18 months. The supply curve for housing is relatively steep. When supply is inelastic, an increase in demand results in a large rise in price but only a small rise in quantity. Price rises from P_1 to P_2 , while quantity increases from Q_1 to Q_2 .



An increase in supply will result in price falling and quantity rising, but because demand is inelastic, total income received by the agricultural sector falls. The reason is that when demand is inelastic, an increase in production results in a large fall in price, but only a small increase in quantity sold. Farming communities have tended to contract over time because of the nature of elasticity.

Panel (b) depicts the housing industry. The supply curve for housing is very inelastic because it takes a considerable time to construct houses. Over time, demand increases due to rising incomes and rising population. An increase in demand leads to a rise in price and an increase in quantity, but when supply is inelastic, most of the effect is concentrated on price. The price of housing increases substantially, while quantity only increases modestly. The purpose of these two examples is to show that having some knowledge of price elasticity can be useful in predicting price and quantity changes over time.

Price elasticity and taxes

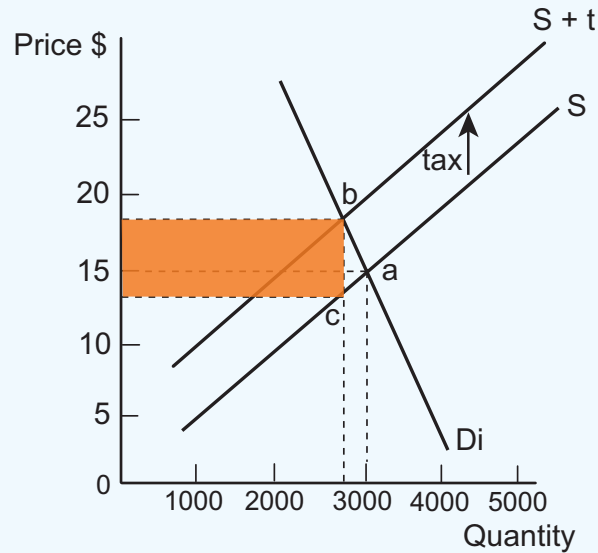
Another important application of price elasticity concerns the analysis of government taxes on goods and services. Taxes on goods and services are an important source of government revenue. In Australia there is a goods and services tax (GST) which is levied on most goods and services at a rate of 10 per cent. This is an example of a broad based consumption tax. This makes it difficult to avoid and provides a reliable source of revenue for the government. Another advantage of the GST is that it is an efficient tax - this means that it has a neutral effect on resource allocation since most goods and services have the same rate of tax. In 2022 the GST raised \$76 billion in revenue for the government (14% of total tax revenue).

The other main indirect tax levied by the government are excise duties. These are 'extra' taxes levied on specific goods such as petrol, alcohol and tobacco. Excise taxes are levied at a higher rate than the GST and are directed at goods with very inelastic demand. Governments often justify large taxes on these goods because they can impose significant health and environmental costs on society. Taxing goods that are inelastic in demand have a number of advantages. First, because demand is inelastic, an excise tax will be very effective in raising revenue. Second, taxes on inelastic goods will have a marginal impact on quantity - this means that the effect on industry output and employment will not be as great compared to a tax on a good with an elastic demand. In 2022 the excise tax on fuel raised \$18 billion while other excise duties collected \$4.5 billion.

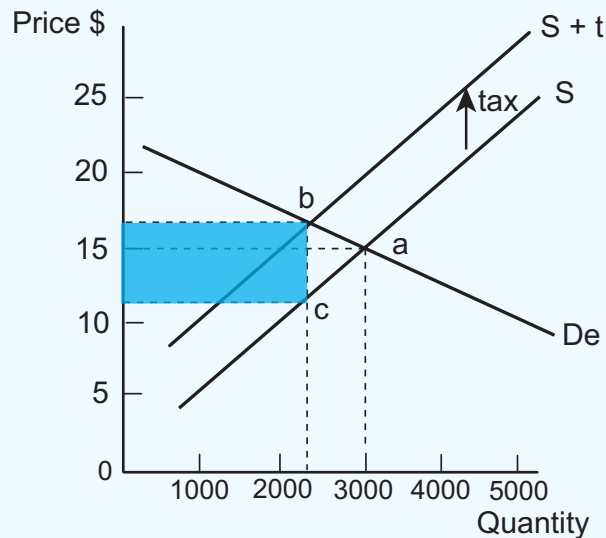
The effect of placing a tax on a good is shown in Figure 3.9. A tax is a cost to the producer and is shown as a decrease in supply. The supply curve will shift by the amount of the tax. A tax creates a wedge between the price paid by consumers and the price received by producers. A tax will always increase the price paid by consumers, decrease the price received by producers and decrease the quantity sold. Panel (a) shows a market where demand is relatively inelastic, while panel (b) shows a market with a relatively elastic demand curve.

Figure 3.9 Taxes and price elasticity**(a) Inelastic demand**

Before the tax, price is \$15 and quantity exchanged is 3000. A \$5 tax shifts the supply curve to $S + t$. After the tax, buyers pay \$18 and sellers receive \$13. Quantity sold falls to 2800. Government revenue = \$14,000.

**(b) Elastic demand**

Before the tax, price is \$15 and quantity exchanged is 3000. A \$5 tax shifts the supply curve to $S + t$. After the tax, buyers pay \$17 and sellers receive \$12. Quantity sold falls to 2300. Government revenue = \$11,500.



Initially the market is in equilibrium at a price of \$15 and a quantity of 3000 units. Suppose that the government levies a \$5 sales tax on each unit sold. The tax will cause the supply curve to shift up vertically by \$5 - the supply curve shifts from S to $S + t$. What is the effect of the tax? The tax has shifted the market equilibrium from point a to point b in both panels of figure 3.9.

Applying a tax to a good will always increase the equilibrium price and decrease the equilibrium quantity. Will a \$5 tax cause the price to increase by \$5? The answer is no! Price will rise but always by less than the size of the tax. Why? Because the demand curve is downward sloping. How much the price rises due to the tax will depend on price elasticity. When demand is inelastic, the increase in price is much greater than when demand is elastic. How much will quantity sold fall? Again it will depend on price elasticity. The fall in quantity will be much smaller when demand is inelastic than when demand is elastic.

In the case where demand is inelastic, the after tax price has increased from \$15 to \$18 and the after tax quantity has fallen from 3000 to 2800. Consumers pay the new price of \$18 but producers only receive \$13 - the difference is the \$5 tax which goes to the government. Who bears the **burden** or the **incidence** of the tax? Notice that consumers pay an extra \$3 while producers receive \$2 less. Most of the burden of the tax falls on the consumer because demand is inelastic. The tax revenue the government receives is shown by the shaded rectangle. It amounts to \$14,000 - the tax (\$5) multiplied by the quantity sold (2800).

In the case where demand is elastic, the after tax price has increased from \$15 to \$17 and the after tax quantity has fallen from 3000 to 2300. Consumers pay the new price of \$17 but producers only receive \$12 - the difference is the \$5 tax which goes to the government. Who bears the burden or the incidence of the tax in this instance? Notice that consumers now only pay an extra \$2 while producers receive \$3 less. Most of the burden of the tax falls on the producer because demand is relatively elastic. The tax revenue the government receives is shown by the shaded rectangle. It amounts to \$11,500 - the tax (\$5) multiplied by the quantity sold (2300).

Notice that both the incidence of the tax and the amount of tax revenue is determined by price elasticity:

- ***the incidence or burden of a tax will fall more on the consumer when demand is relatively inelastic compared with supply (or fall more on the producer when demand is relatively elastic compared with supply).***
- ***tax revenue will be greater on goods with inelastic demand.***

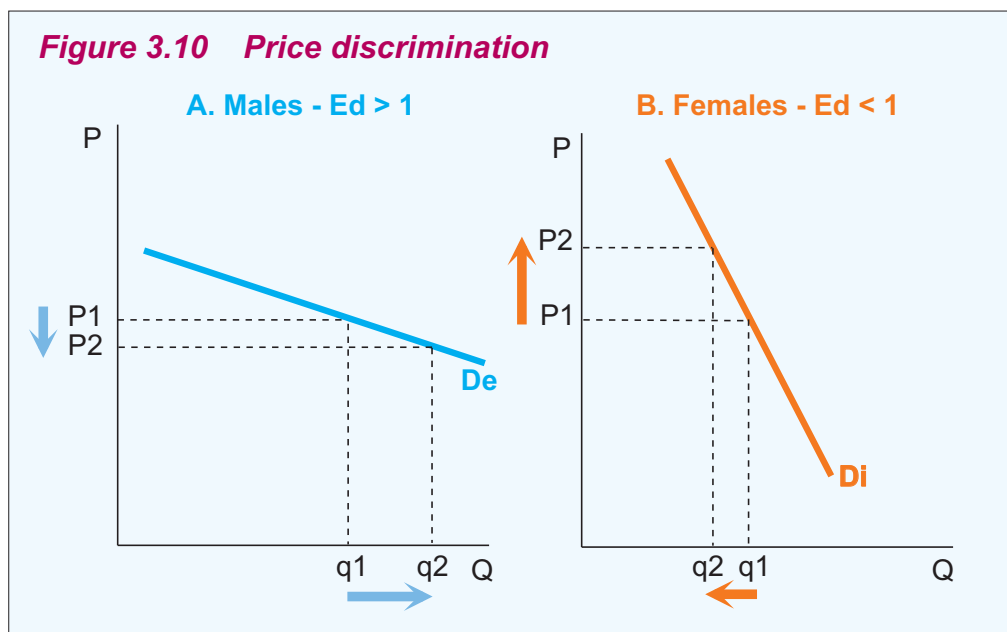
In the special case when demand is perfectly inelastic (vertical D curve), price will rise by the full amount of the tax and all the incidence will be on the consumer. If demand was perfectly elastic (horizontal D curve) then price would not increase at all and all the burden of the tax would fall on the producer. So it makes economic sense for governments to impose taxes on goods such as petrol, alcohol and cigarettes - goods with very inelastic demand. These taxes will be very effective in raising revenue and they also will have a modest effect on production and employment within the industry.

One could also argue that it is morally correct to impose large taxes on these goods because they impose large external costs on society - carbon emissions and pollutants in the case of petrol, and health and social costs in the case of alcohol and tobacco. Would consumers prefer taxes to be levied on elastic or inelastic goods? In the case of elastic goods, consumers have the ability to switch to a substitute good. Notice in figure 3.9 when a tax is levied on an elastic good, the price rises by only a small amount. Consumers, in other words, can easily avoid the tax by switching to a substitute good. In the case of inelastic goods, such as petrol, it is not possible to find a close substitute.

Price discrimination

The concept of elasticity plays an important role in a firm's pricing policy. Why do some firms (e.g. cinemas) charge children and students a lower price than adults? Why do hairdressers charge males a lower price than females for a haircut? The answer is that different consumer groups have a different price elasticity of demand and firms can use this information to charge different prices and increase their total revenue. This common pricing practice is known as **price discrimination** and is used by many firms throughout the economy. Firms can boost their revenue by segmenting their customers into separate groups according to their elasticity.

Lets use hairdressing as the classic example of how price discrimination works. Figure 3.10 illustrates the separate demand curves for males and females. Females have a more inelastic demand compared with males for hair styling. By charging females a higher price than males, hair salons can increase their revenue. At the same time, the hair salons can also boost their revenue by charging males a lower price because their demand is relatively elastic.



Many firms charge a higher price for adults and a lower price for students and seniors. Is this price discrimination? The answer is yes! Students and seniors will have a more elastic demand because they have a lower income. Adults will have a more inelastic demand, so firms can increase their revenue by charging a lower price to students and a higher price to adults. Can you think of other examples of price discrimination?

Predicting changes in price

We can use both price elasticity of demand and supply to predict how much the equilibrium price will change for a given change in either demand or supply. For example an increase in demand will shift the demand curve to the right and increase both the equilibrium price and quantity. But is it possible to predict how much price will increase? The answer is yes, as long as we know the value of both price elasticity of demand and supply.

There is a simple formula to predict the change in the equilibrium price given an increase in demand:

$$\text{\% change in price} = \frac{\text{\% change in demand}}{(E_d + E_s)}$$

For example if demand were to increase by 20 per cent and the price elasticity of demand = 2.5 and the price elasticity of supply = 1.5, then

$$\text{\% change in price} = \frac{20\%}{(2.5 + 1.5)} = 5\%$$

Does the formula work for a change in supply? The answer is yes! Isn't economics wonderful! The formula now will be:

$$\text{\% change in price} = \frac{\text{\% change in supply}}{(E_d + E_s)}$$

Take the example of an increase in supply - a shift of the supply curve to the right. This will cause equilibrium price to fall and equilibrium quantity to rise. Assume that supply increases by 20 per cent and the price elasticity of demand = 0.8 and the price elasticity of supply = 1.2, then

$$\text{\% change in price} = \frac{20\%}{(0.8 + 1.2)} = 10\%$$

Don't you just love economics!

4



Market efficiency

Learning Objectives

In this chapter you will learn about:

- *the concept of economic efficiency*
- *the concepts of consumer surplus and producer surplus*
- *the concepts of total surplus and deadweight loss*
- *the effect of under- and overproduction in a market*
- *the effects of a tax and a subsidy on a market*
- *the effects of a price ceiling and a price floor on a market*

Introduction

For a long time economists have known that competitive markets are a good way to organise economic activity. A competitive market is the result of thousands of individual buyers and sellers interacting with one another. Demand reflects the intentions of buyers and is a measure of the benefits buyers receive from consuming goods and services. Supply reflects the intentions of sellers and is a measure of the costs sellers bear in producing goods and services. The competitive market establishes an equilibrium price and quantity when demand equals supply. This means that the market allocates resources in such a way that at the margin, the price consumers pay matches the cost of resources used to produce the particular good or service. Price is a way to measure the benefit that consumers obtain from consuming a good and at the same time, price is a measure of the value of resources that have been used to produce the good. Economists believe that this makes markets a very effective and efficient way to allocate resources.

Are there other ways to allocate resources other than via markets? In a planned economy, a central authority determines what is to be produced rather than consumers. The central authority decides the priorities for production and then sets out very detailed plans for the allocation of resources. If price is used it may not relate to the cost of supply. Incomes are also set by the planning authority which determines how much a household can consume. Is this efficient? Will a planned economy produce what society wants at the lowest cost? The answer to both questions is no! In fact we have witnessed the demise of central planning in several eastern European countries as well as Russia and even China.

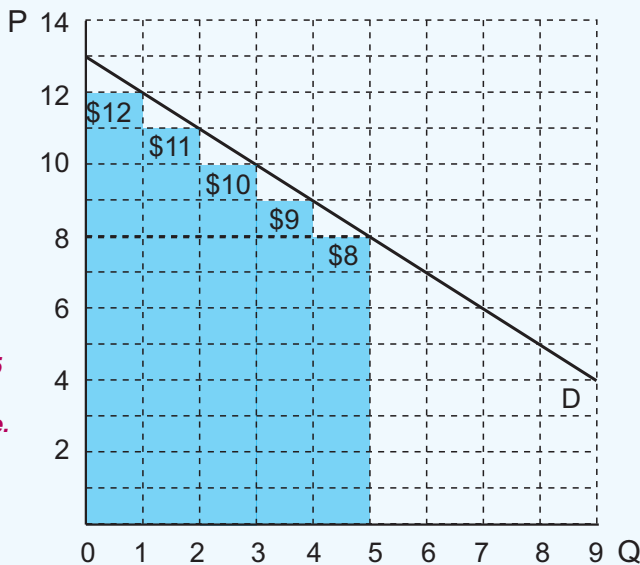
What does **market efficiency** mean? It means producing the goods that society wants at the lowest possible cost. An efficient outcome means that it is not possible to make someone better off without making someone else worse off. Conversely, when an outcome is inefficient, it is possible to improve total well being in society by reallocating resources. Economists relate the term efficiency to making the best use of scarce resources. This is important because we do not want to waste any resources. We want to produce goods and services at the lowest cost, but we also want to produce the 'right' types of goods and services according to society's preferences. We will see how markets can be the best way to achieve efficiency.

Demand and consumer surplus

We begin by focussing on the demand curve as a way to measure the benefits consumers obtain from markets. A demand curve is a willingness to pay curve. A demand curve reflects the maximum price a consumer is prepared to pay for a particular good. We will use an example of an individual consumer, James, buying pizza. Figure 4.1 shows James' demand curve for pizza.

Figure 4.1 Demand and willingness to pay

The demand curve is a willingness to pay curve. For each quantity, price is a measure of the marginal benefit to the consumer. The first pizza is valued at \$12, the second pizza is valued at \$11 and the third at \$10. The marginal benefit falls as quantity consumed increases. The total value of 5 pizzas is \$50 - this is the area underneath the demand curve.

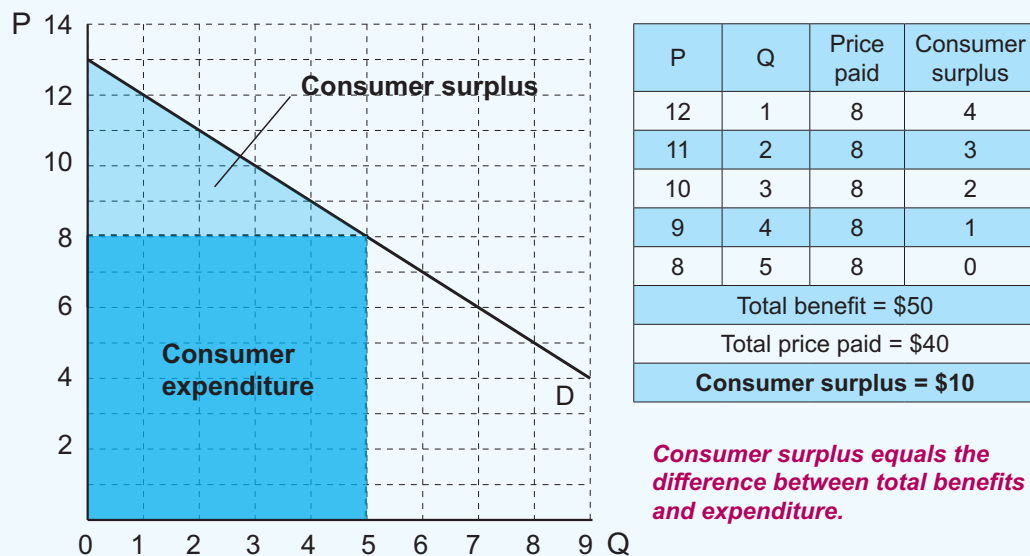


The demand curve depicts the law of demand - James is prepared to buy more pizza as the price falls. Suppose that the market (equilibrium) price for pizza is \$8. At this price, James' weekly demand is 5 pizzas. James spends \$40 on pizza per week. But is this what the 5 pizzas are worth to James?

Remember, the demand curve shows the maximum price a consumer is willing to pay. The demand curve reflects the marginal benefits a consumer gets from the good, so a demand curve is also a marginal benefit curve. James values the 5th pizza at \$8, but notice he values the first pizza at \$12, the second pizza at \$11, the third pizza at \$10 and the fourth pizza at \$9.

So, James actually values all 5 pizzas at \$50 - the sum of \$12, \$11, \$10, \$9 and \$8. The total value of the 5 pizzas is measured as the area under the demand curve. A point on the demand curve measures the price or marginal benefit of an additional pizza. If James were to consume more pizzas, the marginal value would fall but the total value would increase. For example, the sixth pizza has a value of \$7 and the total value of 6 pizzas is \$57.

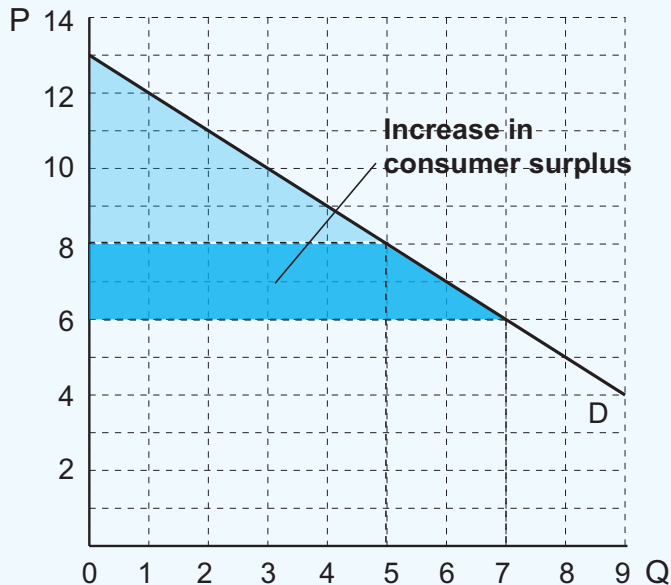
Let's recap - James buys 5 pizzas for \$8 each and spends \$40. But James actually values the 5 pizzas at \$50. The difference of \$10 is James' surplus value. Economists call this bonus value, consumer surplus. **Consumer surplus** is the difference between what a consumer is prepared to pay and what they actually pay in the market. It is like profit for the consumer. Figure 4.2 demonstrates how we can measure consumer surplus. In our example, James pays \$8 for each of the 5 pizzas he purchases. But he would be willing to pay \$12 for the first pizza - he earns a

Figure 4.2 Demand and consumer surplus

consumer surplus of \$4 on the first pizza. On the second pizza, James' consumer surplus is \$3 - the difference between the price \$8 and \$11 which represents the price James would be willing to pay for the second pizza. Consumer surplus on the third pizza is \$2 (\$10 - \$8) and for the fourth it is just \$1 (\$9 - \$8). Notice that consumer surplus for the 5th pizza is zero. In Figure 4.2 we can show consumer surplus as the area above the price line and below the demand curve.

Consumer surplus is a very useful concept because it is a measure of the economic well-being for consumers. Every consumer likes a bargain. You always feel much better buying something if you pay less than what you are prepared to pay - this is your consumer surplus. An increase in consumer surplus means that the consumer is better off - their economic welfare has increased.

For example, If the market price of pizza decreased to \$6 due to an increase in supply, consumers would increase their consumption and this would increase consumer surplus - consumers are now better off because they pay less and consume more. This is shown in figure 4.3. At the new price of \$6, James, our consumer, is now buying 7 pizzas. The increase in consumer surplus is shown by the darker shaded region. Remember that if consumer surplus rises in a market, then this indicates that consumers are happier - their economic well-being has increased.

Figure 4.3 An increase in consumer surplus

If market price falls there will be an increase in consumer surplus because consumers will buy more at a lower price. Their economic welfare will increase.

Changes in consumer surplus are a better measure of welfare than changes in consumer expenditure.

Uber and consumer surplus

You need to get to the airport in a hurry. You check your Uber app which says it will cost \$50. You would be prepared to pay \$80 – the \$30 difference is what economists would call ‘consumer surplus’. It represents the difference between what you pay and what you’re willing to pay. Understanding consumer surplus is important to businesses because it can reveal information about how much people are prepared to pay for things. But calculating it in the real world can be pretty difficult, because companies can’t simply ask you how much you are willing to pay for stuff. It would be in your best interest to always lie!

Thanks to its surge pricing system and a vast collection of customer statistics, Uber is a rare exception. Using nearly 50 million individual-level observations, a group of economists estimated that Uber generated roughly \$3 billion in consumer surplus each year between the service’s four largest U.S. cities (Chicago, Los Angeles, New York, and San Francisco). Their analysis suggests that Uber’s overall consumer surplus for the United States in a year was approximately \$7 billion. In other words if Uber didn’t exist, then the economy would be \$7 billion worse off!

How was the value estimated? Uber’s surge system is always changing prices to reflect supply and demand. This provides data on how many customers were actually willing to pay more – and how much more – at every price point. This means that economists can use this information to construct an actual demand curve for Uber services and from this measure consumer surplus – the area below the demand curve and above the price line.

Source: adapted from Bloomberg News

Check your understanding

Question: The model below shows the market demand curve for smoothies. What is the consumer surplus when the market price of smoothies is \$8?

Answer: Consumer surplus equals the area below the demand curve and above the price line.

So consumer surplus would equal $(\$12 - \$8) \times 600 \div 2$

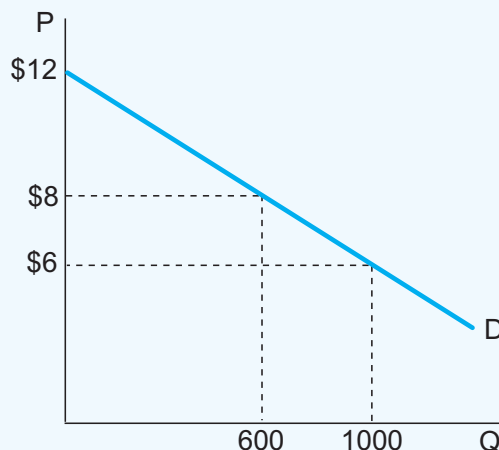
We divide by 2 because it is the area of a triangle.

Therefore consumer surplus when price is \$8 = \$1200.

Question: If the price of smoothies fell to \$6, calculate the increase in consumer surplus.

Answer: When price is \$6, quantity demanded increases to 1000, so consumer surplus = $(\$12 - \$6) \times 1000 \div 2$ which equals \$3000.

So the increase in consumer surplus when price falls to \$6 is \$1800.



Review Quiz

1. Why is a demand curve called a 'willingness to pay' curve?
2. What happens to marginal benefit as consumption increases?
3. What happens to total benefit as consumption increases?
4. Define consumer surplus.
5. Calculate your consumer surplus if you pay \$700 for a new mobile phone but your maximum price is \$1000.
6. Is it possible for your consumer surplus to be negative?

Supply and producer surplus

Let's now turn to the supply side of the market. Do producers receive a similar surplus value like consumers. The supply curve reflects the minimum price that producers are willing to sell their products. The supply curve can be thought of as a 'willingness to accept' curve. The minimum price reflects the producer's costs of

production. The supply curve can also be labelled a marginal cost curve. Suppose that James is buying his pizzas from Brittany. Brittany's supply curve of pizzas is shown in Figure 4.4. We assume that the equilibrium price of pizzas is \$8. Brittany is willing to sell James 5 pizzas. Brittany receives \$40 in revenue but would she have been willing to supply the 5 pizzas for less?

Figure 4.4 shows that Brittany would have been willing to sell the first pizza for \$4, the second pizza for \$5, the third for \$6, the fourth for \$7 and the fifth for \$8. But Brittany receives \$8 for each of the 5 pizzas. Brittany's minimum supply price is \$30 - the sum of 4, 5, 6, 7, and 8. This represents the cost of supplying the 5 pizzas. The total cost of the 5 pizzas is measured as the area under the supply curve. A point on the supply curve measures the marginal cost of an additional pizza. If Brittany were to produce more pizzas, the marginal cost would rise. For example, the marginal cost to produce the sixth pizza is \$9 and the total cost of 6 pizzas is \$39. Let's recap - Brittany sells 5 pizzas for \$8 each and receives \$40. But Brittany's actual cost to supply the 5 pizzas is just \$30. The difference of \$10 is Brittany's surplus value. Economists call this bonus value producer surplus. **Producer surplus** is the difference between what a producer is willing to receive (minimum supply price or cost of production) and what they actually receive in the market. It is like profit for the producer.

Figure 4.5 below demonstrates how to calculate producer surplus. In our example, Brittany receives \$8 for each of the 5 pizzas. But she would be willing to sell the first pizza for just \$4. This would cover her minimum cost for the first pizza. This means that on the first pizza Brittany earns a producer surplus of \$4. For the second pizza,

Figure 4.4 Supply and willingness to accept

The supply curve is a willingness to accept curve. For each quantity, price is a measure of the marginal cost to the producer. The producer is willing to supply the first pizza for \$4, the second for \$5 and the third for \$6. The minimum supply price or cost for 5 pizzas is \$30 - this is the area underneath the supply curve.

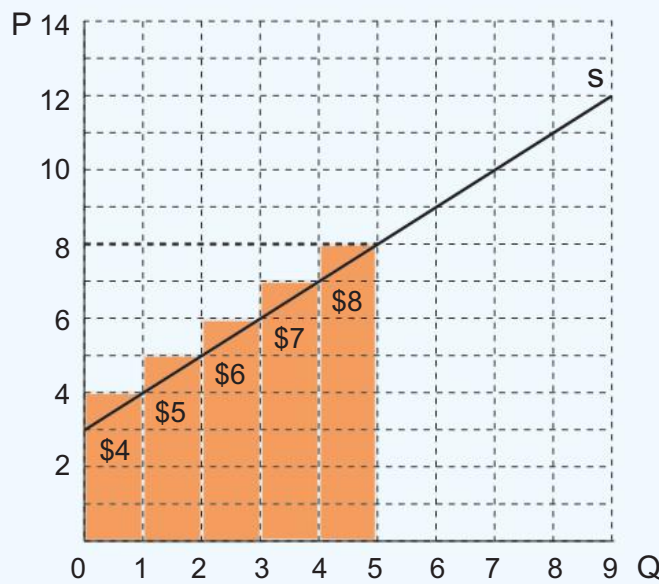
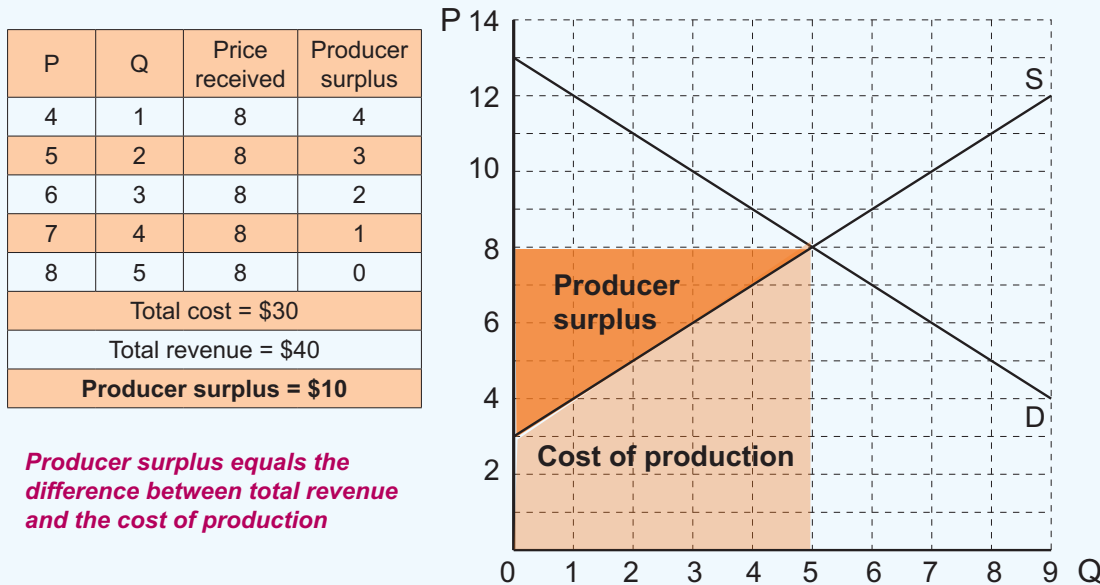
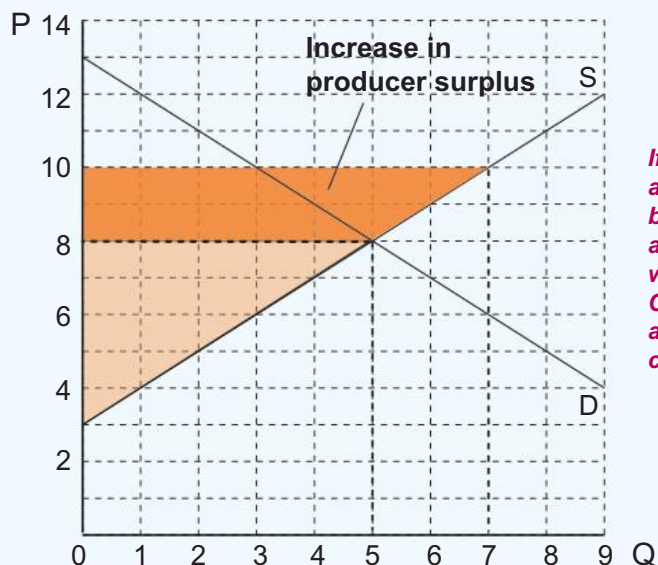


Figure 4.5 Supply and producer surplus

Brittany would be willing to sell for \$5 but she receives \$8 and so her producer surplus for the second pizza is \$3 - the difference between the market price \$8 and the price Brittany is willing to accept. For the third pizza, producer surplus is \$2 (\$8 - \$6) and for the fourth it is just \$1 (\$8 - \$7). Notice that producer surplus for the 5th pizza is zero - Brittany's minimum price is \$8 which is equal to the market price. In Figure 4.5 we can show producer surplus as the area below the price line and above the supply curve. Producer surplus is also a very useful concept because it is a measure of the economic well-being for producers. Every producer loves to make a profit. As a seller you always feel much better selling something if you receive more than what it cost to produce - this is your producer surplus. An increase in your producer surplus means that you are better off - your economic welfare has increased.

So the producer's total revenue (price x quantity) comprises two parts - the cost of production and producer surplus. But it is the change in producer surplus which is used to measure the well-being of producers. An increase in producer surplus means that producers are better off - their economic welfare has increased. For example, If the market price of pizza increased to \$10 due to an increase in demand, producers would increase their production and this would increase producer surplus - producers are now better off because they receive a higher price and sell more. This is shown in figure 4.6. At the new price of \$10, Brittany, our producer, is now selling 7 pizzas. The increase in producer surplus is shown by the darker shaded region. Remember that if producer surplus rises in a market, then this indicates that producers are happier - their economic well-being has increased.

Figure 4.6 An increase in producer surplus

If market price rises there will be an increase in producer surplus because producers will sell more at a higher price. Their economic welfare will increase. Changes in producer surplus are a better measure of welfare than changes in total revenue.

Review Quiz

1. Why is a supply curve called a 'willingness to accept' curve?
2. What happens to marginal cost as production increases?
3. Define producer surplus.
4. Calculate your producer surplus if you receive \$10 each for 10 pizzas but your total production cost is \$60.
5. What happens to producer surplus if the market price falls?

Total surplus

In the example we have used you would have noticed that both consumer and producer surplus are equal to \$10. This is just a coincidence - they do not have to be equal, in most cases they are likely to be quite different. Consumer and producer surplus will also vary between different consumers and producers. What is important is the sum of consumer and producer surplus across all buyers and sellers in the market. We refer to this as total surplus. **Total surplus** is a measure of the net benefits to society from the production and consumption of the good. Total surplus is the sum of consumer and producer surplus. It is a measure of the net benefits society receives after taking into account the cost of resources:

$$\text{Total Surplus} = \text{Consumer Surplus} + \text{Producer Surplus}$$

$$\text{Total Surplus} = \text{Total Benefits} - \text{Total Costs}$$

The aim of society should be to increase total surplus in every market. Total surplus is an extremely important concept because it provides us with a measure of economic efficiency. If we can allocate resources so that total surplus is maximised in each market, then we are using the economy's resources in the most efficient way. Total surplus reflects the net benefits society obtains from the consumption and production of a particular good or service. It provides a method to measure how well the economy is solving the economic problem. Only when total surplus is being maximised can we say that we have achieved an efficient allocation of resources.

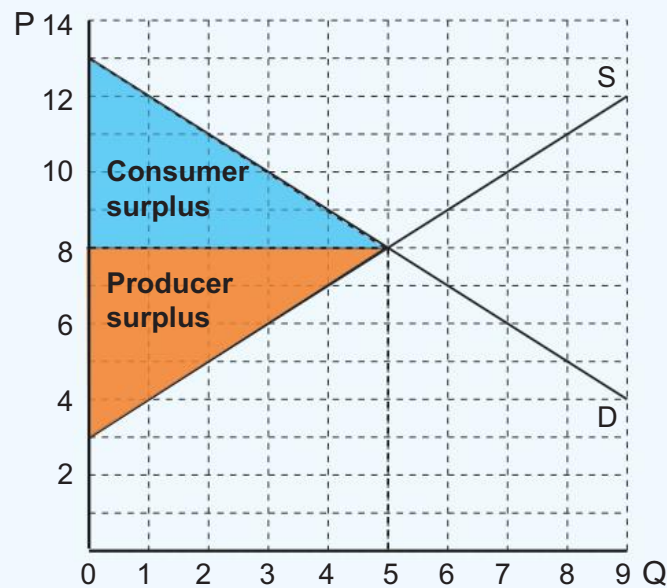
Economic Efficiency occurs when total surplus is at a maximum

Total surplus is only maximised at equilibrium

Figure 4.7 combines our previous demand curve and supply curve to show the equilibrium price of \$8 and equilibrium quantity of 5. Total surplus is the combined area of consumer surplus and producer surplus. The important point to note is that total surplus is only maximised at the equilibrium - where demand equals supply. This is one of the most powerful conclusions in the whole theory of economics! What it is saying is that a competitive market is the best way to allocate scarce resources because it leads to the greatest gain for society. Only a competitive market produces where demand equals supply, so only a competitive market will maximise total surplus. As long as market demand and supply capture all benefits and costs, then the competitive output is the optimal or most efficient output.

Figure 4.7 Equilibrium and total surplus

Total surplus equals consumer surplus plus producer surplus. Total surplus also equals the difference between total benefits and total costs. Total surplus is a measure of economic efficiency. Total surplus equals a maximum only at the equilibrium output. This is why competitive markets are said to be 'ideal' or perfect.

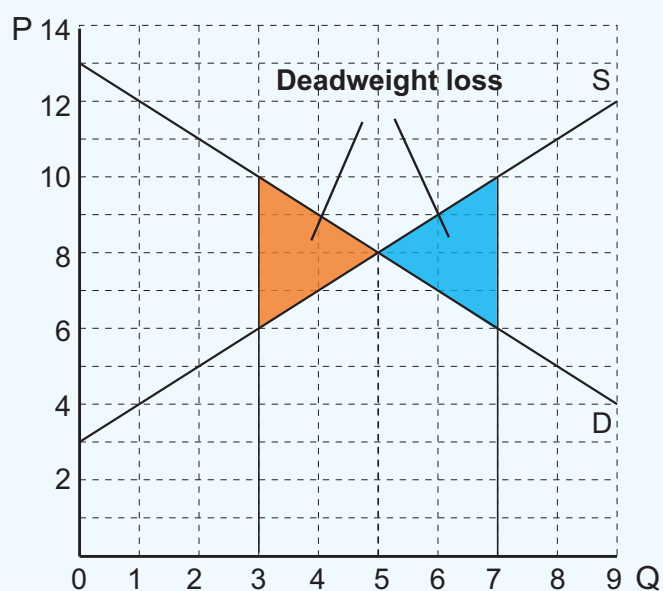


This is why economists advocate competitive markets and why they promote the use of prices to allocate resources in the economy. Markets are able to reflect the buying intentions of consumers and the selling intentions of producers. Can we prove that the equilibrium output is the best or most efficient output? Yes we can, simply by choosing an output that is either less than or greater than the equilibrium output and seeing what happens to total surplus. For example, in Figure 4.7, if the actual market quantity was 4 pizzas or less, total surplus would be lower than it is at a quantity of 5. To the left of equilibrium, marginal benefit (D) exceeds marginal cost (S) - total surplus could be increased by increasing the output of pizzas. Similarly, if the market quantity was 6 pizzas or more, total surplus will be lower than at the equilibrium quantity. With an output of 6, marginal cost (S) now exceeds marginal benefits (D), so society is actually making a loss by producing the sixth pizza.

Deadweight loss

When total surplus is reduced because of either under or overproduction, it is referred to as a **deadweight loss**. This is shown in Figure 4.8. A deadweight loss refers to an avoidable decrease in total surplus because something has prevented the market from producing the optimal output. Figure 4.8 shows the deadweight loss (the decrease in total surplus) if the market produces a quantity that is either greater than or less than the equilibrium quantity. Chapter 5 investigates some of the important types of market failure that can create a deadweight loss.

Figure 4.8 Inefficiency - deadweight loss



A deadweight loss occurs if the market produces a different output than the equilibrium output. Total surplus is always maximised at equilibrium. Producing less than or more than the equilibrium output results in a decrease in economic welfare.

One example is monopoly. Firms in these market structures use their market power to restrict production in order to increase price. This results in **underproduction** and a decrease in total surplus (a deadweight loss). An example of **overproduction** is when an industry pollutes the environment. When firms pollute, they reduce their own private production costs, but impose external costs on the rest of society. They overproduce because they do not pay for the costs of pollution and the market allocates too many resources to the industry. An important role for the government is to address some of the weaknesses of the market economy and hopefully resolve situations that can cause a deadweight loss.

It is important not to confuse a change in market conditions with a deadweight loss. Markets are continually changing - prices and quantities fluctuate in response to changes in demand and supply. For example, consider the banana market when a cyclone destroys much of the banana crop in northern Australia. Queensland is often affected by tropical cyclones which can have a devastating impact. Initially, there is a large decrease in supply which causes banana prices to soar and quantity demanded to fall. Obviously both consumers and producers are adversely affected, but it is important not to confuse a shift in equilibrium with a deadweight loss. As long as the market is free to move to a new equilibrium, then the resulting outcome is regarded as efficient. In the banana example, a cyclone destroying banana plantations will cause price to rise and quantity to fall. Total surplus at the new equilibrium will be lower - society is worse off - compared with the old equilibrium. But the outcome is still efficient because at the new equilibrium, total surplus will be maximised. There would only be a deadweight loss if the market was prevented from shifting to its new equilibrium position. For example, if the government introduced a new banana law preventing banana prices from rising.

Review Quiz

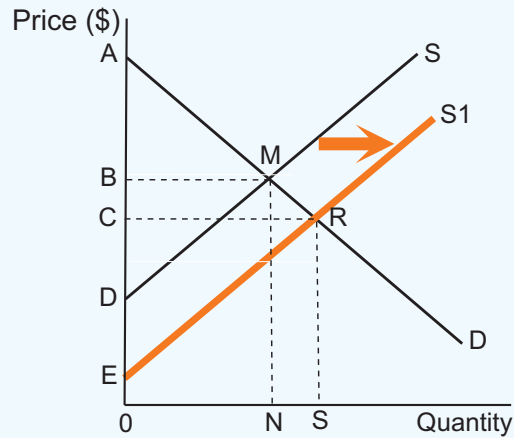
1. **Define total surplus?**
2. **How is total surplus calculated?**
3. **Which is more important - consumer surplus or producer surplus?**
4. **At what price is total surplus maximised?**
5. **What is meant by 'a deadweight loss'?**

Check your understanding

Question: The following demand/supply model (next page) shows the Australian airline market. New entrants have come into the market, shifting the supply curve from S to S_1 . (i) Identify the initial consumer and producer surplus. (ii) Explain the impact of this change on consumer and producer surplus.

Answer: At the initial equilibrium price B, consumer surplus = BMA and producer surplus = BMD.

After the increase in supply, consumer surplus increases to CRA while producer surplus also increases to CRE.



Government policies and efficiency

Sometimes when governments intervene in markets they may decrease economic efficiency because the policy they introduce may distort the price system and lead to either under or over production. In this section we can use the concepts of consumer and producer surplus to evaluate a number of government policies that affect markets. These include:

- market restrictions
- price controls
- government taxes on goods and services
- government subsidies paid to certain industries

Consider the taxi market in most Australian capital cities such as Perth and Sydney, prior to the introduction of Uber. Taxi licence restrictions exist in all Australian States, and have brought about a steady decline in the number of taxis per head of population. The cost of a taxi licence varied between \$300,000 to \$700,000. The price increased steadily over the years as State Governments did not issue sufficient new licences to meet increasing customer demand. The restriction of taxi licences creates high prices (taxi fares) and excess demand - long taxi queues at taxi ranks, especially at peak periods. Compare this with less regulated taxi markets in other countries, such as Singapore. Taxi fares are much cheaper and there is no waiting time. This is because the taxi market is more competitive and is not restricted by the government.

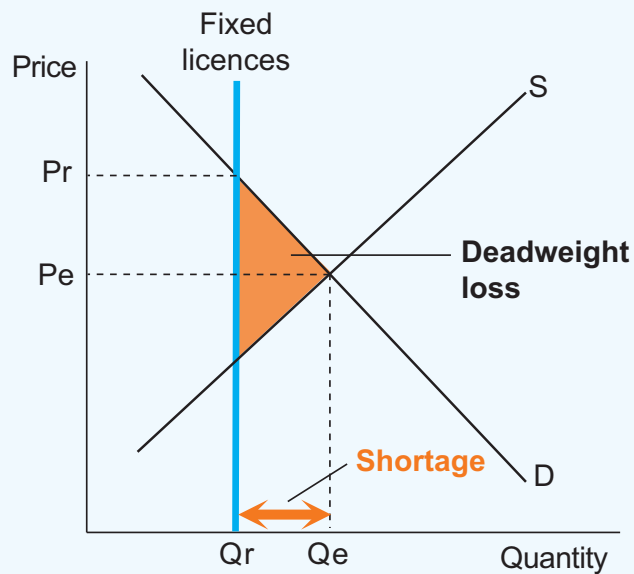
The taxi industry in Australia and the government had long argued that taxi regulation was needed and that it actually benefited the community. Economists would argue that most forms of industry regulation tend to benefit the industry (higher profits) and the government (higher licence fees) rather than consumers.

This viewpoint was vindicated in a major review of the industry by the Productivity Commission where they were unable to identify any benefits to the community that would justify the restrictions on taxi numbers. The National Competition Council also came to a similar conclusion: *“The taxi industry is virtually alone among consumer services in having laws that restrict the actual number of taxis providing services. No compelling argument can be made to justify these restrictions.”*

Figure 4.9 uses the demand/supply model to show the effect of regulation on the taxi market. If there was no regulation, the market would reach a competitive equilibrium where demand equals supply. The market price (P_e) and quantity (Q_e) would be efficient. Total surplus would be maximised at the competitive equilibrium. But if the government regulates the market and restricts supply through a quota of taxi licences then the optimal price and quantity will not be achieved. The regulation will result in a deadweight loss and a decrease in economic welfare in the taxi market. In figure 4.9, licences are restricted to Q_r - the supply of taxis is effectively fixed and becomes a vertical line. This causes price to rise to P_r and creates a shortage. Because the market is restricted, total surplus is decreased, creating a deadweight loss. Over time, as the population grows, demand for taxi services is likely to increase which will lead to a bigger shortage and a larger deadweight loss. Uber is the new, more competitive taxi-like service that is now challenging the taxi monopoly in most capital cities in both Australia and overseas. It has increased competition in the taxi market, lowering fares and improving service. Uber has become very popular with many consumers because the service is quicker, more reliable and generally cheaper. Uber is an example of the market reacting to an overregulated industry.

Figure 4.9 The taxi market

A competitive taxi market operates at the equilibrium P_e and Q_e , where total surplus is maximised. Taxi regulation of licences results in a fixed supply of taxis. This results in shortages and higher prices. The regulated quantity is reduced to Q_r and as a result average taxi fares rise to P_r . By restricting the quantity of taxi licences total surplus is decreased - there is a deadweight loss.



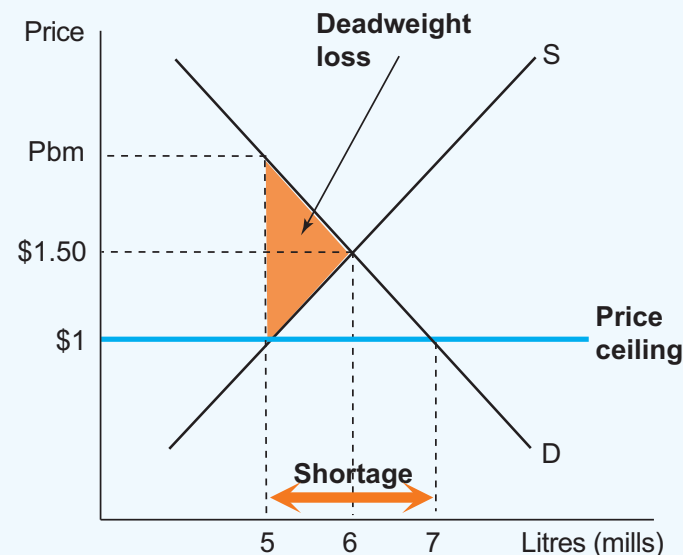
Price controls

Price controls are government regulated prices that set prices either above or below the equilibrium price. There are two types of price controls known as price ceilings and price floors. A **price ceiling** is a legislated maximum price that sellers are allowed to charge in the market. A price ceiling is designed to benefit consumers by keeping the price below the market clearing price. Consumers may have lobbied the government to reduce the market price for an important good or service and so a maximum or ceiling price is set somewhere below the equilibrium price. Price ceilings are often justified on equity grounds - to help low income earners afford the good. For example, price ceilings have often been imposed in rental markets.

A price ceiling or maximum price set below the equilibrium will always create a shortage.

How does a price ceiling affect buyers and sellers and why does it lead to a decrease in total surplus (a deadweight loss)? Surely a policy that reduces the price of an essential good is beneficial for society. The answer is No! Figure 4.10 illustrates a price ceiling imposed on the petrol market. The market clearing or equilibrium price is \$1.50 and the equilibrium quantity is 6 million litres. Suppose that consumers believe that petrol prices are too high and lobby the government to reduce the price. In response, the government sets a maximum or ceiling price of \$1 per litre. Quantity demanded now increases to 7 million litres and quantity supplied contracts to 5 million litres. There is now a shortage of 2 million litres. Some consumers are happy - those that can buy the lower priced petrol, but there are now many consumers who miss out because there is a shortage of petrol that didn't exist at the equilibrium price of \$1.50.

Figure 4.10 A price ceiling or maximum price



A price ceiling is a maximum price that is set below the equilibrium price. A price ceiling results in a shortage because the quantity demanded exceeds the quantity supplied. A price ceiling may increase consumer surplus, but producer surplus decreases by more causing a deadweight loss. Price ceilings often lead to black market prices (P_{bm}).

The shortage may also lead to a much higher black market price (P_{bm} in figure 4.10). All sellers of petrol lose because they sell less petrol and receive a lower price. The price ceiling has resulted in an actual decrease in total surplus - a deadweight loss - shown by the shaded region in Figure 4.10. The price ceiling has resulted in the market failing to produce the optimal quantity and is therefore inefficient. Does the price ceiling improve equity? In other words, does the price ceiling help low income people? The answer is no! Can we guarantee that only low income people get the cheaper petrol? Not necessarily. The price ceiling has distorted the market, reduced both the quantity consumed and produced and may even lead to black market prices. Not only does the price ceiling reduce efficiency, it may also reduce equity as well. It is dangerous to try and use the price system for equity reasons. The government has better ways for helping low income groups through its tax and spending powers. Using the price system always has efficiency implications and will usually result in a decrease in economic welfare.

What about an opposite policy that sets a minimum price somewhere above the market price? A **price floor** is a legislated minimum price that sellers are allowed to charge in the market. Price floors are designed to help producers. Producers may have lobbied the government to increase the market price and so a minimum or floor price is set somewhere above the equilibrium price. Price floors are again justified on equity grounds - to help low income producers. For example, price floors have often been imposed in many agricultural markets to help farmers boost their incomes. Figure 4.11 illustrates a price floor in the pizza market. The market clearing or equilibrium price and quantity is \$8 and 6 million pizzas.

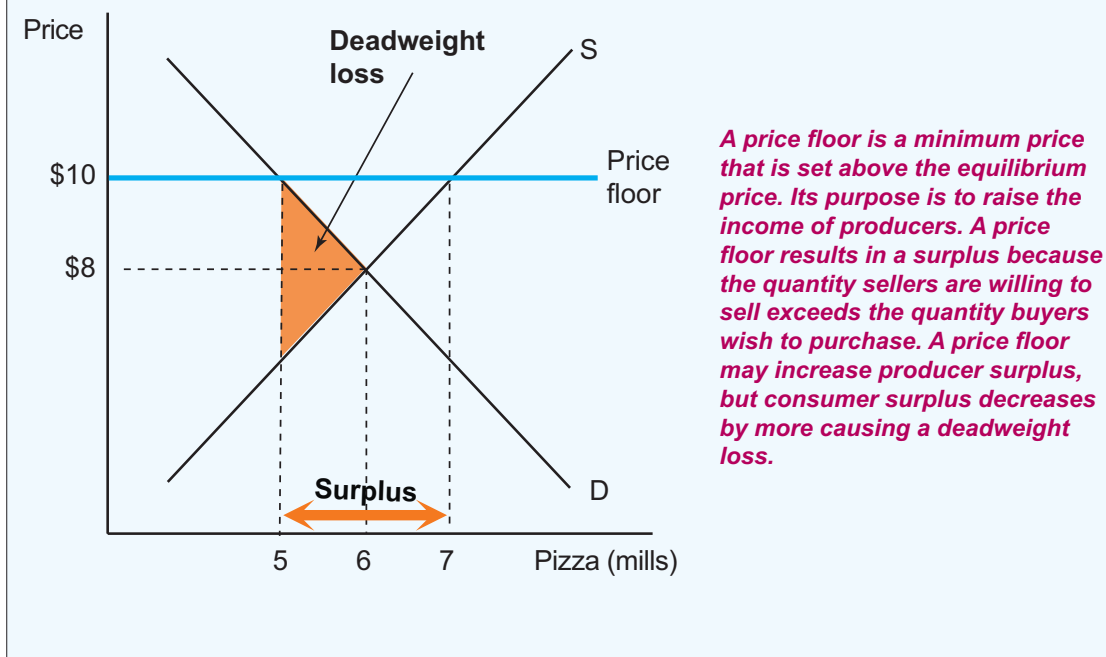
Why price ceilings don't work

Many countries often use price controls to prevent prices of essential goods from rising after a natural disaster. For example in several states of the United States, government legislation prohibits businesses from raising their prices more than 10 percent within 30 days of a declared state of emergency. But laws intended to prevent so-called "price gouging" do more harm than good. Imposing price ceilings on scarce goods punishes those whom it is intended to help: the victims of natural disasters. Laws against "price gouging" further diminish the supply of scarce goods. Disasters lead to a natural increase in the price of goods as their supplies shrink and demand rises. This natural price increase encourages consumers to economise in their purchase of goods and thereby leave more for those who value these goods most. Price ceilings lead to long queues and people wasting hours waiting in the hope of getting the scarce good before it is sold out. Price ceilings also encourage the creation of black markets. The best thing for the government to do is to get out of the way and let private market forces function.

Suppose that the Pizza Makers Guild (PMG) lobbied the government to raise the price of pizza so that their members could earn a higher income. In response the Government imposes a minimum pizza price of \$10. Quantity demanded now contracts to 5 million pizzas, while quantity supplied increases to 7 million. There is now a surplus of 2 million pizzas. Pizza producers as a group will now be happy because their revenue has increased from \$48 million ($\8×6 million) to \$50 million ($\10×5 million). This means that producer surplus has increased. But pizza consumers are now unhappy - they are paying more for their pizzas and receiving less. This means that consumer surplus has decreased.

What is the net result? The price floor has resulted in an actual decrease in total surplus - a deadweight loss - shown by the shaded region in Figure 4.11. The price floor has resulted in the market failing to produce the optimal quantity and is therefore inefficient. What if the government purchased the surplus pizzas and distributed these to the poor? Would that be efficient? The government would have to purchase the 2 million surplus pizzas at \$10 each costing taxpayers \$20 million. Is this a good way to use taxpayers funds! Pizza producers might think so but it is highly inefficient and would cause the deadweight loss to be even larger.

Figure 4.11 A price floor or minimum price



Check your understanding

The demand/supply model below shows the almond industry. The Almond Growers Co-op lobbies the government to set a price floor for almonds to increase almond growers revenue.

Identify the following:

- (i) consumer and producer surplus before the price floor
- (ii) consumer and producer surplus after the price floor
- (iii) the deadweight loss
- (iv) Explain why there is a DWL.

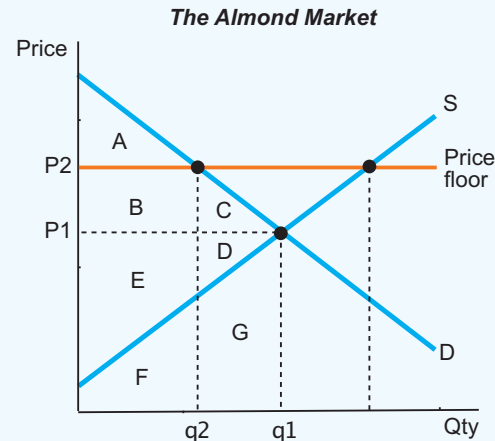
Answer:

(i) $CS = A + B + C$; $PS = D + E$

(ii) $CS = A$; $PS = B + E$

(iii) $DWL = C + D$

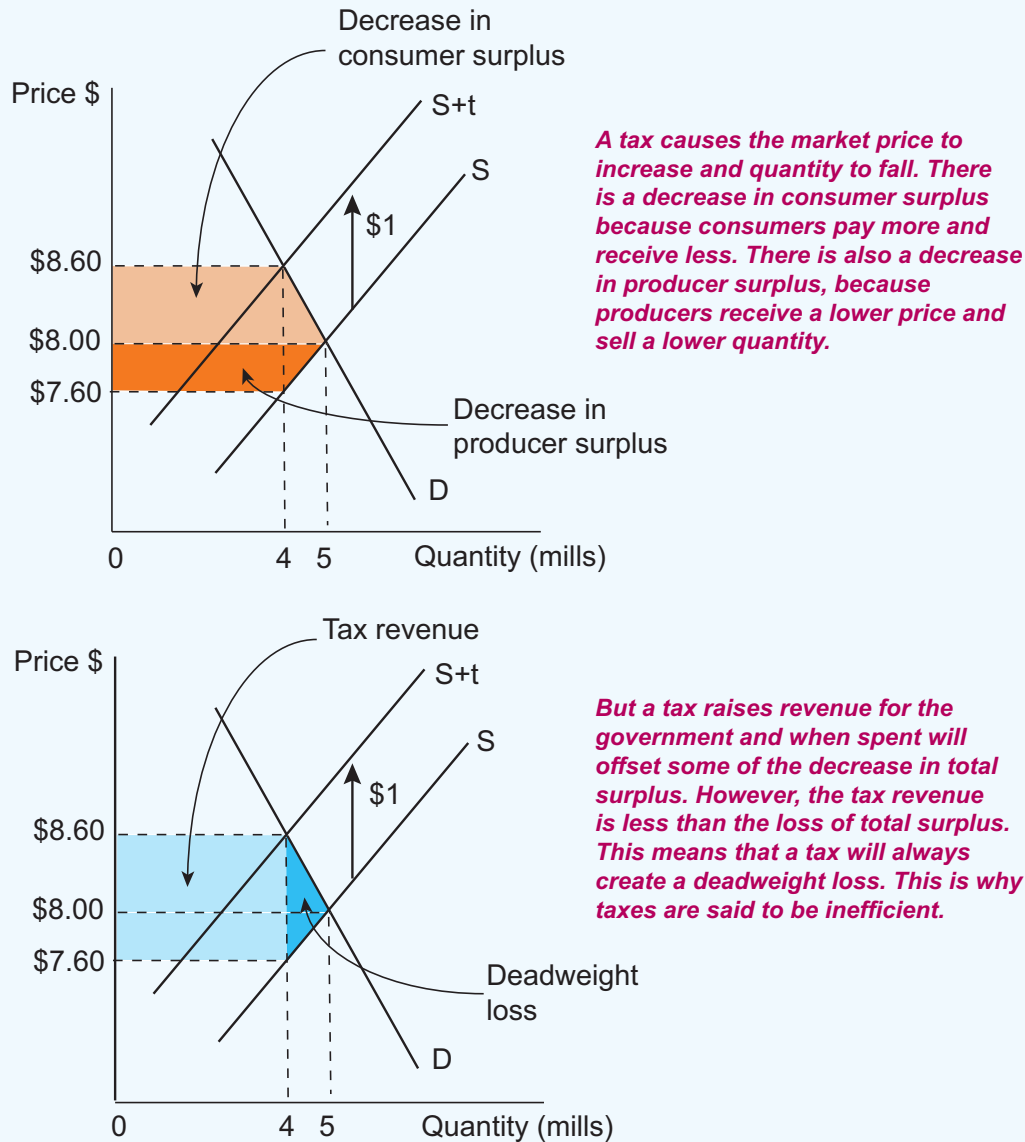
(iv) The DWL is the result of the price floor decreasing output



Taxes and subsidies

Governments levy **taxes** on goods and services in order to raise revenue for government spending programs. How does a tax affect the market and how does the tax affect the welfare of buyers and sellers? Is a tax efficient? To answer these questions we need to analyse the impact of a tax on consumer and producer surplus. Suppose that the government decides to introduce a new \$1 sales tax on pizzas. The top panel in Figure 4.12 shows the pizza market initially in equilibrium with a price of \$8 and quantity 5 million. The new tax is imposed on sellers causes a decrease in supply - the supply curve shifts up by the size of the tax. Will the price rise by \$1? The answer is no because the incidence of the tax is shared between the buyer and seller. In this example, the after tax price increases by \$0.60 to \$8.60 and quantity falls to 4 million. Consumers are clearly worse off because they must now pay a higher price and consume a lower quantity - consumer surplus decreases. Producers are also worse off with the tax, because they now receive a lower price (\$7.60) and sell fewer pizzas - producer surplus decreases.

Does anybody gain from the tax? Remember the government will collect the tax revenue - in this instance the tax revenue will equal \$4 million (\$1 tax x 4 million pizzas). This is shown in the bottom panel of Figure 4.12. The government uses the tax revenue for government spending which will increase economic welfare for various groups in society. It doesn't matter whether the pizza consumers and

Figure 4.12 The inefficiency of a tax

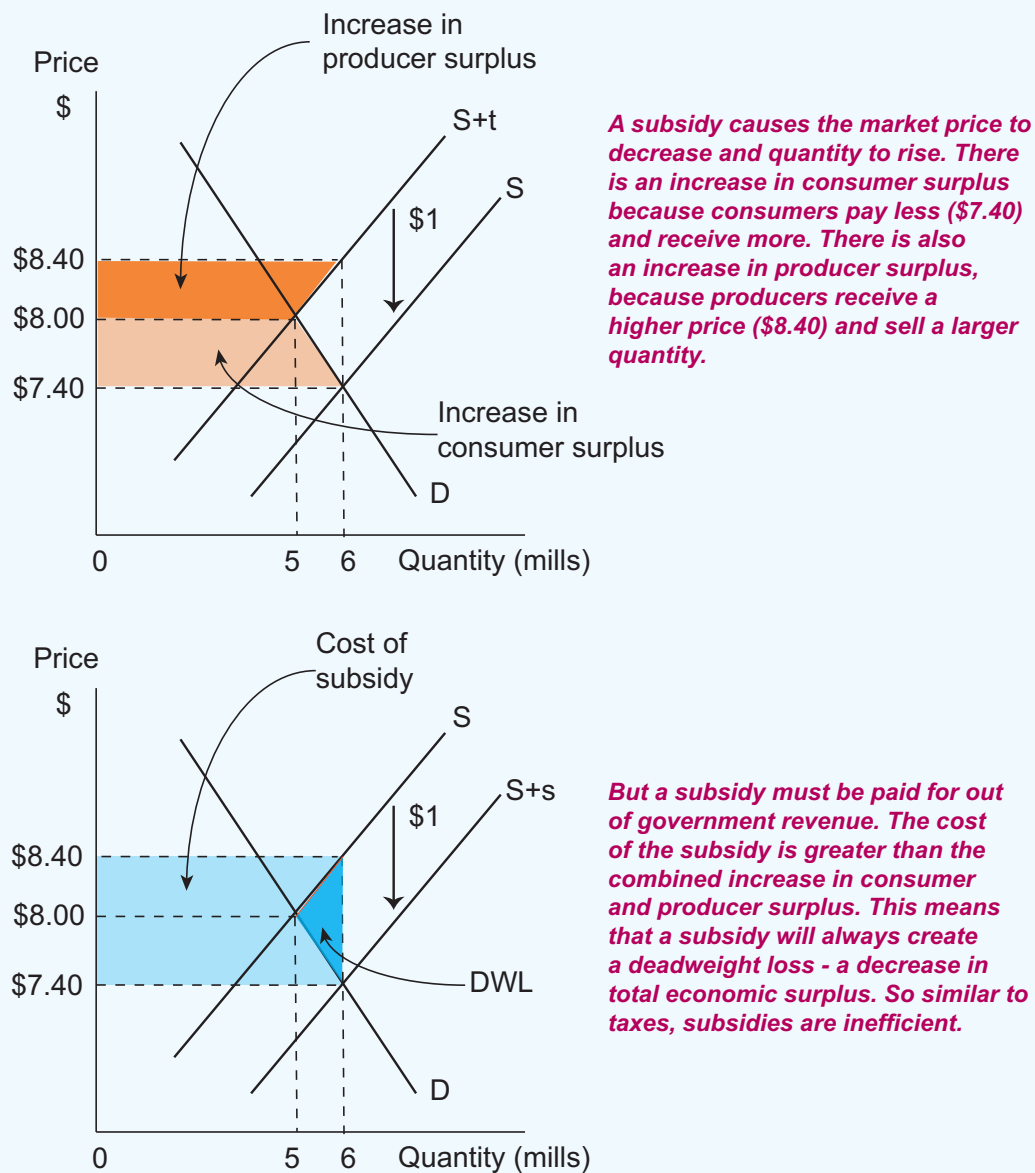
producers receive the benefits of this government spending, as long as someone benefits. You might think that once the tax revenue is spent, it will offset the initial loss in consumer and producer surplus. But this is not the case! The tax revenue is actually smaller than the combined decrease in consumer and producer surplus. In other words, the tax creates a deadweight loss because total surplus or economic welfare has been reduced. The reason is that the tax has caused the market to shrink - the output of pizzas has fallen. This lost economic activity is shown as a

decrease in total surplus. The deadweight loss of the tax is shown by the shaded triangle in the bottom panel of Figure 4.12. Does this mean that we should not have taxes because they are inefficient? The answer is no - the government must levy taxes in order to fund government spending. Taxes are a necessary part of economic life. However, we can use our economic theory to determine on which goods taxes should be imposed.

The objective should be to place taxes on goods where the deadweight loss will be minimised. What determines whether the deadweight loss will be big or small? Obviously the larger the tax, the greater the decrease in economic activity and the bigger the deadweight loss. But a second factor is also important - elasticity. If demand is relatively inelastic, then a tax will only have a small impact on quantity. This means that placing a tax on an inelastic good will result in a small deadweight loss. Placing a tax on a good with relatively elastic demand will cause quantity to fall by a significant amount so that the resulting deadweight loss will be relatively large. So there is a sound reason why governments usually place large taxes on goods such as petrol, alcohol and tobacco - the demand for these goods are highly inelastic.

Governments also pay **subsidies** to different groups in society. A subsidy is a grant paid to a producer with the purpose of reducing costs and increasing output. A subsidy can be thought of as a negative tax. How does a subsidy affect the welfare of buyers and sellers? Is a subsidy efficient? If a tax results in a deadweight loss, will a subsidy lead to an actual increase in total surplus? To answer these questions we need to analyse the impact of a subsidy on consumer and producer surplus. Suppose that the government decides to pay a \$1 subsidy to the pizza industry. The top panel in Figure 4.13 shows the pizza market initially in equilibrium with a price of \$8 and quantity 5 million. The new \$1 subsidy increases supply and shifts the supply curve down by the size of the subsidy. The price now decreases to \$7.40 and quantity rises to 6 million. Consumers are clearly better off because they now pay a lower price and consume a greater quantity - consumer surplus increases.

Producers are also better off with the subsidy, because they now receive a higher price of \$8.40 (\$7.40 paid by consumers plus the \$1 subsidy) and sell more pizzas - producer surplus increases. It would appear that a subsidy is efficient because it leads to a gain in both consumer and producer surplus. But this is not the case. We must subtract the cost of the subsidy. Remember the government must pay for the subsidy out of its tax revenue. How much will the subsidy cost? The cost will equal the amount of the subsidy (\$1) times the new quantity of pizzas (\$6 million). The total cost will equal \$6 million. This is shown in the bottom panel of Figure 4.13 (shaded rectangle). Notice that the cost of the subsidy is greater than the combined increase in consumer and producer surplus. This means that the subsidy creates a deadweight loss because total surplus or economic welfare has been reduced. The deadweight loss of the subsidy is shown by the shaded triangle in the bottom panel of Figure 4.13. So a subsidy, just like a tax, is inefficient because it results in a

Figure 4.13 The inefficiency of a subsidy

deadweight loss. For a very long period, the Australian government paid subsidies to the Australian motor vehicle industry. Taxpayers had been covering the cost of each Australian-made car with subsidies equivalent to as much as \$50,000 for every employee directly involved in their manufacture. Car manufacturing ceased in Australia because the government could no longer afford to waste taxpayer dollars on an industry that had been inefficient and unsustainable for decades.

Review Quiz

1. What is a price ceiling? Who benefits from a price ceiling and who loses?
2. Why is a price ceiling inefficient?
3. What is a price floor? Who benefits from a price floor and who loses?
4. Why is a price floor inefficient?
5. Why does a tax create a deadweight loss?
6. Why does a subsidy create a deadweight loss even though it increases consumer and producer surplus?

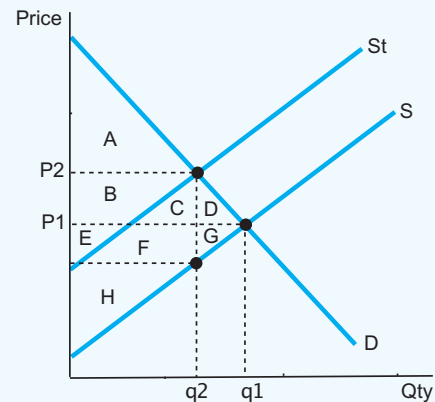
Check your understanding

The model below shows the effect of the imposition of a tax on a product. Identify the following areas:

- (i) the part of the tax paid by consumers
- (ii) the part of the tax paid by producers
- (iii) the decrease in consumer surplus caused by the tax
- (iv) the decrease in producer surplus caused by the tax
- (v) the tax revenue
- (vi) the deadweight loss (DWL)

Answer:

- (i) $B + C$
- (ii) $E + F$
- (iii) $B + C + D$
- (iv) $E + F + G$
- (v) $B + C + E + F$
- (vi) $D + G$



5



Market failure

Learning Objectives

In this chapter you will learn about:

- *the concept of market failure*
- *the concept and causes of market power*
- *the influence of externalities on market efficiency*
- *the concept and types of externalities*
- *the influence of externalities on market efficiency*
- *the classification of goods based on rivalry and excludability*
- *public goods and the free rider effect*
- *common resources and the tragedy of the commons*
- *policy options to reduce market failure*

Introduction

In the last chapter we studied why free markets are efficient. Efficiency in economics is defined as maximising economic welfare. Market efficiency is achieved by allocating resources so that society maximises net benefits, as measured by total surplus. This is important because resources are scarce and they need to be used in the best possible way rather than being wasted on producing things that society does not necessarily value. The market system uses demand and supply to reflect society's benefits and costs. As long as the market captures all benefits and costs associated with economic activity, then the market is the best method to solve the economic problem, that is, to solve the problem of allocating resources. Price reflects economic scarcity and changes in price give incentives to both consumers and producers when making decisions about consumption and production.

There are a number of instances, however, where the market is not capable of producing the optimal or 'best' outcome for society. In these circumstances we say that the market 'fails'. **Market failure** occurs when resources are not allocated efficiently - in other words total economic surplus is not being maximised. This is an important rationale for government intervention in order to improve market outcomes. The main types of market failure that we will investigate are:

- **market (monopoly) power**
- **externalities**
- **public goods**
- **common property resources**

Market power

The model of demand and supply that we studied in chapter 2 applies to a competitive market. This is a market that is characterised by a large number of small firms, free entry and exit and very little product differentiation. When one or more of these conditions is not met, then the market is said to be 'imperfect'.

So an imperfect market exists when:

- there are a relatively small number of firms
- firms have market power
- firms use product differentiation
- barriers to entry are used to restrict competition

The best examples of imperfect competition are monopoly and oligopoly markets. A **monopoly** is a market with just one firm (the prefix 'mono' means one). Synergy and Australia Post are government regulated monopolies. An **oligopoly** is a market with a few large dominant firms (the prefix 'oli' means few). For example,

Coles and Woolworths dominate the grocery market in Australia. Qantas and Virgin dominate the domestic aviation market. In imperfect markets firms are said to have market or 'monopoly' power which means that they can set price. When there is a small number of firms in a market, there is an incentive for these firms to collude to reduce competition. In imperfect markets prices are higher because there is less competition.

Barriers to entry are an important feature of imperfect markets. A **barrier to entry** is anything that restricts or blocks the entry of new firms into an industry or market. They may include government regulation and patents, technology barriers, start-up costs and licensing requirements. Existing firms in an industry may own essential raw materials that is not available to potential competitors. A firm may acquire a **patent** on a certain good which effectively gives it a monopoly. Patents are important in the pharmaceutical industry providing firms with exclusive rights to the production of prescriptive drugs. Firms may be protected from competition by government regulations or an existing firm may use advertising and brand proliferation to make it difficult for new firms to gain a foothold in the industry. High start up costs in the form of extensive capital equipment may also make it difficult for new firms to enter a market. Some examples of entry barriers are listed below:

- *controlling a scarce resource - if a mining company pegged the only diamond mine in the country, it would have sole rights to mine the gems*
- *a government licence granting a legal monopoly e.g. Australia Post.*
- *a technological advantage - e.g. Microsoft has considerable market power because it supplies the operating system used in most computers.*
- *a patent on an invention gives protection from competition (up to 17 years in Australia).*
- *extensive product differentiation, brand proliferation, large advertising budget, controlling retail outlets.*
- *economies of scale - only a few firms can compete in the market because of the large setup (fixed) costs*
- *collusive behaviour - when firms agree to share markets, to fix prices or quantities or otherwise seek to reduce competition and/or prevent new firms entering a market*

In an imperfect market, such as monopoly or oligopoly, firms can use their market power to 'exploit' the market. A firm has **market power** if it can affect the market price by varying its output. Monopoly and oligopoly firms have substantial market power because they operate in markets with little effective competition. Firms with market power will attempt to profit maximise. Their private interest will not necessarily coincide with society's interests and therefore the socially optimal level of output is unlikely to be produced. This will result in higher prices and reduced output, decreasing economic welfare for society.

Patents - a powerful entry barrier

What is the biggest selling pharmaceutical drug of all time?

Lipitor - a cholesterol lowering drug made by one of the largest pharmaceutical companies, Pfizer.

Lipitor was first patented in 1997 and in the 14 year period before its patent expired in 2011 it earned the company over \$US130 billion.

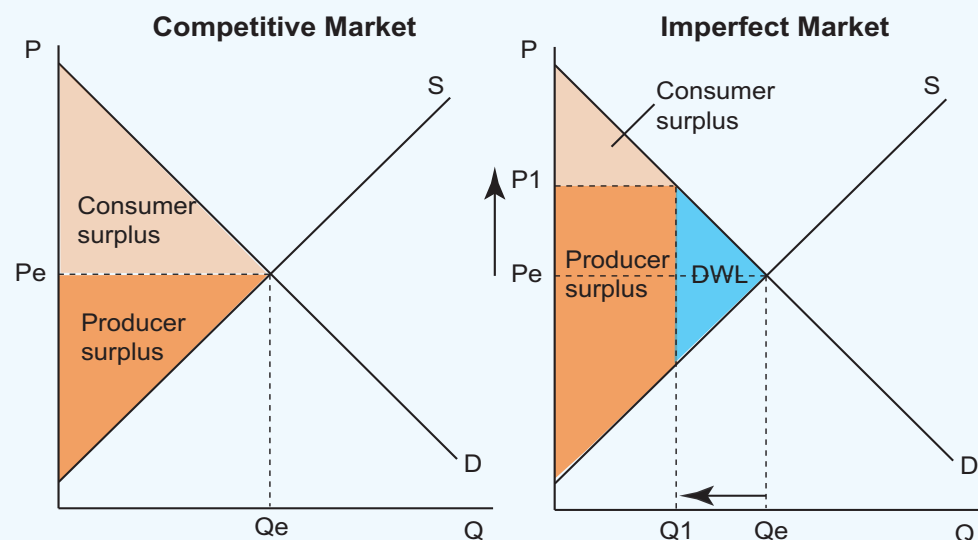
The patent protected the company for 14 years - while there were other similar drugs on the market, Lipitor was the most effective. This meant that it was the preferred choice by doctors and consumers. The patent meant that no other company could sell an identical product to Lipitor - in other words Pfizer had the monopoly on Lipitor. Once the patent expired, other firms could produce and sell generic versions of Lipitor at much lower prices reducing the monopoly profits of Pfizer.



Figure 5.1 illustrates the effect of market power on price and quantity. A competitive market will produce where demand equals supply. The equilibrium price (P_e) and quantity (Q_e) is efficient. At the equilibrium, total surplus (the sum of consumer and producer surplus) is maximised. The panel on the right shows the effect of market power. In this case a monopoly reduces output to Q_1 in order to increase price to P_1 . Notice that consumers are now worse off - they pay a higher price and consume a lower quantity. Consumer surplus decreases. The monopoly on the other hand gains - producer surplus (or profit) increases. But society is now worse off because total surplus decreases by the area DWL (the deadweight loss). The deadweight loss represents the loss in economic welfare because the market has been restricted. This is the classic case against monopoly and why monopolies and oligopolies are criticised for being inefficient. Most countries now have government legislation which promotes a competitive business environment and tries to prevent firms with market power from exploiting the market.

Anti-competitive behaviour

Firms with market power have the incentive to reduce competition - by either reducing price competition or by reducing the number of firms competing in the market. The term **anti-competitive behaviour** refers to any agreements or arrangements between firms that seek to restrain competition and thereby remove the automatic regulation that competitive markets achieve. Competition provides the spur for businesses to improve their performance, develop new products and respond to changing circumstances. Competition offers the promise of lower prices and improved choice for consumers and greater efficiency, higher economic growth and increased employment opportunities.

Figure 5.1 Market power

A competitive market is efficient because it maximises total surplus. Market power allows a firm to increase its price by restricting output. Producer surplus increases, but consumers are worse off because they pay more and get less. Total economic surplus decreases - there is a deadweight loss (DWL).

Any agreement between firms in an industry to fix prices, to divide the market, or to prevent the entry of new firms will decrease competition. By engaging in anti-competitive behaviour, firms are able, collectively, to act as a monopoly or oligopoly. Business practices that try to reduce competition will result in market failure and will lead to a deadweight loss. Figure 5.2 summarises some of the main types of anti-competitive behaviour that are used by firms in order to reduce competition.

Government policy and market power

Market power is prominent in imperfect markets such as monopoly and oligopoly markets. Market power is inefficient because it reduces competition and decreases total surplus. Government policy to address market power includes regulation/deregulation as well as specific legislation. An example of government **legislation** in Australia that attempts to prevent market power is the Competition and Consumer Act 2010. This Act is administered by the **Australian Competition and Consumer Commission (ACCC)** and contains rules against anti-competitive conduct to ensure that there is fair and effective competition within Australia. The Act also contains consumer protection rules, known as the Australian Consumer Law, which businesses must abide by in their dealings with consumers.

Figure 5.2 Business practices that reduce competition	
<i>Cartel</i>	<i>When firms agree to act or collude together instead of competing with each other - includes both price fixing and market sharing</i>
<i>Collusion</i>	<i>General term describing agreements between firms - either price or market sharing - to reduce competition and increase profits</i>
<i>Market sharing</i>	<i>A market is divided into a series of smaller markets, each supplied by one of the firms, thus reducing competition</i>
<i>Misuse of market power</i>	<i>A business that has a substantial degree of power in a market (e.g. a monopolist) is prohibited from taking advantage of that power for the purpose of eliminating or substantially damaging a competitor</i>
<i>Collusive tendering</i>	<i>Firms agree to submit exorbitant tenders which ensure high profits and the sharing of work between the collusive members</i>
<i>Predatory pricing</i>	<i>When a company with substantial market power sets its prices at a sufficiently low level with the purpose of eliminating or substantially damaging a competitor</i>
<i>Resale price maintenance</i>	<i>Suppliers and manufacturers are prohibited from specifying a minimum price below which goods or services may not be resold or advertised for resale. A supplier may recommend a resale price for goods, provided that it is a recommended price only.</i>
<i>Exclusive dealing</i>	<i>When one firm trading with another imposes some restrictions on the other's freedom to choose with whom or where they deal</i>
<i>Merger</i>	<i>Two or more firms join together to form one larger firm. If a merger results in benefits to consumers then it is allowed, but if it - substantially reduces competition in the market then it is prohibited</i>

The role of the ACCC is to protect, strengthen and supplement the way competition works in Australian markets and industries to improve the efficiency of the economy and to increase the welfare of Australians. This means that the ACCC tries to ensure that the benefits of increased competition flow through to consumers in the form of lower prices and better service. It does this by prohibiting anti-competitive conduct by firms with market power such as price fixing and collusion.

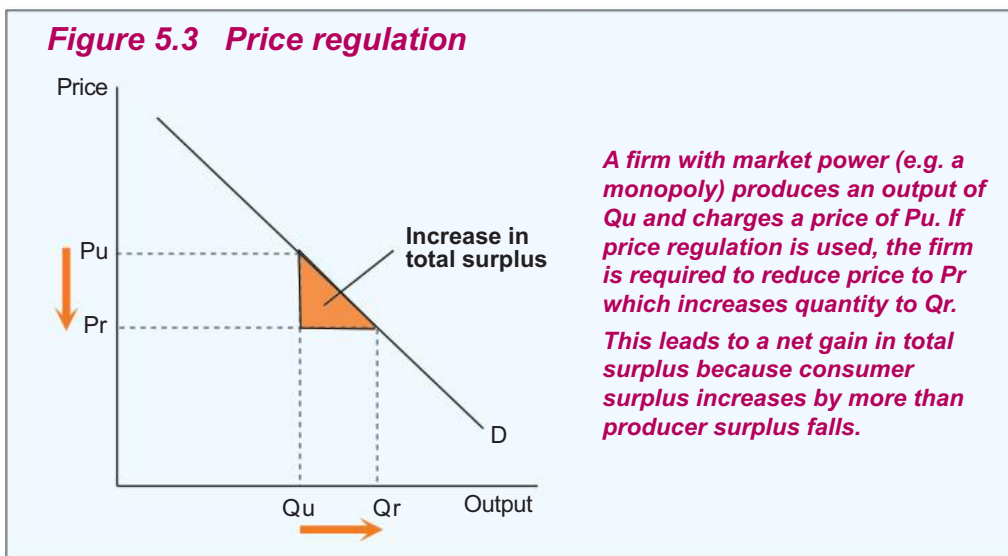
The Competition and Consumer Act provides for heavy penalties where firms where firms have engaged in anti-competitive behaviour. In 2008, for example, Visy was fined \$36 million by the Federal Court for its role in the cardboard packaging cartel which overcharged thousands of firms and millions of consumers. In 2016, Colgate-Palmolive was ordered to pay an \$18 million fine for colluding with rival companies to fix the price of detergents in Australian supermarkets.

In 2023 steel manufacturer BlueScope Steel was ordered to pay a \$57.5 million penalty for attempting to fix prices for flat steel products supplied in Australia. Flat steel products are an important material in a number of important sectors of the Australian economy, including the construction, building, manufacturing, automotive and transport industries. The penalty ordered by the Federal Court is the highest penalty ever imposed for cartel conduct in Australia. The ACCC stated that cartel conduct is illegal because it cheats Australians by increasing the prices consumers and business customers have to pay, and by restricting healthy economic growth.

Regulation

Governments can use regulation to reduce or eliminate the market failure associated with monopoly firms. The most common form of regulation is to use price regulation to prevent firms from exploiting consumers. Figure 5.3 shows the market demand curve in an imperfect market with the unregulated (monopoly) price and quantity at P_u and Q_u . If the price is regulated to a more competitive price of P_r , then quantity is increased to Q_r which increases economic welfare.

Price regulation is especially important where an industry is a '**natural monopoly**'. This is an industry where it is efficient to have only one firm in the market due to significant economies of scale. Utility companies such as the Water Authority and electricity providers are examples. When firms face no competition they can charge what the market will bear in order to maximise profits. Consumers are exploited and the outcome is inefficient. The government can increase economic welfare by using price regulation to ensure that prices will be similar to a more competitive market. Government regulation may also involve requiring firms to meet minimum safety and environmental standards as well as protecting consumer rights.



At the same time governments need to be careful when using regulation to achieve certain social objectives that they don't reduce the level of competition in an industry. The types of regulations that restrict competition are those that:

- limit the number or types of businesses
- limit the ability of businesses to compete
- reduce the incentive for businesses to compete
- limit the choices and information available to consumers.

The taxi market is a good example where government regulation led to reduced competition, high prices and relatively poor service. In this case, the answer is **deregulation** - remove the unnecessary restrictions on the market and allow increased competition. The deregulation of the telecommunications market is another example that has allowed consumers to benefit from lower prices of phone calls and internet usage. It is important to understand that there is a tradeoff between regulation that promotes economic welfare and deregulation that increases competition and reduces prices to consumers.

Review Quiz

1. *When does market failure occur?*
2. *What are the four characteristics of an imperfect market?*
3. *Provide three examples of an entry barrier.*
4. *What is market power?*
5. *Why is a monopoly inefficient?*
6. *What is the role of the ACCC?*

Check your understanding

A monopoly takes over an industry from competitive firms. Which of the following is not likely to be true about a monopoly compared with a competitive firm?

- (a) A monopoly will earn a higher rate of profit.*
- (b) A monopoly will charge a higher price.*
- (c) A monopoly will produce a lower quantity than the competitive market.*
- (d) A monopoly will offer a wider choice to the consumer.*
- (e) A monopoly will result in an increase in total surplus.*

Answer: Alternatives (a), (b) and (c) are correct statements. Alternatives (d) and (e) are incorrect. A monopoly will offer less choice to consumers and will result in a deadweight loss compared with a competitive market.

Externalities

The market reflects the buying and selling intentions of consumers and producers. Demand reflects the private benefits that consumers receive while supply reflects the private costs of production. There are many circumstances though, when the production (or consumption) of a good may create external costs and/or external benefits. These are side effects of economic activity and are referred to as **externalities**. Consider the following examples - which of these would be considered an externality?

1. *A person smokes a cigarette in a crowded room*
2. *Loud music from a nearby concert disturbs your sleep*
3. *A factory discharges toxic chemicals into a river*
4. *Your neighbour maintains a beautiful garden*
5. *You visit your doctor to get a flu vaccine*
6. *A hurricane destroys fruit and vegetable crops*

The first five are examples of an externality, but not the last example. Examples 1, 2 and 3 are all negative externalities. In each of these cases there is an external cost imposed on someone else. Examples 4 and 5 are positive externalities because someone receives a free external benefit. In the case of example 4, you receive the external benefit from your neighbour. In example 5, your friends will receive an external benefit because they will be protected from getting the flu from you. Example 6 is not an externality because the effects of the hurricane will be captured by the market in terms of higher prices. Externalities are unintended consequences of economic activity. It means that when they exist, the market outcome will not be efficient. The market will fail to set the 'correct' price and fail to produce the socially optimal quantity.

Negative externalities

There are many examples of negative externalities created from both the consumption and production of goods and services. Driving cars increases smog and air pollution and contributes to congestion increasing travel time; lawn mowers and chain saws create noise pollution; people smoking cigarettes affect the health of non-smokers; using fossil fuels contributes to global warming and climate change. These are all examples of activities that create negative side effects. When economic actions from either production or consumption create an **external cost**, it is referred to as a **negative externality** and it will cause the market quantity to be greater than the optimal quantity and will cause the market price to be less than the optimal price.

Consider the example of using a freeway at peak time to drive to and from work - a private decision which thousands of motorists make each day. They make their decision by weighing up the costs and benefits that accrue to them as individuals.

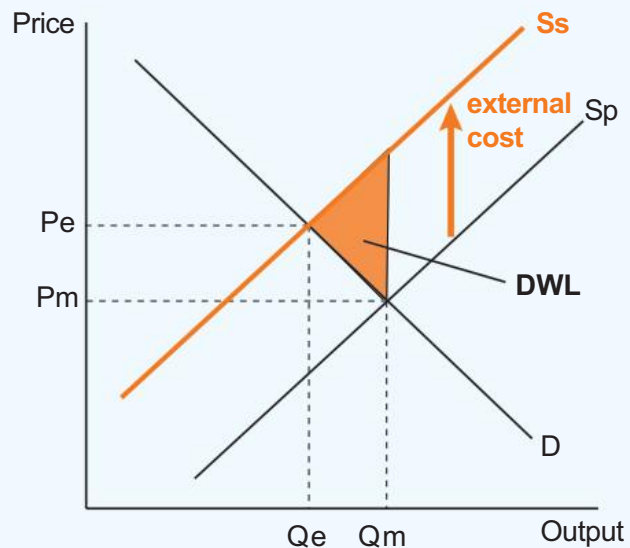
These would include the costs of petrol, the time taken for the trip, the convenience factor of having their car at work, or perhaps to avoid the need to walk from the bus station to their office. But the economic action of driving along the freeway imposes costs on other motorists. The extra car adds to the congestion experienced by all other cars on the freeway. The increased congestion adversely affects other motorists - it imposes an external cost or externality on other drivers.

Pollution is a classic example of a negative externality. A factory that emits pollutants into the atmosphere is likely to impose an external cost on those people who are affected by the pollutants. The pollution may adversely affect the health of people living in the area. Why do firms pollute the environment? Because it is free - no one owns it. If the firm was forced to install air filters to eliminate the pollutants, then there would be no external cost and there would be no market failure. The problem is that the atmosphere is free to use and so the factory pollutes. A negative externality can be analysed using the demand and supply framework introduced in Chapter 2. Figure 5.4 shows a typical negative externality such as air pollution associated with a factory. The demand curve D in Figure 5.4 represents the benefits of consumption, while the supply curve S_p represents the private costs of production. If only private costs are taken into account, the market (equilibrium) quantity is Q_m , and the market price is P_m . But the private market fails to recognise the external costs of the pollution. To determine the efficient or optimal output we need to consider all costs of production, both private and external. This is called **social cost**.

Social cost is equal to private costs plus external costs

Figure 5.4 A negative externality

A negative externality such as pollution results in an external cost which causes a divergence between private costs (S_p) and social costs (S_s). The market equilibrium is where $D = S_p$ with price P_m and quantity Q_m . The market fails because it overproduces - the efficient price and quantity considering external costs, is P_e and Q_e where $D = S_s$.



In Figure 5.4, the social supply curve is S_s . The 'correct' or efficient price and quantity is where the S_s curve intersects with the demand curve - price should be P_e and quantity should be Q_e . The market is said to 'fail' in the presence of a negative externality because there is overproduction - the market quantity exceeds the efficient or optimal quantity. This means that there is a deadweight loss - a decrease in total surplus. If producers were forced to pay for the external costs, then there would be no externality and no market failure.

Positive externalities

Externalities are not always bad! **Positive externalities** create an **external benefit** for third parties. How many health clubs or gyms are in your area? The membership fee gives the consumer the right to use the equipment and get expert advice to improve their fitness and general well-being. The first and second parties in this market are the buyer and seller. A number of third or external parties also benefit from the private transaction - for example, the member's employer. A healthy, fit worker is more likely to be a productive worker. If this is the case, some of the benefits of the transaction have 'spilled over' to the third party. A student entering university in Australia pays several thousand dollars in HECS (Higher education contribution scheme) fees. These can be paid up-front or deferred until a threshold income is reached. The private benefit of further education is the extra salary which the student will receive. But society also gains in the long run, because it has a more skilled and productive workforce. Society has thus enjoyed an external benefit from the individual's decision to further their education.

Figure 5.5 analyses a typical positive externality such as education. The supply curve S_p in Figure 5.5 represents the costs of education, while the demand curve D_p represents the private benefits of consuming education services. If only private benefits are taken into account, the market quantity is Q_m , and the market price is P_m . But the private market fails to recognise the external benefits of education to society. To determine the optimal or efficient output we need to consider all benefits of consumption, private and external. This is called **social benefit**.

Social benefit is equal to private benefits plus external benefits.

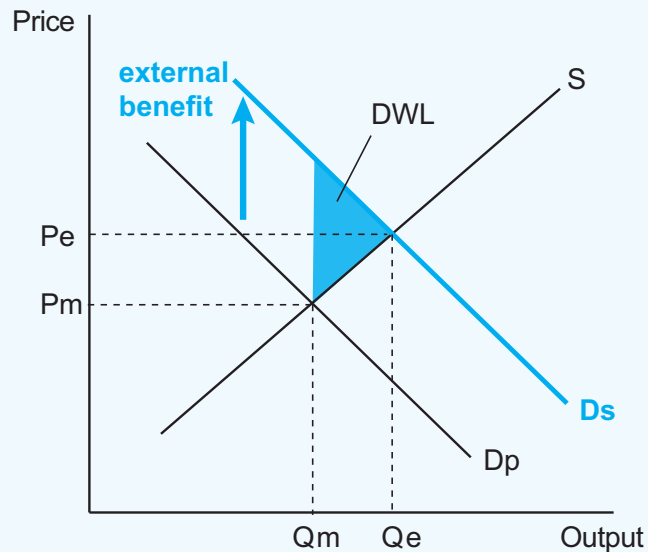
In Figure 5.5, the social demand curve is D_s . The 'correct' or efficient price and quantity is where the D_s curve intersects with the supply curve - price should be P_e and quantity should be Q_e . The market is said to 'fail' in the presence of a positive externality because there is underproduction - the market quantity is less than the efficient or optimal quantity. This means that there is a deadweight loss - a decrease in total surplus. If the market were forced to consider the external benefits, then there would be no market failure.

Why do externalities occur? In the case of environmental externalities such as pollution, the problem is the lack of **property rights**. Who owns the atmosphere or the oceans? Property rights define the ownership and use of a resource. Many environmental resources are open access resources - they are not privately owned.

These types of resources do not have a price to restrict their use like a private good. Free goods such as the environment will be overused and exploited. People can use these resources without paying for them. There is no incentive to use these resources in a socially optimal way.

Figure 5.5 A positive externality

A positive externality such as education results in an external benefit which causes a divergence between private benefits (D_p) and social benefits (D_s). The market equilibrium is where $D_p = S$ with price P_m and quantity Q_m . The market fails because it underproduces - the efficient price and quantity, considering external benefits, is P_e and Q_e where $D_s = S$.



Check your understanding

You grow fruit trees in your garden. They attract butterflies and bees. Which of the following is not an externality of this?

- (a) Neighbours may be stung by the bees that pollinate the trees.
- (b) Neighbours may buy fruit more cheaply from you than the local supermarket.
- (c) Neighbours may enjoy better air quality as the trees naturally improve the atmosphere.
- (d) Neighbours may like to watch the activity of the butterflies and bees at no cost.

Answer: Alternative (a) is a negative externality - there is an external cost on your neighbours. Alternatives (c) and (d) are positive externalities - the neighbours receive an external benefit. Alternative (b) is not an externality - if you purchase the fruit you receive a private benefit.

Government policy and externalities

When externalities exist, the market outcome will not be efficient - the optimal quantity will not be produced and the price charged may not reflect the true value of the resources used in production. Governments have a clear role in the presence of externalities. They should take action to reduce the production of goods causing negative externalities, and increase the consumption of goods creating positive externalities. Government policy needs to 'internalise' the externality - force the market to recognise and include the external cost or external benefit in the market price.

Figure 5.6 illustrates how governments can use market based policies to correct for externalities. In the case of a negative externality, a tax should be placed on the producer to reduce output, while in the case of a positive externality a subsidy should be used to increase output. The top diagram shows a negative production externality. A firm in producing its output pollutes the environment. The government could place a pollution tax on the firm equal to its external cost - the difference between the firm's private cost (S_p) and society's social cost (S_s). The tax increases the firm's private costs, which shifts the private supply curve (S_p) to coincide with the social supply curve (S_s). The tax increases the price of the good from P_m to P_e , while output is decreased from Q_m to Q_e . The tax has corrected the market failure - firms are being forced to pay for their external costs. Taxes are an excellent example of the 'polluter pays' principle. Pollution taxes provide firms with incentives to reduce their pollution in order to reduce their tax bill. Taxes also encourage firms to adopt cleaner technology.

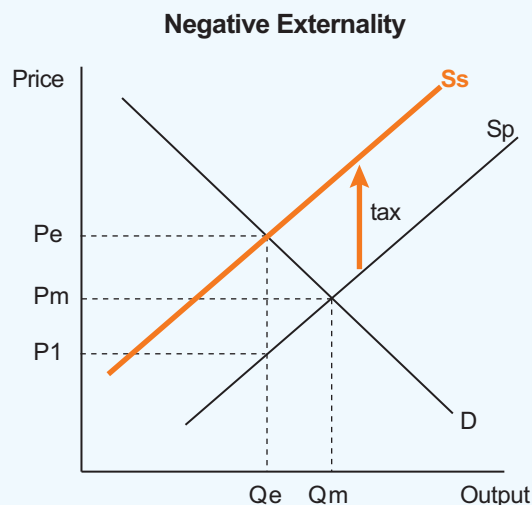
The bottom diagram shows a positive consumption externality such as education. Education creates a large external benefit - the social demand curve (D_s) lies above the private demand curve (D_p). The market equilibrium is at P_m and Q_m , but this does not take into account the external benefits. In this case, the government could pay a subsidy to the consumer equal to the external benefit (PeP_2). The payment of the subsidy would shift the market from the equilibrium price and quantity of P_m and Q_m to the efficient combination of P_e and Q_e . The subsidy has the effect of reducing the price paid by consumers and increasing consumption. In Australia, the government not only subsidises the cost of education and health services but also provides free public schools and hospitals.

Review Quiz

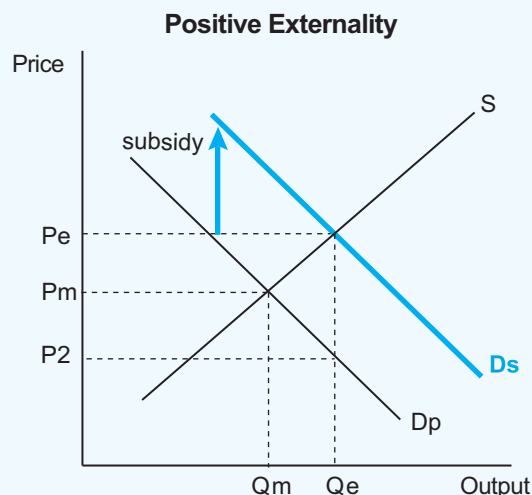
1. Why are externalities referred to as 'spillover effects'?
2. Give an example of a negative externality.
3. Give an example of a positive externality.
4. Why does a negative externality create a deadweight loss?
5. Why does a positive externality create a deadweight loss?

Figure 5.6 Internalising externalities

To internalise a negative externality, the government can impose a tax on producers equal to the external cost. The tax is equal to $PeP1$. The tax forces the polluter to pay. The tax shifts the firm's private supply curve (Sp) to the social supply curve (Ss). Price is increased to Pe and quantity is decreased to Qe .



To internalise a positive externality, the government can pay a subsidy to consumers equal to the external benefit. The subsidy is equal to $PeP2$. The subsidy shifts the consumer's private demand curve (Dp) to the social demand curve (Ds). Producers receive Pe but consumers only pay $P2$ (after the subsidy) while quantity increases to Qe .



Check your understanding

If the production of a good involves a negative externality, which of the following must be true?

- (i) market price of the good is higher than its optimal price.
- (ii) market price of the good is lower than its optimal price.
- (iii) market quantity of the good is higher than its optimal quantity.
- (iv) market quantity of the good is lower than its optimal quantity.

Answer: Alternatives (ii) and (iii) are true - the market price will be lower and the market quantity will be higher than the social optimum.

Public goods and common resources

The price system normally enables markets to provide the efficient quantity of a good because prices send the right signals to both consumers and producers. The market ensures that people can buy essential goods such as milk, bread, meat and vegetables. If there is a shortage of a particular good, its price will rise which will signal to consumers to either lower consumption or look for a substitute. At the same time, the rising price will be an incentive to producers to increase production. We don't need a special government department for milk or bread to make sure that enough bottles of milk or loaves of bread are being produced. The market automatically does this. However, there are some goods and services in the economy that do not have prices, which means that these goods will not usually be produced by markets. To examine these types of goods we need a way to separate the goods that have prices and those that do not. A useful way to classify the different goods in the economy is to use two criteria:

- whether a good is **rival** in consumption – does the consumption by one person reduce the supply available to other users?
- whether a good is **excludable** – is it possible to exclude a non-payer from consuming the good or service?

Using these criteria it is possible to identify four different types of goods:

- **private goods**
- **club goods**
- **public goods**
- **common resources**

These four different types are shown in figure 5.7. Markets can profitably supply private goods and club goods, but they cannot supply public goods or common resources. The reason is that the latter two goods do not have a price – they are non-excludable. These goods are subject to **free riders** – people who can consume the goods without paying for them.

Private goods

The term **private goods** describes most of the goods and services purchased by households. Private goods have two important characteristics – they are rival in consumption and they are excludable from non-payers. A good is said to be rival in consumption if one person's consumption decreases the consumption of others. A can of soft drink consumed by one person cannot be consumed by someone else. When you buy a new car, the stock of cars available to other consumers is reduced by one. When you purchase a good you are given a receipt – this is your property right to the good which gives you legal ownership. Private goods are also characterised by the **exclusion principle**.

Figure 5.7 Classifying goods

		Rival	Nonrival
<p><i>The four different types of goods are determined by:</i> <i>(1) whether a good is rival in consumption, and</i> <i>(2) whether a good is excludable.</i> <i>Only public goods and common resources suffer from market failure.</i></p>	Excludable	Private Good e.g. computer mobile phone clothing	Club Good e.g. Netflix Spotify gymnasium
	Nonexcludable	Common Resource e.g. forests fish in the ocean the atmosphere	Public Good e.g. lighthouse national park national defence

This means that those consumers who are willing and able to purchase a product gain exclusive rights of ownership and the benefits that can be derived from that ownership. Consumers who are not able or willing to pay the price are excluded from using the good. Property rights for private goods are thus easily identified and enforced - non-paying customers can be prevented from consuming private goods. The free market will usually provide adequate amounts of private goods because consumers are willing to pay for their use, creating a profit incentive for producers.

Club goods

Club goods (also known as quasi-public goods) are nonrival in consumption and excludable. Nonrival means that these goods can be consumed collectively by many people at the same time. An example would be streaming music from Spotify or iTunes or watching a movie in a cinema. As long as the cinema has spare seats, an extra person can enter the cinema and consume the movie without affecting the consumption of others. Excludable means that price can be used to prevent or exclude people who do not pay for the good or service. The cinema can charge a price to watch the movie - a consumer must present a ticket to gain entry. Netflix and Spotify are other good examples of club goods. Millions of people can consume these streaming services at the same time (nonrival consumption) but they must pay a subscription fee to receive the transmission (excludable). These goods are referred to as club goods because they can be consumed collectively by a large number of people. Gymnasiums and sports clubs are also good examples.

Public goods

The two types of goods that involve market failure are public goods and common property goods. **Public goods** are nonrival in consumption, and nonexcludable - free riders cannot be excluded. A good is non-rival if its consumption by one person does not lower the potential consumption of others. The air you breathe is nonrival - many people can all breathe air at the same time without reducing the amount of air for others. The use of a footpath is also non-rival - if another person decides to walk on the path, he or she does not diminish the ability of others to enjoy walking on that path. A fireworks display and a free-to-air television broadcast are also non-rival goods.

The other essential characteristic of public goods is that the exclusion principle does not apply to them. It is impossible or extremely difficult to prevent a non-paying customer from consuming a public good - 'if made available to one, they must be made available to all'. It is not possible to exclude someone from enjoying a fireworks display over the city skyline or from receiving broadcast television or radio. An excellent example of a public good is a lighthouse. Consumption is non-rival - a ship using the lighthouse as a navigation aid does not prevent other ships from seeing the light. The service is non-excludable - it would not be possible to switch the light off if a passing ship had not paid its fee! Other examples of public goods include:

- suburban roads
- national defence
- national parks
- broadcast radio and free to air television

Radio and free to air television are examples of public goods that are provided by private firms. Both are nonrival in consumption and both are nonexcludable - the services are free. The cost for these services is paid for by advertising. Cable TV, on the other hand, is not a public good because, while being non-rival in consumption, it can be excluded from consumers who don't pay.

National defence is a public good, but public transport and public health are not.

Check your understanding

Which of the following could be considered a public good?

- (i) *public transportation by bus*
- (ii) *clean air*
- (iii) *community swimming pools for which the user must pay a fee*
- (iv) *postal services*

Answer: only alternative (ii) is a public good. Alternatives (i), (iii) and (iv) are all excludable because consumers must pay a price. Only alternative (ii) is both nonrival and nonexcludable.

Public goods suffer from the 'free rider' problem - people who can consume without paying.

Many public goods are essential for our welfare as a society, and are generally provided by the government and financed by general taxation revenue. Private enterprise has no incentive to provide public goods because they cannot be priced and sold in a market, and hence they cannot be profitable. It would be virtually impossible to exclude non-paying customers from consuming these goods. These non-paying customers are referred to as **free riders** - consumers who enjoy the benefits of consumption without paying for the cost of provision. Many people classify public education, public health and public transport as public goods, but this is incorrect. These are not public goods, even though they are supplied by the government. Each of these goods is excludable - they can be priced. While these goods can be consumed collectively they can be subject to congestion - overcrowding on public transport and shortage of hospital beds. Governments supply these goods because they have large external benefits for society. These types of goods are sometimes referred to as '**merit goods**'.

Education and health are both supplied (at a price) in private markets. But if their supply was left completely to the free market, it is likely that there would be significant under-consumption of these goods. This is because the value some individuals place on these services is less than the value society places on them. Not everyone can afford private education or could pay expensive hospital and medical bills. The substantial social benefits associated with these goods often results in the government intervening to supply them at a heavily subsidised price to encourage greater community consumption.

Common resources

Common resources share the non-excludable characteristic of public goods but are rival in consumption. The ocean and the atmosphere are good examples. Ownership of these goods is universal - there are no clearly defined private property rights. Common resources, similar to public goods, cannot be priced. If you go fishing and catch a nice pink snapper, does it have a price tag attached to its tail? Do you have to throw money into the ocean to buy the fish? Of course not! The fish have no price, they are free. This encourages people to consume as many as they can. The stock of a renewable resource, such as a fish population, will decline over time if consumption of the resource exceeds its replenishment. The problem with a common resource is that it is difficult to prevent overconsumption because of the non-excludable characteristic.

The 'tragedy of the commons' results in overconsumption and the depletion of a resource that is mutually shared.

When common resources like fish in the ocean are consumed, a negative externality is imposed on other consumers because the quantity has been depleted. The number of fish in the ocean is rival, so over-fishing will drastically reduce the stock. People pursue their own self interest to the detriment of others. This is commonly referred to as the '**tragedy of the commons**' after an article written by Garrett Hardin (a biologist) in 1968. Other examples of common resources include endangered species, such as elephants and tigers, and congested freeways and highways. Each of these suffers from the tragedy of the commons. Fish and wildlife are both

non-excludable and rival - this is why the free market fails to preserve fish stocks and fails to prevent many forms of wildlife from becoming extinct. Most freeways and highways are free to use by any motorist - there are usually no tolls. At peak times, the freeways become congested or 'rival'. As more cars enter the freeway, the congestion imposes an external cost on all other motorists on the freeway. Common resources require the government to act as protector and regulator, to manage and help control the use and overconsumption of these goods. In the case of fishing, most states in Australia set a restricted fishing season and bag limits for recreational fishing and quotas and licences for commercial fishing. In this way the fish stock is managed so that it can be replenished over time. In some cities, tolls or electronic road pricing is used to put a price on the use of freeways, especially at peak times, to reduce the amount of congestion.

Review Quiz

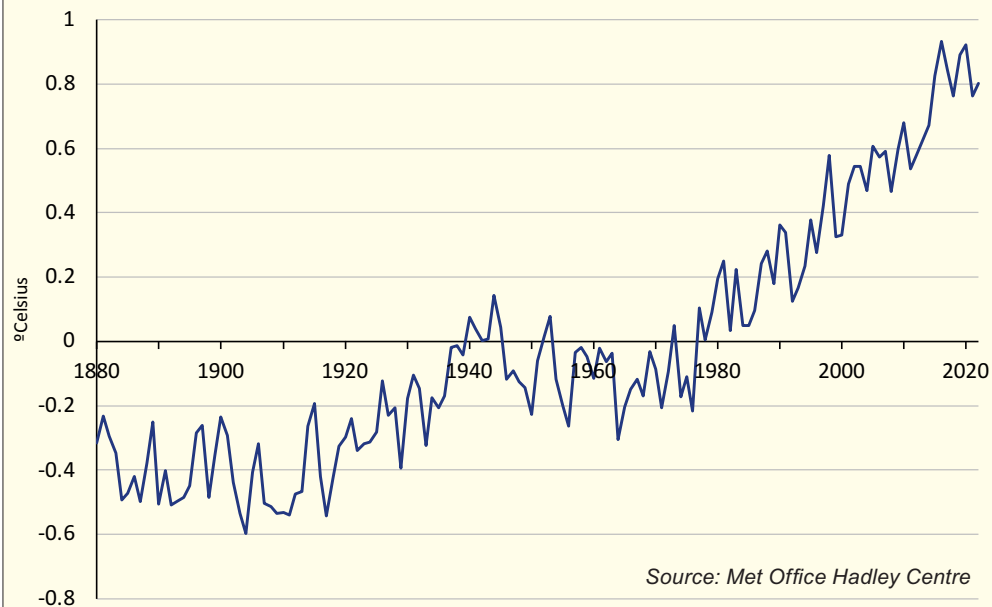
1. *When is a good non-rival in consumption? Give an example.*
2. *When is a good non-excludable? Give an example.*
3. *What is a public good? Give an example.*
4. *What is a common resource? Give an example.*
5. *Why do public goods and common resources suffer from market failure?*

Climate change - a case study in market failure

Global warming leading to climate change has been called the greatest market failure of all time! Global warming results from the burning of fossil fuels such as coal, oil and natural gas. These energy resources supply around 80 per cent of the world's energy. Most of these fossil fuels are used to produce electricity for industrial and household use and in the case of oil, to produce petrol for the transport sector. Burning these fuels produces carbon dioxide which collects in the atmosphere and contributes to the enhanced 'greenhouse effect'. Carbon dioxide (CO₂) and other greenhouse gases such as methane and nitrous oxide, act as a blanket which traps outgoing radiation and warms the atmosphere. This warming effect is crucial for life - it prevents the planet from freezing. The natural greenhouse effect keeps the planet at an average temperature of around 15° C instead of -15° C. So what is the problem? The IPCC (Intergovernmental Panel on Climate Change) has concluded that human activity is increasing the concentration of greenhouse gases (especially CO₂) in the atmosphere and that this is adding to the natural greenhouse effect.

Since the industrial revolution, the concentration of carbon dioxide (measured as parts per million by volume) in the atmosphere has increased by nearly 50 per cent and is considered by climate scientists to be the main reason why the average temperature has increased by around 1.5 degrees Celsius over the past 100 years. The problem with carbon dioxide is that it lasts in the atmosphere for up

Year	CO ₂ conc (ppm)
1960	317
1970	326
1980	339
1990	354
2000	370
2010	390
2023	419

Figure 5.8 Global temperatures**Temperature Anomaly 1880 - 2022**

Over the past century global temperatures have increased by around 1.5°C. This increase has been linked to the increasing concentration of greenhouse gases in the atmosphere. The burning of fossil fuels and deforestation are the main factors causing the increase in CO₂ concentration.

to a century - it does not dissipate quickly. It is predicted that if the concentration of greenhouse gases continues to increase, then the average temperature could rise by 2 - 3 degrees by 2100! This could lead to dramatic changes in climate, the melting of the polar ice caps and subsequent rise in the sea level. Figure 5.8 shows the change in global temperature since 1880. The vertical axis measures the temperature difference (anomaly) with respect to the average temperature for the 1961-1990 base period. The graph shows a period of global cooling between 1880 and 1930 and then a period of distinct warming from 1975 to the present.

Why is climate change regarded as the greatest market failure of all time? Because it involves global negative externalities in both production and consumption and it involves the overuse of a common resource - the atmosphere. Every country in the world produces carbon emissions. Industry produces carbon emissions and so do households. The emissions impose external costs on everyone, especially future generations. To solve the problem of global warming will require every country to reduce their carbon emissions, to switch to a cleaner technology or to switch to a non-carbon based energy such as solar power. A solution favoured by economists is a carbon tax. This would increase the price of using fossil fuels and provide incentives for both producers and consumers to seek non-carbon alternatives.

6



Macroeconomics

Learning Objectives

In this chapter you will learn about:

- *the concept of macroeconomics*
- *the concepts of total spending, total output and total income*
- *the circular flow of income model*
- *the concepts of equilibrium, leakages and injections in the circular flow of income*
- *the effect of changes in leakages and injections on the level of equilibrium*
- *the concept of Gross Domestic Product (GDP)*
- *the expenditure approach to measuring GDP*

An introduction to macroeconomics

The subject of Economics can be divided into two broad ‘fields’ – microeconomics and macroeconomics. **Microeconomics** studies the behaviour of individual households and firms. It addresses questions such as why consumers usually buy more goods and services when prices are low; how producers can make the most efficient use of resources; how the price of a commodity such as oil is influenced by changes in demand and supply; and why markets are considered to be efficient. You will recall these concepts from earlier chapters.

Macroeconomics, on the other hand, studies the economy as a whole. The prefix ‘macro’ means large, so macroeconomics is concerned with the ‘big picture’ of the economy. Macroeconomics is concerned with topics such as economic growth, the business cycle, inflation, unemployment, and the economic policies that may be applied in response to changes in these variables.

In the study of macroeconomics, economists apply the scientific method to:

- collect and analyse information and statistics to understand current trends in the economy;
- apply economic models and theories that describe and explain those trends; and
- propose policy measures to improve the performance of the economy in both the short and the long term.

Why study macroeconomics – is it relevant to us?

As senior secondary students, you are probably considering your future education and career path. You have probably wondered how you will ‘fit’ into the economy – what job or career you are suited to; whether you might start your own business; how much money you could earn, and the like.

Because every one of us is a participant in the economy, it’s useful to develop ‘economic literacy’ – an understanding of economic events and how they might affect our households, jobs and businesses. Some familiarity with these concepts is important because they affect the decisions we make from day to day. Would you borrow money to buy a computer or a car if news reports said that interest rates were rising? Would you buy new equipment for your business if consumer spending was falling? Should one of your family members quit their part-time job if job vacancies are falling?

Economic literacy also helps us to think critically about events that are in the news every day. How has higher inflation affected our standard of living? Is it good or bad if the Australian dollar falls against the Euro? Is a rise in labour force participation significant? Is a news report about falling productivity based on facts or opinions?

Spending, output and income

You may have heard the saying that “every person’s spending is another person’s income”. It is based on a key concept of macroeconomics – that spending, output, and income are closely interconnected.

From an economic point of view, spending refers to the **expenditure** on goods and services by households, businesses, and the government. This chapter will describe several categories of spending: consumption spending by households; investment spending by businesses; government spending on public goods and services; and net overseas spending (exports minus imports). The overall level of spending is the driver of economic activity and growth over time.

Output represents the total production of goods and services produced within an economy during a specific period. It’s a measure of the production that occurs in the various sectors of the economy, such as agriculture; mining; manufacturing; construction; and services. Output is measured in dollar terms – that is, the total value of production. This referred to as **Gross Domestic Product (GDP)**.

Income refers to the total earnings of individuals, businesses, and the government over a period of time. Income can be derived from a number of sources, such as wages and salaries earned from paid employment; profits earned by businesses; rent from properties; interest on saved funds; and dividends on investments. Income is generated as a result of the production and sale of goods and services in the economy. Many people also receive government transfer payments (social welfare benefits) – the word ‘transfer’ implies that a payment is made without goods or services being received in return.

The interconnection between spending, output and income is modeled by the circular flow of income and expenditure, as described in the next section. Buying goods and services generates revenue for producers, which they use to pay for the factors of production they have employed. That income funds further spending, generating further economic activity and output.

The collection of statistics about the levels of spending, output and income is ‘big business’ in modern economies. These so-called economic indicators are used to assess the overall performance and health of an economy.

The circular flow of income model

A model is a simplified view of reality that omits many of the complications of the real world in order to provide us with a clear picture of how something works. Most of us use maps on our smartphones. Maps are models of an area’s landscape and land use. They may not show high levels of detail, but they provide us with a good representation of what we need to know to find our way through the suburbs.

The **circular flow of income** is a macroeconomic model that describes the flows of resources, goods and services, and income and expenditure, between the parts of the economy. The model divides the economy into its key sectors – households, firms, the financial sector, the government and the overseas sector. To build the circular flow model, we first describe the nature of the household and firms sectors, and the relationships between them. We then introduce other sectors.

Households and firms

Households consist of one or more persons who live in the same housing unit, such as a family. Households are the owners of the productive resources (natural, human and capital) and the buyers of final goods and services. **Firms** are the employers of resources, which they use to produce goods and services for the economy.

The economy is a continuous flow of money and productive resources between people that make goods and services, and people that want to buy them. The circular flow diagram is a model of this activity.

The basic model in figure 6.1 is based on a number of simplifying assumptions that allow us to start developing our ‘map’ of the economy:

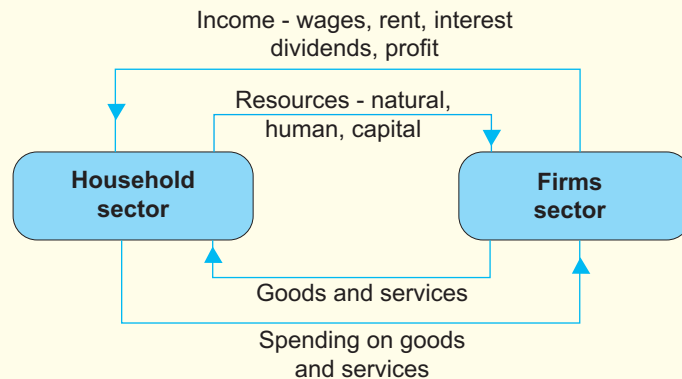
- there are only two sectors in the economy – households and firms. All output produced by firms is sold to households;
- households spend all their income (there is no saving);
- there is no government sector; and
- there is no overseas trade.

Given these assumptions, figure 6.1 describes the basic pattern of exchange that occurs in our economy. The model has two sectors (households and firms) and four flows. The inside flows (goods and services, and resources) are **real** flows, whereas the outside flows (spending and income) are **money** flows.

Figure 6.1 Circular flow - households and firms

In the factor market, households receive income in the form of wages, rent, interest, dividends and profits from the resources they supply to firms for use in the production process.

In the product market, households spend their income in exchange for goods and services produced by the firms sector.



In the **factor market** (the two flows at the top of the diagram), firms hire natural, human and capital resources from households, in return for which they provide various types of income as payment. Most households receive the bulk of their income in the form of **wages or salaries** from a job (employment), but many earn some of their income from:

- **rent**, in return for productive land or property they hire to producers;
- **dividends**, a return for the money capital they have invested in companies;
- **interest** on surplus money lent to banks or financial institutions; and
- **profits**, as a reward for their managerial and entrepreneurial skills (enterprise).

In the **product market** (the lower half of the diagram), households exchange the income they have earned for goods and services produced by business firms.

The model reminds us that people in modern economies are **interdependent** – we all depend on one another to provide the goods and services that satisfy our wants and needs. Very few people in the modern economy claim to be self-sufficient. Very few even try! It is a much better use of scarce resources, both for individuals and groups, to ‘specialise and exchange’. Earn an income from your knowledge, skills and effort, and spend it on the output of firms to create income for others. That’s how the modern economy functions.

Saving and investment

The four assumptions we made prior to introducing figure 6.1 will now be withdrawn to build a more realistic model. Firstly, let’s relax the assumption that households spend all of their income on goods and services. **Saving** is the portion of household income not spent on goods and services for current consumption. Many households have surplus income that they deposit into financial institutions such as banks, credit unions and superannuation funds. These institutions make up what is called the **capital market** or financial sector, as shown in figure 6.2. Saving represents a **leakage** or withdrawal from the circular flow because it reduces the flow of money and goods between households and firms.

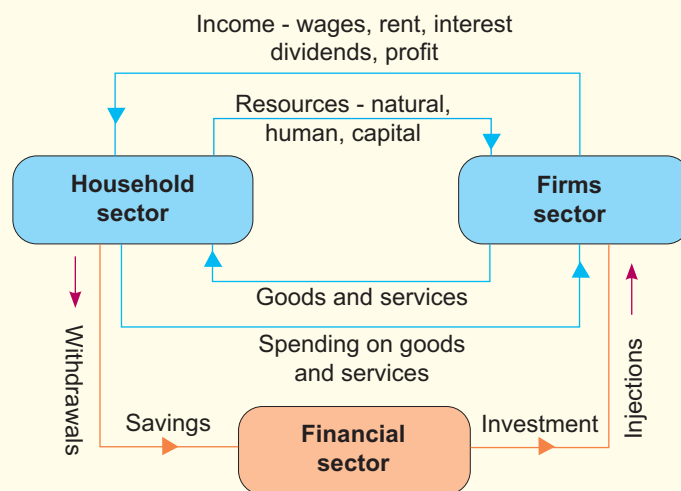
Investment (to economists) refers to the purchase or production of **capital goods** that will be used to produce final goods, including assets such as buildings, machinery, equipment, vehicles, and tools. Capital equipment is necessary to assist labour in the production of services and goods. The equipment used may be quite simple (a hammer used by a carpenter), or very complex (an aircraft used to fly people around the world). In the circular flow, investment is the **injection** that offsets the savings leakage. Institutions in the financial sector pool the savings of households to provide funds for firms to use in investment.

The economic definition of investment differs from the popular usage, where decisions to purchase shares or property are thought of as investment.

Figure 6.2 Circular flow - the capital market

Saving is the proportion of income not spent on consumption, and is a leakage from the flow of current income. Investment is spending on capital equipment that firms use to produce final goods and services. Investment is an injection of funds into the circular flow.

The model shows how the capital market is the intermediary between savers and investors – it pools the funds of savers to create a pool of funds for firms to spend on investment.



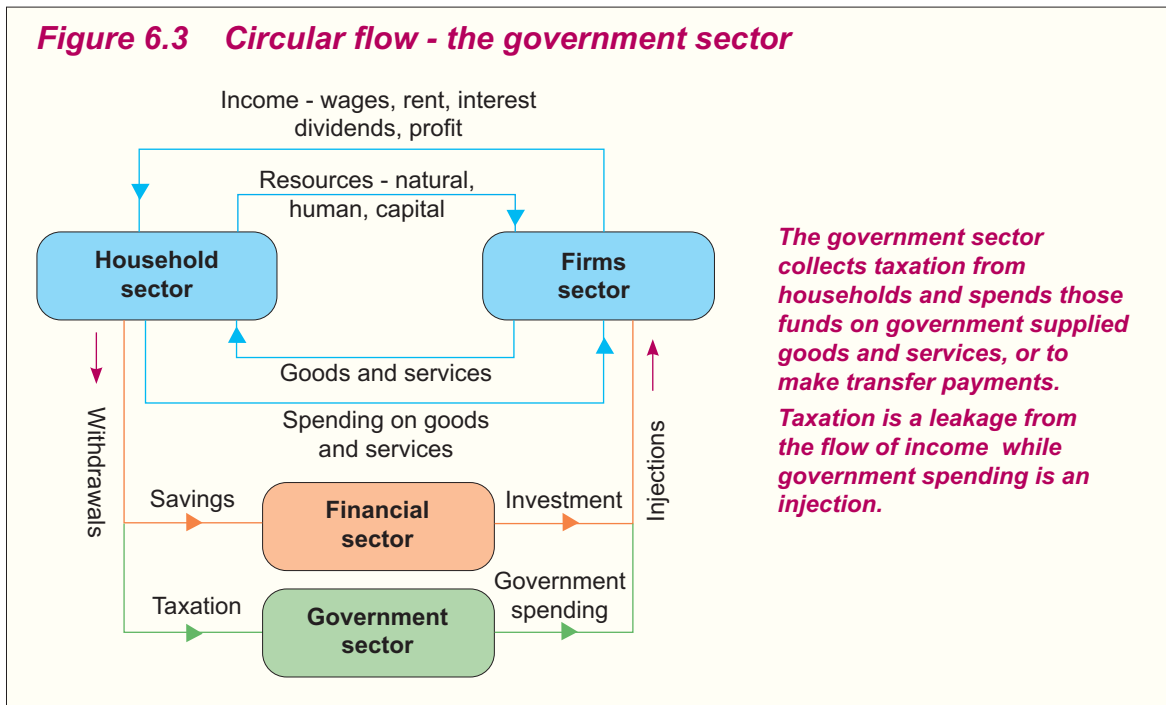
The government sector

In Australia, the three levels of government together employ about 18 per cent of the workforce (some 2 million people). As will be described in chapter 12, the government plays a significant role in the economy as a producer of **public goods** and services such as education, health, welfare services, and defence. To produce these services, the government buys natural, human and capital resources in the factor market. It is also a consumer, buying final goods and services from businesses.

The government is also responsible for the provision of social welfare (such as age pensions, the job search allowance and child care allowance). In economics, these are called **transfer payments** because they are provided without the exchange of goods or services in return. Government also regulates aspects of economic activity so that commerce runs smoothly and equitably.

Figure 6.3 illustrates the role of the government in the circular flow of income. Wages and salaries attract income tax, business firms pay tax on their profits, and certain types of consumption expenditure attract taxes, such as Goods and Services Tax (GST) and excise duties. Like savings, taxation is a leakage from the money flows between households and firms.

Government spending is the corresponding injection into the flow of income. Government spending can also be classified as **current expenditure** (spending on current goods and services such as wages and salaries, fuel, power and stationery) or **capital expenditure** (spending on capital or investment goods which are sometimes called public or **social infrastructure** – schools, roads, railways and hospitals).

Figure 6.3 Circular flow - the government sector

The overseas sector

All Australian households spend some of their income on goods and services imported from overseas. Clothing, electrical items and motor vehicles are familiar examples. Foreign households and firms also purchase Australian-made goods and services. Construction and manufacturing firms in China and India buy Australian iron ore. Japanese power companies buy natural gas. Students from around the world come to Australia to further their education, so they are buying an Australian service.

Hence, we should relax the assumption that the economy is 'closed'. An **open economy** is an important contributor to our economic well-being because trade allows us to buy products that we cannot make economically, and foreigners to buy products that they may not be able to produce. A transaction is classified as an **import** when the money flow is from Australia to overseas. In the case of **exports**, the flow of money is from overseas to Australia.

The international sector is also a source of investment funds. Many Australian firms have built factories in overseas locations; many household mortgages are sourced from the surplus income of foreigners; and foreign institutions are significant investors in Australian mining projects.

Figure 6.4 adds the overseas sector to our model. Imports are the leakage or withdrawal from the flow, and exports are the corresponding injection.

Figure 6.4 Circular flow - the full model

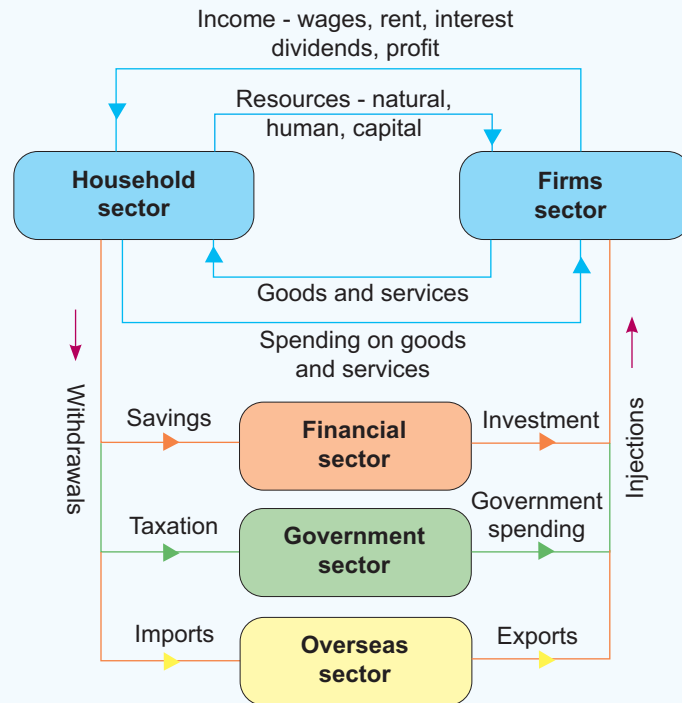
The addition of the overseas sector completes the full circular flow model. Flows between Australia and overseas include imports and exports of goods and services, and financial transactions.

Imports are a leakage as they reduce the flow of income in Australia, whilst exports are an injection which adds to the flow.

For overall equilibrium:

$$S+T+M = I+G+X$$

That is, the sum of the leakages from the flow equal the sum of injections entering the flow.



The full circular flow model

As we have relaxed our original assumptions, the model has become progressively more realistic. Aside from the real and money flows that constitute the flow between households and firms, the full model includes:

- the financial sector that exists to match the needs of households with surplus income and the firms that wish to draw on those funds for investment;
- the government sector that uses taxation from the income and spending flows to provide community needs; and
- the overseas sector which recognises that imports provide for needs we cannot satisfy ourselves, in return for domestically produced goods and services that are surplus to our needs (exports).

Figure 6.4 could be described as the 'five-sector' circular flow of income model. It's a simple diagram, yet it provides a good summary of the flows of money and goods that take place millions of times every day in the economy. It also reminds us of the **interdependence** between the major sectors of the economy.

The model also helps us understand the relevance of macroeconomic events to everyone in the economy. Whenever levels of spending are changing, the size of the real and money flows shown in the circular flow must also change. If there is

an increase in investment in capital equipment by the business sector, everyone benefits because money and real flows increase. A rise in taxes, on the other hand, would reduce the amount of money that people have to spend, leading to reduced production, and thus a fall in earned income. A rise in exports (such as minerals or grain) would bring more money into the circular flow, and increase total income earned. These types of changes are examined in more detail in the next section. The box on the next page illustrates how the early stages of the Covid-19 pandemic in 2020 might be viewed through the lens of the circular flow model.

Review Quiz

1. *Distinguish between the product and factor markets in the circular flow model.*
2. *Describe the dual role of households and firms in the circular flow model.*
3. *Explain the role of the financial sector in the economy.*
4. *Explain the role of the overseas sector in the economy.*
5. *Distinguish between a leakage and an injection.*

Macroeconomic equilibrium

An important conclusion to be drawn from the simple version of the circular flow model (see figure 6.1) is that ‘one man’s spending is another man’s income’. In the circular flow, the value of output produced by firms must equal the value of income paid to resource owners, which must in turn equal the value of spending by households to produce the output.

This equality can be expressed as an identity:

$$\Sigma O = \Sigma Y = \Sigma E$$

where O = output, Y = income and E = expenditure, and the Greek letter sigma (Σ) means ‘the sum of’. The identity means that ‘the sum of all output equals the sum of all income equals the sum of all spending in the economy’. All income is spent and all output is consumed. In economic terminology, this is known as **equilibrium**. When equilibrium occurs, there is no tendency for the level of income in the economy to change. Equilibrium means that the macroeconomy is ‘in balance’.

In introducing the capital market into the circular flow model (see figure 6.2), we described how households save part of their income which financial institutions inject back into the flow by lending the money to business wishing to invest in capital equipment. The capital market is in equilibrium when the size of the savings leakage is matched by the size of the investment injection.

The Covid pandemic and the circular flow

The disruptive initial impact of the Covid-19 pandemic can be viewed through the lens of the circular flow of income model.

Many businesses had to temporarily or permanently close due to lock downs and social distancing regulations imposed by state governments to limit the spread of the virus. This led to a fall in production and output across a number of sectors of the economy (one example being hospitality and tourism), resulting in reduced income for businesses and individuals working in that sector.

As businesses scaled back their operations or shut down, many people lost their jobs or experienced reduced working hours, meaning lower incomes. This impacted on the ability of households to purchase goods and services from the firms sector. With job losses and economic uncertainty, consumer confidence declined, and many households reduced their discretionary spending and focused primarily on essential goods and services.

Global supply chains were also disrupted by restrictions on movement and trade. Manufacturing and distribution processes were hindered as people were not allowed

to attend workplaces leading to shortages of goods and services in certain sectors. These disruptions affected the flow of inputs and outputs between businesses, causing a ripple effect through the circular flow of income.

Governments around the world implemented economic assistance measures to mitigate the economic impact of the pandemic. These included direct cash transfers, subsidies, and business support programs such as the JobKeeper allowance in Australia. While these interventions aimed to alleviate the negative effects of the crisis, they also involved redirections of income and resources, altering the normal flow of income in the circular flow. Most government budgets went into deficit as tax inflows fell relative to the expenditure required to support the economy.

Overall, the pandemic disrupted the circular flow of income by reducing production, causing job losses and lower incomes, decreasing consumer spending, disrupting supply chains, and necessitating government interventions. These disruptions created significant challenges for businesses, households, and governments. Their effects are still being felt in many parts of the world.

In other words, when savings equals investment.

That is,

$$\mathbf{S = I}$$

Figure 6.3 introduced the government sector into the circular flow model. Government expenditure on current and capital items is financed by taxation. For equilibrium in the government sector, the level of taxation must equal the level of government spending. That is,

$$\mathbf{T = G}$$

The open economy circular flow model was shown in figure 6.4. For equilibrium in the overseas sector, the leakage (spending on imports) must equal the injection (revenue from exports). That is,

$$\mathbf{M = X}$$

For equilibrium in the full circular flow model (i.e. the whole economy) the sum of the withdrawals ($S + T + M$) from the money flow must equal the sum of the injections ($I + G + X$) into the flow. That is

$$S + T + M = I + G + X$$

Changes in leakages or injections

While the circular flow model demonstrates that an economy will always be moving towards equilibrium, for most of the time the actual level of income will be in '**disequilibrium**'. For this reason, economists are more interested in studying what causes disequilibrium and how it affects the levels of production, income and spending in the economy.

First, we will focus on the simple model of the circular flow with the single leakage of saving and the single injection of investment. There is no reason why the savings plans of households should match the investment plans of firms. They are independent decisions made by different groups, for different reasons! Household saving is influenced by the need for financial security and to finance future consumption. Household savings is the difference between a household's disposable income and its consumption. Firms invest to buy capital equipment which will be used to make goods and services. Firms may invest to expand their business, to take advantage of new innovations and improved technology, or in the expectation that economic conditions will be buoyant in the future.

If the savings plans of households don't match the investment plans of firms, the circular flow of income will be in equilibrium, and the level of income in the economy will change. If the flow of savings exceeds investment ($S > I$), the flow of income in the economy will **contract**, as leakages exceed injections. Total spending will be less than output, so unsold stocks of good held by firms (known as **inventories**) will increase. When inventories rise, firms will decrease production and reduce the amount of resources they employ. This means that households will receive less income, and therefore consumption and savings will decrease. This pattern will continue in subsequent periods until savings again equals investment, at a lower level of total income.

The term 'inventories' refers to stocks of unsold goods.

If firms plan to invest more than households plan to save, on the other hand, there will be an **expansionary** effect on the circular flow. Total expenditure will exceed current output causing inventory levels to fall. Firms will react by increasing production and employing more resources. The level of economic activity will expand and this will result in an increase in household income and consumption. At the same time, the level of saving will also rise towards the point where the total level of savings will equal the total level of investment. Once savings again equal investment, then the level of income will be stable - it will be back in equilibrium.

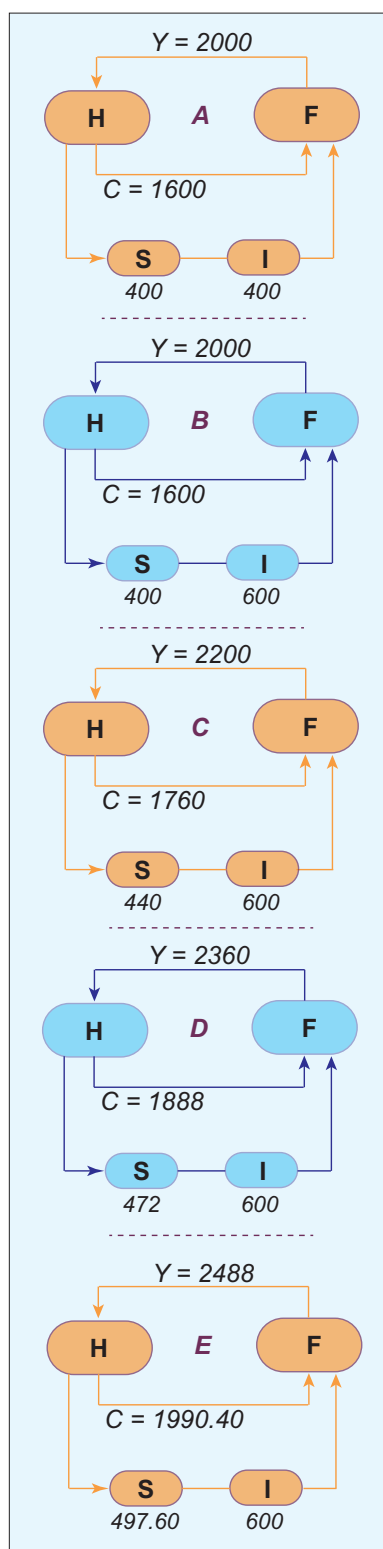


Figure 6.5 The equilibrium process

We should explore the changes in savings and investment in some detail as they cause fluctuations in the level of macroeconomic activity – the level of expenditure, quantity of output produced, and amount of income earned.

The sequence of three sector circular flow diagrams in figure 6.5 (households, firms and the capital market only) helps us understand what happens when there are changes in one of the leakages or injections.

In time period A, \$2000 of goods and services have been produced by firms, creating \$2000 worth of income for households. Assume that households spend \$1600 on consumption, and save \$400. In other words, they spend 80 per cent of their income, and save 20 per cent.

$$\text{As } Y = C + S$$

$$\text{so } 2000 = 1600 + 400$$

In equilibrium, that \$400 savings leakage is injected back into the firms sector as expenditure on capital items ($I = 400$). The three sector economy is in equilibrium because $S = I$, and all income has been spent. Both conditions for equilibrium have been met.

Households and firms save and invest for different reasons. Households save for financial security, to build wealth and to purchase things such as holidays, furniture and cars. Businesses invest to produce goods and services which they expect can be sold profitably in the future. As they have different motives, there is little reason why planned household savings should match planned business investment. When the savings and investment plans of households and firms are different, levels of expenditure, output and income in the whole economy will change, and the equilibrium level of income will also change.

Panels B through E in figure 6.5 illustrate what happens as a result of these changes. Imagine that firms have growing confidence in the economy and expect that sales will rise, so they increase total investment from \$400 to \$600 (see panel B).

The circular flow is now out of equilibrium, because total expenditure ($C + I$) exceeds current levels of output and income (Y). The new investment expenditure expands the output of the firms sector in the next time period, so the level of income earned in the next period (panel C) will rise by the amount of the initial investment – from \$2000 to \$2200.

If households maintain the consumption and saving proportions we assumed earlier (i.e. they spend 80 per cent of income, and save 20 per cent), then consumption in panel C rises to \$1760 (an increase of \$160), and saving to \$440 (an increase of \$40). This is not the end of the adjustment process. The higher levels of consumption expenditure creates extra demand for goods and services – firms produce more output to meet demand, and employ more factors of production. Thus income will rise. In panel D, income and output increase to \$2360 to match total expenditure of \$1760 (consumption in period 3) plus \$600 (investment in period 3). In the following period (panel E), income increases to \$2488 – comprising \$1888 of consumption and \$600 of investment. Notice that in each period the level of savings is rising.

When will this adjustment process end? Can we determine the new equilibrium level of income from the initial increase in investment? Remember that our condition for equilibrium is that savings must equal investment. This means that savings must increase to \$600 to match the new level of investment. We need to use a little bit of mathematics! If savings equals 20 per cent of income (0.2), then the new equilibrium level of income will equal $\$600 \div 0.2 = \3000 . This means that the flow of income will increase all the way up to \$3000 where the new level of savings (\$600) will match the level of investment. Consumption will have risen to \$2400. Note that it has taken some time for the rising level of income to flow through the system to restore the $S = I$ equality.

Once equilibrium is established the flow of income is stable. But if either firms change their investment plans, or if households change their saving behaviour, then the level of income will change because $S \neq I$. We have just analysed the adjustment process when investment exceeded savings ($I > S$). Figure 6.5 showed the progressive increase in income, consumption and savings caused by an initial rise in investment. What if households planned to save a higher proportion of income. This would result in $S > I$. Now the level of income and output in the economy would contract.

An excess of savings over investment means that less goods and services will be purchased by households. Firms will decrease their current production as they notice their inventories of unsold goods rising. They might reduce the hours of their staff, or perhaps lay off some employees. This means the aggregate level of income in the economy will fall and cause consumption to fall in the next time period (as will savings). The new equilibrium will be at a lower level of income. Note that equilibrium in the capital market does not necessarily imply that all resources are fully employed.

Similarly, should there be an inequality between the taxation leakage and the government expenditure injection, the level of output and income in the economy will either rise or fall. If $T > G$, the amount of money withdrawn from the circular flow exceeds the expenditure injection, so the level of income in the future will be expected to fall. If $G > T$, on the other hand, the level of output and income in the economy can be expected to rise.

The same logic applies to an inequality between imports and exports, the level of output and income in the economy will either rise or fall. If $M > X$, the amount of money withdrawn from the circular flow exceeds the funds injected from export sales, so the level of income can be expected to fall. If $X > M$, on the other hand, the level of income can be expected to rise because injections from exports increase the size of the circular flow of income.

From the aggregate perspective (the five-sector model), the sum of the parts is more important than the individual sectors. Macroeconomic equilibrium occurs when total leakages match total injections. That is, $S + T + M = I + G + X$.

If $S + T + M > I + G + X$, then aggregate withdrawals are greater than injections, and output and income will fall. If $I + G + X > S + T + M$, then aggregate injections exceed withdrawals, and therefore income and output will rise. Of course, imports could exceed exports if the shortfall was made up by extra government spending or investment.

Check your understanding

The following table shows the planned changes to injections into and leakages from the circular flow of income for one year.

Other things remaining the same, these changes would cause

- A. consumer expenditure to decrease.*
- B. national income to increase.*
- C. unemployment to increase.*
- D. savings to decrease.*

Exports	\$190 bn
Government expenditure	\$290 bn
Imports	\$200 bn
Investment	\$340 bn
Savings	\$260 bn
Taxation	\$320 bn

Answer: First compare the total value of injections with the total value of leakages. The sum of injections = \$190bn + \$290bn + \$340bn = \$820bn. The sum of leakages = \$200bn + \$260bn + \$320bn = \$780bn.

Since injections > leakages, then the level of income will increase - alternative B is correct.

Gross Domestic Product (GDP)

Millions of economic transactions take place every day in the Australian economy. Households receive income from various sources, which they spend on food, clothing, transport, communication, leisure, and other goods and services. Businesses produce and sell goods and services. Governments purchase goods and services and employ thousands of people. Australians trade goods and services with other countries. The circular flow model depicts the economy as a constantly circulating flow of goods, services, and money. Statisticians and economists have developed national income accounting systems to measure these flows. In Australia, these are called the **National Accounts**. The Australian Bureau of Statistics (ABS) publish these accounts every quarter and they provide a detailed analysis of all the different types of transactions that are associated with the circular flow of income.

The most frequently used measure of economic performance is the **Gross Domestic Product (GDP)** – defined as the total market value of all final goods and services produced in an economy during a period of time (usually a year). A key part of the definition of GDP is the term ‘final’ goods and services. If we attempted to add up the value of all goods and services produced within the economy we would make the mistake of including **intermediate** goods. These are goods used in making the final good or service.

To avoid ‘double counting’ the value of intermediate goods is excluded from GDP

There are three ways in which the level of GDP could be measured:

- the **income approach**, in which all incomes received are added
- the **expenditure approach**, which involves the addition of all spending on final goods and services and
- the **production approach**, in which the value of all final goods and services produced is calculated.

Each method will produce same value. We will use the expenditure approach because it relates closely to the circular flow of income model, and to the way the Australian Bureau of Statistics (ABS) reports the national accounts .

GDP – The expenditure approach

Measuring GDP using the expenditure approach involves measuring the total expenditure on final goods and services produced by the four major sectors of the economy:

- household spending on goods and services – consumption (C)
- private investment spending by firms (I)
- government spending (G) and
- net exports (overseas spending on Australian exports, minus Australian domestic spending on imports from overseas).

Figure 6.6 The categories of GDP expenditure

Category		Description
Consumption	C	a. expenditure on non-durable goods – food, clothing. b. expenditure on services – plumbers, doctors, accountants, recreation. c. expenditure on consumer durables – appliances, furniture, motor vehicles.
Investment	I	Business expenditure on new capital equipment which will produce final goods and services in the future - machines, factories, trucks, tools etc. Also includes expenditure on new building and housing.
Government	G	G1. current expenditure associated with the day-to-day functions of government. G2. capital expenditure to provide for infrastructure such as schools, roads, power, communications.
Net Exports	X – M	The value of goods and services sold to overseas, minus the value of goods and services bought from overseas.

The expenditure approach can be expressed in an equation

$$\text{GDP} = C + I + G + (X - M)$$

where C = consumption expenditure; I = investment expenditure;

G = government expenditure; X = exports; and M = imports.

A summary of each component of GDP expenditure appears in figure 6.6. Describing aggregate expenditure patterns, and seeking explanations for why they change, enables us to explain the current performance of the economy.

The nature and size of the expenditure aggregates

Australia's GDP in 2022-23 amounted to \$2,230 billion (\$2.23 trillion). The largest component of GDP is **consumption** expenditure, which comprises approximately 52 per cent of the total (\$1,151 billion). As shown in figure 6.6, personal consumption expenditure has three categories:

- expenditure on non-durable goods;
- expenditure on durable goods; and
- expenditure on services.

Non-durable goods are those that are consumed quickly after purchase (strictly, according to the National Accounts, this could be up to three years). In the main, non-durable consumption refers to spending on food, clothing and transport. Non-durable consumption accounts for about 30 per cent of total consumption.

Durable goods are those that can be expected to last (provide satisfaction to the

buyer) for three or more years, such as major appliances (washing machines, fridges, dishwashers); consumer electronics (TVs, computers, sound systems) and small appliances such as kettles, coffee machines and toasters. Spending on durable goods accounts for about 10 per cent of consumption spending, and is usually regarded as **discretionary** spending, because households can bring forward or delay purchases according to their level of confidence in the economy, income, employment status and willingness to use credit.

Services are intangible items such as education, health, recreation, and utilities (such as power and water). In today's economy, spending on services actually makes up the largest component of consumption, accounting for about 60 per cent of the total.

Private investment is a significant component of aggregate expenditure. In 2022–2023, private investment amounted to around 18 per cent of Gross Domestic Product. Investment spending by private firms (gross private investment) includes:

- fixed investment (privately funded expenditure on the equipment and structures used in production);
- residential fixed investment (private expenditure on new housing); and
- changes in business inventories (stocks of goods that have been produced but not yet sold).

Private investment is the most volatile component of aggregate spending. Over the last 50 years, private sector investment has accounted for between 16 per cent and 23 per cent of Australia's aggregate expenditure or GDP.

Government spending includes all federal, state and local government expenditure on final goods and services, and investment in capital equipment and infrastructure. The federal government is responsible for the majority of this expenditure. Government expenditure normally accounts for around 25 per cent of GDP. However, in recent years this figure has been much higher due to the impact of the Covid pandemic causing a significant rise in government spending. If government spending exceeds taxation, then the government records a budget deficit ($G > T$) which will have an expansionary effect on the level of income. If government taxation exceeds expenditure, then the government records a budget surplus ($T > G$) which will have a contractionary effect on the level of income.

Net exports (exports - imports) are the final element of aggregate expenditure. Over time, net exports have accounted for between -4 and +4 per cent of GDP. If net exports are positive then Australia records a trade surplus (exports > imports). If net exports are negative, then Australia records a trade deficit (exports < imports). A trade surplus increases real GDP and represents a net injection into the circular flow of income. A trade deficit decreases real GDP and represents a net leakage from the circular flow of income. Australia has recorded a trade surplus every year from 2017 - 2023.

Figure 6.7 The size of GDP categories 2022-2023

Consumption as a proportion of GDP fell during the Covid period - it usually makes up approximately 54 per cent. Government spending is normally around 25 per cent of GDP but increased during this period, as governments spent money to stabilise the economy.

GDP components, 2022-2023		
Category	Value (\$m)	% of GDP
Household consumption	1,151,140	52
Private investment	394,479	18
Government spending	620,198	28
Net exports	61,641	3
(Statistical discrepancy)	2,368	
GDP	2,229,827	100

Chain volume measures, percentages rounded to whole numbers.
Source: ABS 5206.0 Table 36. September 2023.

The determinants of aggregate expenditure

Whilst economists are interested in the size of the spending flows described above, they are more concerned with how much they vary from year to year, and why they vary. Hence, we need to explore the factors that influence each component of aggregate expenditure.

Factors affecting consumption expenditure

Aggregate consumption spending includes household spending on day-to-day items such as food and clothing, services such as health and education (non-durable items) and household equipment such as major appliances, furniture and electrical equipment (durables). The main determinant of aggregate consumption levels is the level of **disposable income**. This is actual income received by households after tax, the medicare levy and superannuation contributions are subtracted. Consumption is a positive function of disposable income, which means that as income rises, so does consumption.

Because many households use credit (borrowed funds) to fund purchases of consumer durables, the **cost of credit** (interest rates) will influence consumption patterns. Lower interest rates, for example, tend to have a positive effect on aggregate consumption, for two reasons:

- interest repayments fall, taking a smaller slice of household disposable income, and
- the **opportunity cost** of expenditure on consumer items falls. Households with surplus funds can choose to spend or to save those funds. Saving is less attractive when interest rates are falling, as savers

receive a lower return on their funds. Borrowing is more attractive, however. Rising interest rates, on the other hand, may lead to postponement of consumption, because repayments rise. Households choosing to spend would also forego a higher return available from lending surplus funds to financial institutions (saving).

The current **stock of household wealth** plays an important role in determining aggregate consumption. Households that hold property or shares tend to 'feel' more wealthy when the value of those assets are rising, and are thus more likely to spend on consumer durables. This is known as the 'wealth effect'. On the other hand, declining share values or property prices may result in households reducing their discretionary spending.

Consumer expectations play a very important role in determining the willingness of households to spend. Expectations are the positive or negative feelings that people hold about the future state of the economy. They are influenced by recent economic trends such as the level of unemployment and the availability of jobs; government policy decisions; changes in interest rates and 'economic news'. Changing expectations probably don't have much effect on expenditure on basic commodities like food, clothing and transport, but they are likely to affect discretionary spending on items such as holidays and durable goods like electrical items, furniture and motor vehicles.

Government policies also affect aggregate consumption. The government's power to raise revenue through taxes, then spend that money, affects households' disposable income. The Reserve Bank of Australia (RBA) conducts its monetary policy by influencing interest rates which affects the cost and availability of credit.

Other influences on aggregate consumption include changes in demographic and institutional characteristics – such as the aging population and intergenerational change. For example, 'Gen Y and Gen Z' Australians have different attitudes to home and car ownership than earlier generations. We are also witnessing a rise in the circular economy – moving from a 'take, make and dispose' pattern of consumption to a more sustainable 'reduce, re-use and recycle' model. Climate change is affecting consumer preferences in many ways, examples being the rapid uptake of rooftop solar power systems and hybrid/electric vehicles.

Factors affecting investment expenditure

Investment is expenditure on producer or capital goods that are used to produce final goods and services in the future. As such, investment is very important for the future health of the economy. Private investment is the most volatile element of aggregate expenditure, swinging between 16 and 23 per cent of GDP over the last 50 years. It is important to remember that investment decisions concern the future. As the future is unknown, it involves **risk**. Many factors influence risk, including economic events; political decisions; international events; and changes in consumer tastes.

Financial risk is broadly categorised as the chance an outcome will differ from the expected outcome.

We should note here that technological progress is embodied in new capital items, so investment in more efficient equipment often lowers production costs and increases **productivity**. A key driver of investment decisions is the current **profitability** of the business sector. This is because many firms retain a portion of their profits for expansion – to build premises or purchase equipment and machinery. When sales and profits are low, firms have less reserves to spend on new equipment, machinery and buildings.

Investment spending often requires borrowed funds. Hence, the **rate of interest** charged on those funds is a major influence on investment decisions. Interest rates and the level of investment expenditure are negatively related. Thus higher interest rates tend to reduce investment spending because:

- interest rates represent the price of borrowed money – when interest rates are high, so too are repayments for equipment purchased with borrowed funds.
- interest rates also represent the **opportunity cost** of money. Firms have the choice of using money capital for investment, or for some alternative purpose. The opportunity cost of investment increases when interest rates are high. For example, if the interest rates on borrowed funds for small business were 8 per cent p.a., the desired rate of return on capital equipment (the ‘hurdle rate’) must be at least 8 per cent before a manager would consider investment to be a wise decision.

A distinction between nominal and real rates of interest should be made here. **Nominal rates** are the headline price of borrowed money (i.e. the stated or advertised interest rate on a deposit or loan). The **real rate of interest**, however, takes the rate of inflation into account. If nominal rates of interest are 8 per cent, and inflation is 4 per cent, then the real rate of interest is 4 per cent (8% minus 4%). Real rates of interest are a greater influence on business decisions than nominal rates. A key determinant of investment is **business expectations**. Managers collect information which helps them form their view of the future, such as inquiries from buyers, sales levels, and current economic events in their industry. If expectations about future sales and profit levels are positive, it is likely that investment will increase. On the other hand, a downturn in the level of business confidence would see a reduction in planned investment. Business expectations also affect decisions about short-term production levels and employment plans.

Government policies influence investment directly and indirectly. Fiscal and monetary policies affect investment levels because they affect business costs (e.g. taxation), the cost of credit, and because they influence the general level of economic activity. Sometimes, government policy can have a direct impact on investment. It would be appropriate, for instance, for the government to offer incentives for businesses to invest (such as subsidies, taxation allowances, overseas trade promotion) in a period of slow economic activity, or to encourage new initiatives to cut greenhouse gas emissions and reduce climate change.

Factors affecting government expenditure

Government spending is divided into current expenditure and capital expenditure. Current expenditure is spending by the government on the purchase of goods and services across sectors such as defence, education and health. In 2023, government current expenditure was \$504 billion - this represented 81 per cent of total government spending. This type of spending tends to be fairly stable from year to year since programs in the various government departments have ongoing funding requirements, including salaries and operating costs. Over time, as the population grows and ages, then we would expect government spending on most of its services, especially healthcare would rise.

Government capital expenditure refers to government spending on investment goods such infrastructure and defence equipment. In 2023 this amounted to \$116 billion (19 per cent of the total). Capital expenditure is greatly influenced by the priorities of the elected government. For example in the past the government invested directly in public utilities such as power, water supply, roads and communications infrastructure. Today, many of these services are carried out by private firms, or as public-private partnerships. National security has recently become an important bi-partisan government objective. This has meant that the government has committed billions of dollars to modernising Australia's security network and upgrading its fleet of submarines and combat aircraft.

Factors affecting net exports

Exports and imports can be quite volatile components of aggregate expenditure, particularly in Australia which, as a **small open economy**, is subject to abrupt changes in global economic activity. Australia's main export category is primary commodities, including agricultural and mining goods. The prices of agricultural exports, such as wheat, wool and beef can rise and fall due to the vagaries of seasons. Producing a 'bumper crop' requires good weather, but a bumper crop does not guarantee a good economic return. A good season for Australian wheat or barley growers, for example, could mean that world supply increases and market prices fall! Australia's resource exports, such as iron ore and coal, are affected by the business cycles of the world's major economies. For example, an increase in China's economic growth will increase the global prices of Australia's mineral exports and increase their value. The changes in the prices of both our exports and imports has a significant effect on the value of net exports and is measured by an index called the terms of trade.

Domestic levels of economic activity influence Australians' propensity to import. Traditionally, Australian imports are **elastic** with respect to GDP - if GDP rises by 2 per cent, then it is likely that imports will rise by a larger amount. This has much to do with the small size of Australia's economy. In periods of high economic activity, consumers import goods which cannot be sourced from local manufacturers, and businesses purchase capital equipment that might not be produced domestically.

To encourage investment, Australian businesses can currently claim an immediate tax deduction for the cost of an asset in the year the asset is first used (Australian Tax Office).

Figure 6.8 The determinants of aggregate expenditure

Factors influencing aggregate consumption expenditure (C)	<ul style="list-style-type: none"> - disposable income (Y_d) - interest rates (r) - expectations 	<ul style="list-style-type: none"> - household confidence - stock of wealth (property, shares) - government policy.
Factors influencing aggregate investment expenditure (I)	<ul style="list-style-type: none"> - business expectations - interest rates (r) - business confidence 	<ul style="list-style-type: none"> - level of past profits (π) - government policies (e.g. taxation)
Factors influencing government expenditure (G)	<ul style="list-style-type: none"> - determined in accordance with government policy objectives e.g. social welfare, health, education, full employment, economic growth, income redistribution. 	
Factors influencing net exports (X - M)	<ul style="list-style-type: none"> - domestic business cycle - overseas business cycle - exchange rates 	<ul style="list-style-type: none"> - commodity prices - terms of trade.

The **exchange rate** is an important influence on net exports. When the Australian dollar (AUD) increases in value (appreciates), the price of imports become cheaper for Australian buyers, but makes our exports more expensive in overseas markets. Similarly, if the AUD falls in value against other currencies (depreciates) exports become more competitive in overseas markets, but imports become more expensive for Australian buyers.

Figure 6.8 summarises the factors that affect each of the components of aggregate expenditure. Understanding why each of these components of expenditure can change helps to unlock the secrets of the business cycle, which is the subject of chapter eight.

Review Quiz

- 1. Distinguish between durable and non-durable consumption.**
- 2. Explain the impact of an increase in interest rates on (a) durable consumption; (b) non-durable consumption; (c) private investment.**
- 3. Explain how 'expectations' influence consumption and investment spending.**
- 4. Describe three factors affecting net exports.**

7



Economic Growth

Learning Objectives

In this chapter you will learn about:

- *the concept and measurement of economic growth*
- *the distinction between nominal Gross Domestic Product (GDP), real GDP, and real GDP per capita*
- *GDP as a measure of economic welfare*
- *the demonstration of economic growth using the Production Possibility Frontier (PPF) and Aggregate Production Function (APF)*
- *the determinants of economic growth*
- *the costs and benefits of economic growth*
- *the trends in economic growth in Australia over the last five years*

Macroeconomic objectives

Macroeconomics is the branch of economics that studies the performance of the economy as a whole. In modern developed economies, it is generally thought that people want to live in a stable economic environment that fosters economic growth, the creation of jobs, and improved living standards.

More specifically, the key macroeconomic objectives of modern economies are generally accepted as:

- sustainable economic growth;
- price stability;
- full employment; and
- a more equitable distribution of income.

Economic growth is defined as an increase in the productive capacity of the economy and is measured by calculating the change in the value of production over time. **Real gross domestic product (real GDP)** is the 'go to' statistic to capture the performance of the economy. An economy's growth rate is expressed as the annual percentage change in real GDP. For Australia, a desirable rate of GDP growth is in the region of three per cent per year. If growth is slower than this, the economy may not be able to fully employ its resources, especially labour, causing the unemployment rate to be higher than desirable. If growth is too rapid, on the other hand, inflationary pressure will build if total demand is growing faster than the capacity of the economy. High rates of growth could also make it difficult to ensure the sustainability of scarce resources. The use of the term **sustainable** recognises that economic growth has both benefits and costs, and that an appropriate rate of growth is one that improves the living standards of the current generation without reducing the living standards for future generations.

Price stability refers to low rates of **inflation**. Australia's inflation target is between 2 and 3 per cent per year. Achieving price stability is important because inflation adversely affects the spending power of households and firms; erodes international competitiveness; distorts the distribution of income; and influences the allocation of resources throughout the economy.

Full employment occurs when everyone who is willing and able to work can find paid employment. It would be unrealistic to expect a 'zero' rate of unemployment because there is always some frictional and structural unemployment (see chapter 10). The objective is to achieve a rate of **unemployment** consistent with the **natural rate of unemployment** – currently estimated to be around 4 per cent of the workforce.

Achieving an **equitable distribution of income** is also regarded as an important objective. In chapter 11, we outline some of the concepts used to measure the extent to which the distribution of income and wealth in our economy are

equitable (fair). Equity does not imply that everyone is as 'well off' as everyone else, but that all people have opportunities to participate in economic activity, and are able to achieve a decent **standard of living** (a material concept) and level of **welfare** (a more general concept of well-being or happiness of people).

The **economic problem** applies as much to national objectives as it does to personal, household or business goals – at any point in time, the nation has limited resources with which to meet its unlimited wants. Not all objectives can be achieved at once, so there are choices to be made and trade-offs to be considered. Growth and full employment tend to be compatible because both rely on expanding economic opportunities, but other objectives may bring about conflicts in policy making, a good example being the inflationary risks associated with trying to reduce unemployment. As a result, choices have to be made between alternative courses of action, and national economic objectives have to be prioritised. This will become more obvious as the chapters discussing economic performance unfold. Firstly, in this chapter, we discuss the most significant macroeconomic objective – sustainable economic growth.

Economic growth

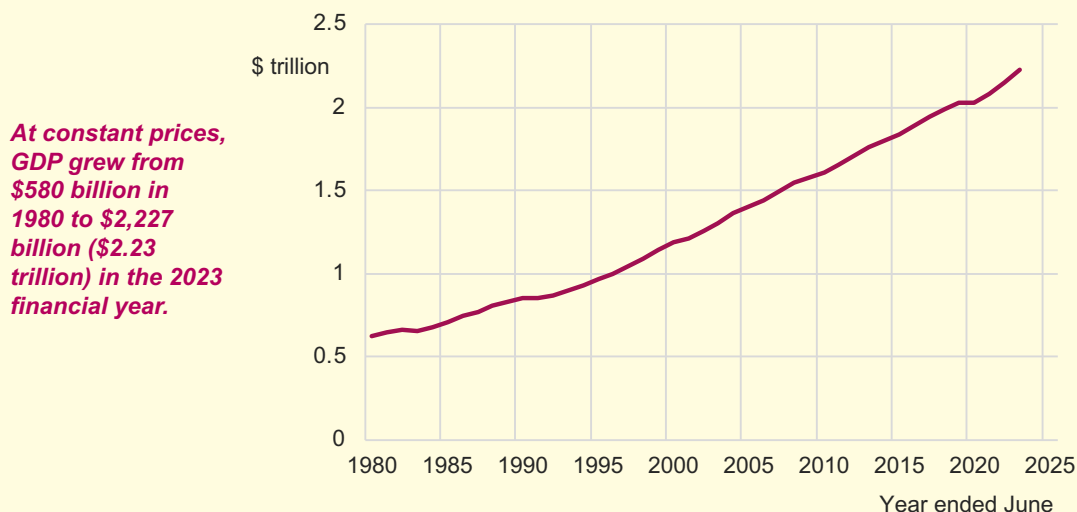
Economic growth is measured as an increase in the real output of goods and services produced in an economy. Economic growth usually implies higher living standards since greater production means that more wants can be satisfied. Economic growth also implies that the productive capacity of the economy has increased which means that future living standards should also improve. As long as the growth in real GDP exceeds population growth, then real GDP per person will increase.

Economic growth refers to an increase in the productive capacity of an economy.

Measuring economic growth

The most frequently used measure of a country's economic performance is **Gross Domestic Product (GDP)** – the total market value of all final goods and services produced in an economy during a given time period. Figure 7.1 describes the increase in Australia's real GDP over the period 1980 to 2023. At constant prices, GDP grew from \$617 billion in 1980 to \$2,230 billion (\$2.23 trillion) in 2023. This represents an annual average growth rate of around 3.1 per cent. The GDP graph exhibits an almost linear trend - a constant rise in the level of output. If you look carefully, you will notice brief periods when real GDP falls - in 1983, 1991 and more recently in 2020.

It is important to understand the distinction between **nominal GDP** and **real GDP**. Nominal GDP is the value of output expressed in the prices of the day (current prices). We don't use current price GDP data to measure growth, however. This is because any increase in GDP has two components – the change in output, and the change in the prices charged for that output - measured by the inflation rate.

Figure 7.1 Australia: Real GDP 1980 - 2023

If we used the current price GDP to measure growth, we would overstate the true growth rate (which is the growth in the economy's volume of production). In light of this, economists and statisticians convert nominal (current price) data into real (constant price) data to remove the impact of inflation price increases and measure the value of output produced.

An example will illustrate. In figure 7.2, a two-good 'economy' produced 50 dresses (each priced at \$40) and 30 pairs of trousers (each priced at \$60) in Year 1. The total value of output in Year 1 was thus \$3800 (the result obtained by calculating the total value of dresses and trousers produced).

In Year 2, dress production rose by 3 units, but dress prices stayed at \$40. Trouser production remained at Year 1 levels (30), but the price of trousers rose from \$60 to \$63. Thus the nominal GDP in Year 2 is \$4010 – the total value of production in current (Year 2) prices. Nominal growth is $\$4010 / \3800 – a 5.6 per cent increase! But how much of this is due to increased output, and how much to changing prices? Some of the apparent growth in the value of output would be the result of the \$3 increase in the price of trousers – from \$60 to \$63. So we recalculate the results using the original Year 1 prices.

Get the latest GDP data ...

The Australian Bureau of Statistics (ABS) updates GDP data every quarter. The release, titled 'Australian National Accounts: National Income, Expenditure and Product', can be found at the ABS home page (abs.gov.au).

Figure 7.2 Nominal (current price) and real (constant price) GDP

	Year 1 (base year)				Year 2				Year 3			
	Total value of production				Total value of production				Total value of production			
Item	P	Q	At current prices	At constant (Year 1) prices	P	Q	At current prices	At constant (Year 1) prices	P	Q	At current prices	At constant (Year 1) prices
Dresses	\$40	50	\$2000	\$2000	\$40	53	\$2120	\$2120	\$41	55	\$2255	\$2200
Trousers	\$60	30	\$1800	\$1800	\$63	30	\$1890	\$1800	\$64	32	\$2048	\$1920
P = price Q = quantity			Nominal GDP	Real GDP				Nominal GDP	Real GDP			
			\$3800	\$3800				\$4010	\$3920			
			Annual growth rate in nominal terms (current prices)				4010/3800 = 5.6%				4303/4010 = 7.3%	
			Annual growth rate in real terms (at year 1 prices)				3920/3800 = 3.2%				4120/3920 = 5.1%	

Percentages rounded to one decimal place

At constant prices, Year 2 output was \$3920 (53 dresses at \$40 each, plus 30 trousers at \$60). This is a 3.2 per cent real increase on Year 1. In Year 3, GDP at current prices is \$4303. Again, some of the increase is due to the prices of dresses having increased from \$40 to \$41, and trouser prices rising to \$64. If we assume the price increases had not occurred, real GDP is \$4120 (that is, in Year 1 prices). Note that we refer back to Year 1 prices as that is the base year (the year to which others are compared).

Having removed the effect of price increases, we can compare the ‘true’ value of output across the three years, and calculate the year-on-year rate of economic growth. Growth is 3.2 per cent in Year 2, then 5.1 per cent in Year 3. Adjusting the GDP data to account for the price changes has thus allowed us to measure the real increase in the value of production in this two-good economy. With millions of goods and services produced, the economy is obviously much more complicated than our simple two-good example. The important point is that we must use constant price data when calculating economic growth. Growth refers to increases in the value of output, not increases in the price of the output!

Calculating a rate of growth

As mentioned, figure 7.1 describes a slow, steady upward trend in real GDP. Economists are interested in the rate of change in real GDP from year-to-year (the **rate of economic growth**). To calculate the annual rate of increase, we can use either of the following methods:

Most data in this book is sourced from the Australian Bureau of Statistics (ABS), which uses the terms ‘chain volume measures’ where the dollar value of data has been adjusted to account for price changes, or ‘current prices’ otherwise .

$$\text{GDP \% change} = \frac{\text{GDP}_{(\text{year } 2)} - \text{GDP}_{(\text{year } 1)}}{\text{GDP}_{(\text{year } 1)}} \times 100$$

or

$$\text{GDP \% change} = \frac{\text{GDP}_{(\text{year } 2)}}{\text{GDP}_{(\text{year } 1)}} - 1 \times 100$$

ABS data showed that the GDP at June 2023 was \$2,229,827 million, up from \$2,156,824 million in June 2022. Substituting these figures into the second formula, we find the annual rate of growth is 3.4 per cent:

$$\text{GDP \% change} = \frac{2229827}{2156824} - 1 \times 100 = 1.034 - 1 = 0.034 \times 100 = \mathbf{3.4\%}$$

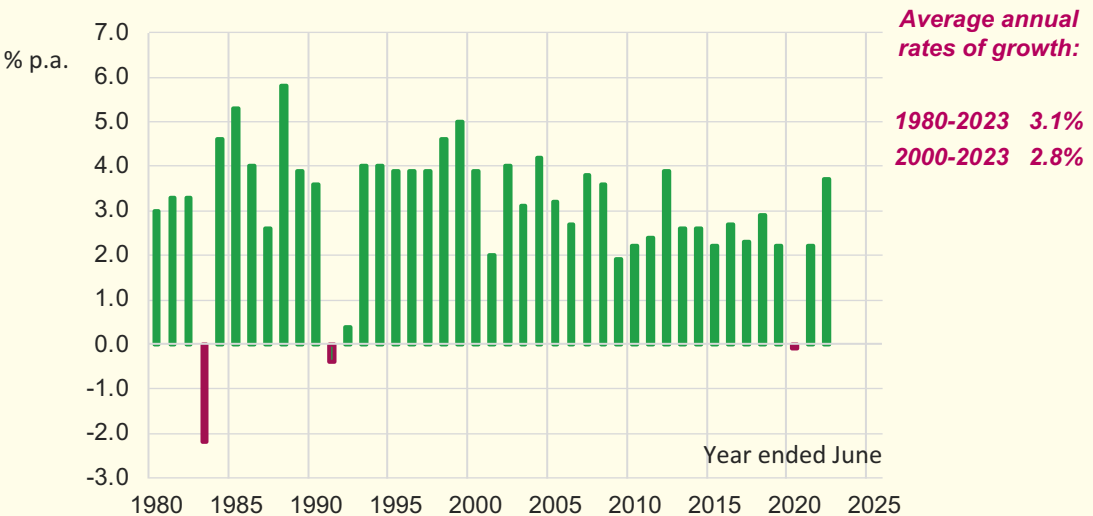
The ABS also releases quarterly GDP data for the September, December, March and June quarters (the September quarter being the period from June to September - the first quarter of a new financial year). Rates of change from one quarter to the next are compiled by substituting 'quarter' for 'year' in either formula. For example, the total value of goods and services produced in the June quarter of 2023 was \$560,335 million, up from \$558,349 in the March quarter. Substituting these figures into the second formula, we find the quarterly rate of growth is 0.4 per cent. In its September 2023 media release, the ABS noted that "annual growth remained above trend", but that growth for the June quarter had slowed.

Figure 7.3 is based on the same data as figure 7.1. The chart's columns show annual rates of change in real GDP (i.e. economic growth). The average rate of growth over the whole period is 3.1 per cent (although the average is slightly slower for the period 2000 to 2023). The highest annual rate over the period was 5.8 per cent in 1987-88; the lowest was minus 2.2 per cent in 1982-83. Over the whole period, growth was negative in just three years. Until the onset of the pandemic, Australia held a world record for the longest continuous record of economic growth - 29 consecutive years.

GDP per capita

Between 1980 and 2023, Australia's population grew from 14.6 million to 26.3 million. It is currently rising by about 500,000 people every year. Real GDP is also growing, but it has to be shared amongst more people! In figure 7.4, we divide

Figure 7.3 GDP growth rates (annual) 1980 - 2023



Source: ABS, Australian National Accounts
September 2023 Table 34.

real GDP by the population to determine **real GDP per capita**. The importance of real GDP per capita is that it is a measure of a country's living standard - it reflects the average value of income per person. As long as real GDP per capita increases over time, then average living standards will rise. Between 1980 and 2023, real GDP increased by .about 3.6 times while per capita real GDP doubled.

Figure 7.4 Australia: Real GDP per capita

Year	Real GDP (\$m)	Population (millions)	Real GDP (\$ per capita)
1980	617278	14.6	42272
1985	709607	15.7	45263
1990	860938	17.0	50833
1995	968072	17.9	54111
2000	1191868	18.9	63007
2005	1401974	20.0	69946
2010	1611911	21.9	73729
2015	1843293	23.6	77982
2020	2034914	25.5	79731
2023	2229827	26.3	84894

Source: ABS

Australia's real GDP increased by a factor of 3.6 over the period 1980 to 2023.

Accounting for population increase, the average person in 2023 was 2 times better off than the average person in 1980!

Review Quiz

1. Define the term 'economic growth'.
2. Distinguish between nominal and real GDP.
3. Write a formula to calculate the rate of growth in GDP over a one year period.
4. Australia's average rate of growth is around 3% per annum. Is growth in GDP per capita higher or lower than this ? Explain.

GDP as a measure of economic welfare

Essentially, there are two questions to be answered in this section: whether GDP does a good job as an accounting measure (measuring the total value of final goods and services produced over a period of time), and whether GDP provides any insight into 'quality of life' and economic welfare. Measuring GDP is a complicated accounting process. Each quarter, the Australian Bureau of Statistics (ABS) collects production, income and expenditure data from households, companies and government agencies. It follows international frameworks and quality assurance protocols to ensure the accuracy of what it calls 'The National Accounts'.

There are a couple of issues to be aware of when reading National Accounts data, and comparing results over time. Firstly, GDP only includes the value of goods and services that are exchanged for payment. Other activities such as housework; voluntary work; the work of charities and do-it-yourself activities also contribute to material welfare, but they are not exchanged for payment. The value of these **non-market** goods and services is not officially estimated. Hence GDP understates the 'true' value of production by omitting non-market activities.

Secondly, GDP data tends to understate changes in **utility** (an economic term that refers to the ability of a good or service to satisfy wants). Most goods and services produced today deliver better performance than equivalent products produced in the past. 'Smart' televisions can stream content from the Internet, so they provide a better service than a free-to-air broadcasts; cars are safer and more fuel efficient; and people can shop on line and have purchases delivered to their front door! GDP data records the dollar value of these items, but doesn't account for improved quality and usefulness (utility) over time. Indeed, the price of many types of goods has declined in real terms.

Similarly, GDP doesn't account for rising **productivity** (output per unit of input). Productivity has risen slowly over the years as knowledge and skills improve, and more capital equipment is used in production. Rising productivity has helped to

Utility is an abstract economic concept that refers to the usefulness or enjoyment a consumer can get from a service or good

deliver economic growth and some of the benefits it delivers, such as increased leisure time.

GDP data could also overstate growth. If GDP increases because more people worked overtime, or held two jobs, then we might question whether rising material welfare was worth the costs of achieving it? The national accounts don't report on the working conditions of people in offices, factories, farms and mines! Many fly-in fly-out workers find their rosters are hard on themselves and their families, despite the monetary benefits involved. Many other workers complain about long hours and their problems with 'work-life balance'.

Australia's multiple job-holding rate was 6.6 per cent in the March quarter, 2023 - a record one in fifteen people hold more than one job. (ABS)

Material welfare vs quality of life

There are three important questions that GDP as a measure of growth overlooks – is growth fair, is it 'green', and is it improving our lives? Many economists have warned that GDP is not necessarily a suitable measure of a country's economic progress, because people don't measure their well-being by material standards alone.

An appropriate rate of growth is now regarded as one that improves the living standards of the current generation without creating significant problems for future generations. **Sustainability** encompasses three main pillars: environmental, social, and economic. Environmental sustainability focuses on the conservation and protection of natural resources and ecosystems. Social sustainability involves a discussion of the distribution of the proceeds of growth between all individuals and communities (see chapter 11). Economic sustainability refers to developing a thriving economy that provides long-term prosperity and features ethical business practices, innovation and technological development, diversification, and efficient use of resources.

A number of countries have developed a 'dashboard' of indicators to describe a more complete picture of well-being. GDP is included, as the measure of market activity. Other parts of the dashboard introduce metrics (measures) for health, sustainability and other values that the people of a nation want to achieve, such as inequality, insecurity and other harms that they want to reduce. It cannot be assumed that people are better off just because incomes have grown and households have more spending power.

The Australian Treasury introduced its "Measuring What Matters" framework in 2023 (see box 7.1). A number of private institutions have also developed broader indicators of progress. These include the Measure of Economic Welfare; the Index of Sustainable Economic Welfare (ISEW); the Genuine Progress Indicator (GPI); and the Measure of Domestic Progress (MDP). The Organisation for Economic Co-operation and Development (OECD) has published several editions of its 'Measuring Wellbeing - How's Life' series since 2011, and notes that "people's well-being has improved in many respects, but progress has been slow or deteriorated in others". The OECD dashboard has 15 dimensions which include, for example,

Box 7.1 Measuring What Matters

Governments have increasingly recognised the value of broader measures of well-being. Countries such as Scotland, Wales, Canada, New Zealand and Germany have used well-being frameworks to raise the profile of non-economic outcomes and to improve policy making. In July 2023, the Australian Treasury released the first version of Australia's 'Measuring What Matters' framework.

The framework recognises that traditional economic indicators such as GDP and employment are a vital part of a measure in process, but don't constitute the whole story. The Measuring What Matters framework describes its five well-being themes as:

- **Health:** A society in which people feel well and are in good physical and mental health, can access services when they need, and have the information they require to take action to improve their health.
- **Security:** A society where people live peacefully, feel safe, have financial security and access to housing.
- **Sustainability:** A society that sustainably uses natural and financial resources, protects and repairs the

environment and builds resilience to combat challenges.

- **Cohesiveness:** A society that supports connections with family, friends and the community, values diversity, and promotes belonging and culture.
- **Prosperity:** A society that has a dynamic, strong economy, invests in people's skills and education, and provides broad opportunities for employment and well-paid, secure jobs.

Fifty key indicators were selected, in consultation with community groups, to monitor progress over time. The indicators were selected for having consistent, comparable and reliable data, and are aligned with indicators already captured elsewhere through existing strategies and plans. Current indicators are available on an online dashboard at the Treasury web site.

The indicators will be used to inform general directions for Government policy, and to understand the impacts of that policy. Discussion of each theme addressed in Measuring What Matters includes a number of policy directions called Key Government Initiatives, progress against which will be informed by the metrics used in key indicators.

Based on Commonwealth of Australia: Information and Budget Paper Statement 4 (2022-23 Budget)

income and wealth; health; environmental quality; subjective well-being; and social connections.

These perspectives on economic progress have their own conceptual and methodological problems. GDP may not be a 'perfect' measure of economic progress, but it does provide a consistent measure of output, income and spending over time. The point of establishing wider measures of growth and progress is to improve our economic awareness and inform public policy. In developed countries, happiness is often related to success in doing things of everyday life – making a living, raising a family, maintaining good health, and having a rewarding job. That suggests that public policy might be better to focus less on economic output, and instead target effective welfare, unemployment reduction and even minimum incomes!

Review Quiz

1. *List several reasons why GDP statistics may understate, or overstate, the 'true' size of the economy and its rate of growth.*
2. *Describe the meaning of the term 'sustainability' in relation to economic growth.*
3. *Give one example of an economic 'bad' that could be regarded as a type of market failure.*
4. *List three measures you would use to evaluate your own 'quality of living'. List three measures that your parents might use.*

Modelling economic growth

In this section, we present two models that help understand the economic growth process. These are the production possibility frontier (PPF) and the aggregate production function (APF). These models explain how economic growth results from an increase in the quantity of resources (natural, human and capital) and/or an improvement in the way they are used (the 'quality' of the resource or its **productivity**). For example, the development of a new lithium mine will increase the quantity of natural resources available for use. The productivity of workers at the mine site could increase if they were trained to use specialised equipment, or if managers improved mine processes. An economy's labour force will grow over time if population growth is positive, while better health care and education will improve the quality of the labour resource. An economy's stock of capital equipment increases over time as long as investment increases. Investment by both the private and government sector can lead to an increase in capital equipment such as machinery as well as an increase in the construction of new factories and buildings. The quality of capital can improve with the application of new technology.

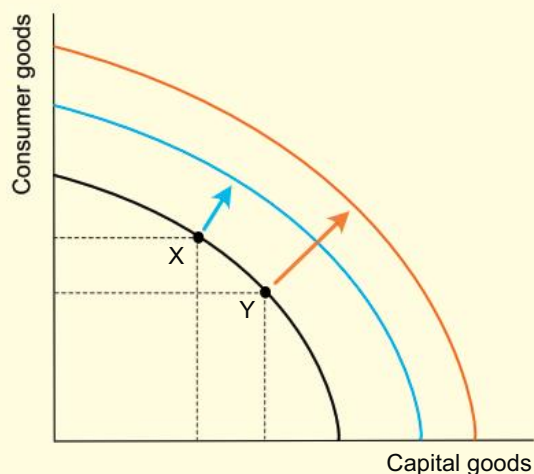
Growth and the PPF model

The **production possibility frontier** (PPF) model shows the combinations of output that an economy can produce using its available resources and level of technology for a given time period. The frontier shifts outwards when the quantity of resources increases and/or the quality of resources improves. It is important to note that the frontier shows the potential level of output when all resources are employed. If the economy produces at a point inside the frontier then this would mean that some unemployment exists and there would be a gap between actual output and potential output. A movement from a point inside the frontier to a point on the frontier represents an increase in output but it does not represent economic growth. Economic growth occurs when potential output increases.

Figure 7.5 The PPF and economic growth

The production possibility frontier shows the combinations of output that an economy can produce using its available resources. If resources increase, or they are used more efficiently the PPF will shift outwards.

An economy which chooses to produce more capital goods than consumer goods has a higher potential growth rate than an economy which prefers to allocate resources to consumer goods. Thus country Y's frontier will shift outwards more rapidly than country X.



The PPF model can also illustrate how a trade off between present and future consumption might influence the potential rate of growth. Investment is seen as the 'engine' of economic growth because it creates **capital goods** that are used to produce final goods in the future. Sacrificing some current consumption enables resources to be diverted to produce more capital goods. On the other hand, if available resources are used to produce consumer goods today, that will potentially mean less consumption for the future.

The trade-off is illustrated in figure 7.5. Think of X and Y as two countries with similar resources. Initially, they can produce any combination of consumption and capital goods on the black frontier. Country X allocates a greater proportion of its resources to consumption goods. Country Y, on the other hand, allocates a greater proportion of its resources to capital goods. This choice results in different rates of growth for the two economies. Country X's PPF shifts to the blue frontier while Country Y's PPF shifts further out to the orange frontier. A higher rate of investment will always lead to a higher rate of economic growth. Remember that economic growth is shown as a shift of an economy's PPF to the right. The important conclusion is that choices made today can have a significant impact on future living standards.

Small differences in rates of growth can have a significant impact on future living standards. For example if an economy grows by 2 per cent per year, how long will it take for the level of GDP to double? There is a simple mathematical rule called the 'rule of 70' which provides the answer. Simply divide the number 70 by the annual growth rate. So $(70 \div 2)$ equals 35 years. If the growth rate was 3.5 per cent per year, then it would only take 20 years for the economy to double in size $(70 \div 3.5)$.

The Rule of 70 states that if the annual growth rate is $x\%$ the economy will double in size every $70 \div x$ years.

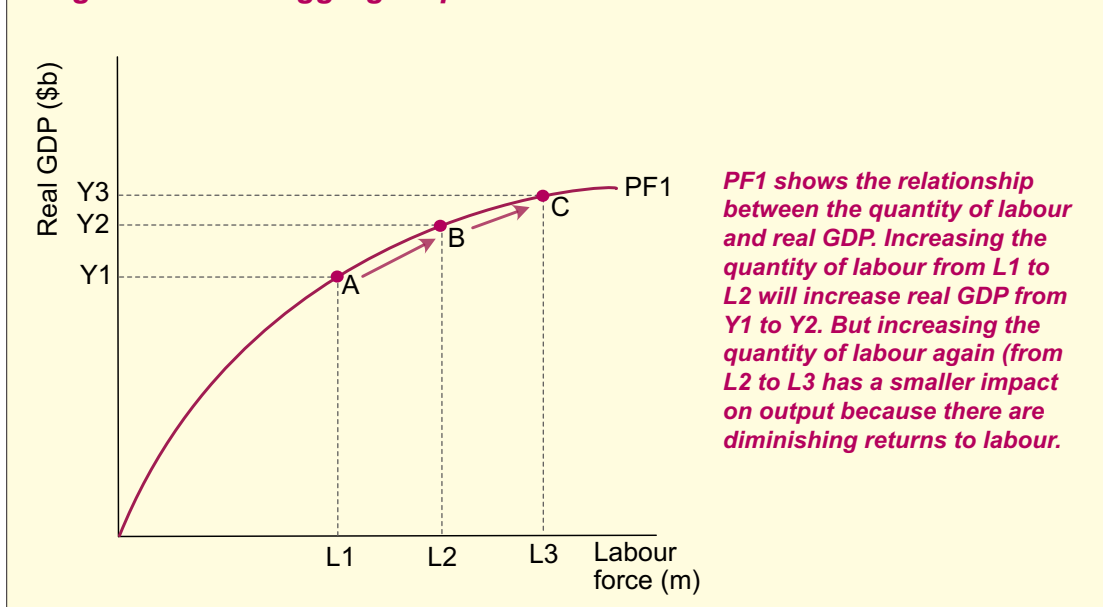
The aggregate production function model

All goods and services are produced by combining resources (natural, human and capital). At the firm level, production occurs when a firm employs labour and capital equipment to convert inputs (natural resources) into a final good or service. At the macro level (the whole economy), the **aggregate production function (APF)** model was developed to help explain the causes of economic growth.

In figure 7.6, the aggregate production function PF1 shows the relationship between two variables - the labour force and real GDP, holding other factors constant, such as the quantity of capital and the state of technology. The x-axis shows the size of the labour force, in millions of people, and the y-axis shows real GDP in billions of dollars. In 2023, 14 million people were employed in Australia while the level of real GDP produced was \$2,230 billion. This means that on average each worker produced around \$159,000 worth of goods and services. The aggregate production function shows a positive relationship between the quantity of labour and total production. This means that if the quantity of labour is increased then real GDP will increase - represented by a movement up along the along the APF.

Note that the APF is not a straight line - it is curved downwards - which means it rises at a decreasing rate. Why is this the case? The answer relates to an important economic principle known as the **Law of Diminishing Returns**, which holds that if more units of labour are used with a fixed amount of capital input, then output will rise, but at a decreasing rate. A firm-level example will illustrate. Imagine your local cafe employed just two workers. They would be very busy trying to do all the necessary tasks (food preparation, serving customers and cleaning).

Figure 7.6 The aggregate production function



Adding a third and fourth employee would increase output because each worker could specialise in a particular task – such as taking orders, making coffee, preparing food and washing dishes. But would output per worker rise? The law of diminishing returns implies that the increase in production would get smaller with the addition of each worker.

The APF model assumes that the diminishing returns principle applies at the ‘macro’ level as well. If the labour force increases from L1 to L2, real GDP will rise from Y1 to Y2 - the movement between points A and B. When the quantity of labour increases again from L2 to L3 (the same increase as L1 to L2), real GDP increases from Y2 to Y3. Notice that this is a smaller increase - this is the law of diminishing returns at work.

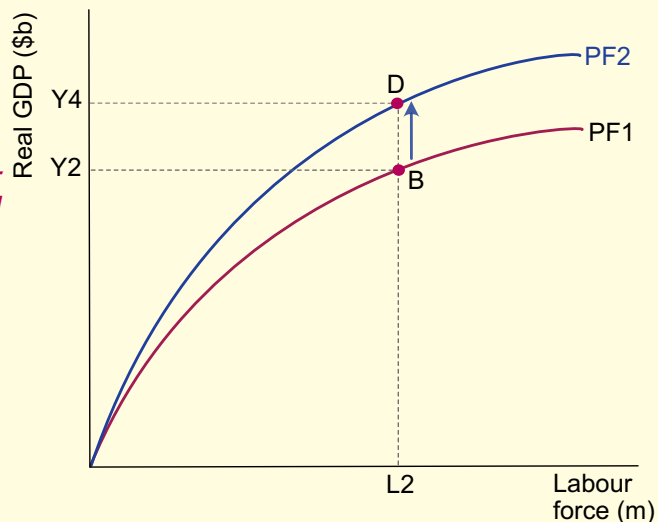
So far we have discussed the relationship between output and labour, assuming the quantity of capital and technology is fixed. In our cafe example, the capital inputs would be the coffee machine, a point-of-sale register, kitchen appliances, dishwasher and tables and chairs. If the cafe invests in a new larger espresso machine, then a barista will be able to produce more espressos per hour. Increasing the amount of capital per worker will always result in an increase in labour productivity.

Figure 7.7 shows the effect of either increasing the amount of capital equipment or improving the quality of the capital equipment that workers use on the aggregate production function. The result is that the APF will shift upwards from PF1 to PF2. This means that the amount that each worker can produce has increased. In figure 7.7, L2 workers can now produce a much higher level of real GDP - Y4.

Figure 7.7 An increase in the APF

A given production function is associated with a fixed quantity of capital. If the quantity of capital is increased, then the production function will shift upwards. This means that output per worker (labour productivity) will rise. L2 workers will be able to produce Y4 instead of Y2.

The production function will also shift upwards if the quality of labour, through education, or the quality of capital, through technology, improves.



The PF2 function shows that capital equipment increases output at every level of labour input because it increases the productivity of labour – an upward shift of the entire production function. The increase in the capital stock has enabled workers to be more productive – the **productivity** of labour increases because it has more capital equipment available to use in production.

Remember that a given production function is drawn assuming that the level of technology is fixed. So if we now allow technology to improve over time, then we will see an improvement in the quality of capital inputs. For example, computers and mobile phones have become faster and more powerful enabling workers to complete more tasks per unit of time. The important point is that technology can be a powerful factor in boosting labour productivity and shifting the APF upwards. The quality of labour can also improve over time and shift the APF as education and training improve the skills and knowledge of workers.

There are other ways to bring about an upward shift of the APF, as suggested by the following examples:

- workers undergo training and development to improve their skills;
- managers and business owners think about ways to bring innovations (improved or new products, production processes) to their business to increase efficiency.
- the capital equipment people use at work is gradually improved as technology improves;
- people become more educated; and/or
- community health programs improve health outcomes

Each of these changes would increase efficiency and the amount of output that a worker could produce in a period of time.

Review Quiz

1. *What does a production possibility frontier illustrate?*
2. *As more resources are available over time, what happens to the PPF?*
3. *Why is growth more likely to result from producing more capital goods?*
4. *What is an aggregate production function?*
5. *Explain why the APF does not have a constant slope.*
6. *Use the APF model to explain the effect of an increase in the capital stock on output.*

The determinants of economic growth

We need to distinguish between potential and actual economic growth. The determinants of potential growth are those that increase the capacity of the economy to produce more goods and services with available resources. Actual growth at any point in time is determined by how much household, firm and government spending is taking place to consume those goods and services. What determines a country's potential growth? Simply put, potential growth is determined by the quantity or economic resources it has available, and the 'quality' of those resources – their efficiency or productivity.

One source of growth could be exploring for, and developing, more resources! This was the basis of Australia's growth in the mid-late 1800s, when there were gold booms in Victoria, NSW and WA, and rapid growth in agriculture and pastoral industries to meet demand from Britain (especially for wool). Mineral and energy resources have also been important contributors to economic growth in recent times, examples being the iron ore boom that saw state growth rates up to 8 per cent in Queensland and WA in the early 2010s. Finding new mineral deposits obviously increases the quantity of those resources that can be used in production. There has, for example, been a boom in lithium and copper exploration to cater for expected demand as the economy electrifies.

In advanced economies, however, human and capital resources are the key drivers of growth. We use a 'three Ps' framework (population, participation and productivity) to provide more detail about their role in driving potential growth.

Population growth

Australia's current population should reach 27 million people by 2025. The annual average population growth rate has been just short of 1.4 per cent over the past 40 years. Forty per cent of that is due to **natural increase** (the excess of births over deaths in the resident population). Natural increase averaged 145,000 people per annum over the decade to December 2022. Sixty per cent of Australia's population increase in recent years is due to **migration**. Over the decade to December 2022, net overseas migration (immigration less emigration) averaged 220,000 people each year (ABS), although migration virtually stopped for two years due to travel restrictions associated with the pandemic. Population growth contributes to economic growth because:

- increased population means greater demand for goods and services and the productive factors used to make them (including labour);
- population growth increases the size of the labour force. Migration has a more immediate impact than natural increase, as most migrants are of working age, and often qualified for migration by virtue of their occupational skills or intention to start a business; and

- population growth through migration promotes growth because it involves the transfer of wealth, knowledge and skills from overseas; slows the aging of the population; and has a positive fiscal impact, as working migrants pay taxes.

In other words, population growth by increasing the labour force will shift the PPF outwards and cause a movement up along the APF. Population growth also has the potential to shift the APF upwards if it is due to an increase in skilled migration since it would increase the stock of human capital.

Participation

The **participation rate** is the proportion of people over 15 years old who are in paid work, or actively looking for work. A high rate of labour force participation is regarded as crucial to Australia's economic growth in the future because it makes more use of the available stock of human resources. In July, 2023, the participation rate was 67.0 per cent (up from 63.5 per cent in 2000).

Since 1980, workforce participation of men between 25 and 54 years of age has fallen from 95 per cent to 90 percent. On the other hand, participation by males aged 65 plus has risen from 12 per cent to 20 per cent, possibly due to changing social attitudes about older workers, the less physical nature of the employment, and greater availability of part-time work. The female participation rate has risen for all age groups over the same period – most significantly in the 25-64 year age group, where it rose from 52 per cent to 76 per cent. Higher participation by women has occurred in all occupations, but especially those in the service sector. Rising female participation reflects a number of trends, such as:

- lower barriers to female participation in work;
- changing attitudes to work and family, with men being increasingly likely to work part-time and contribute to domestic tasks;
- increasing equality of workplace opportunities; and
- two-incomes can better meet a family's cost of living challenges.

What is the relationship between workforce participation and economic growth? Overall, greater participation means a higher proportion of people are producing goods and services and earning an income which they can spend to satisfy their needs and wants. The rising participation of women has increased household financial security and contributes to higher levels of aggregate demand. Increased participation by older males increases the level of experience and 'tacit knowledge' in the workforce. In other words, participation pushes the PPF outwards.

Productivity

For economists, **productivity** is the efficiency with which firms, organisations, industries, and the economy as a whole, convert factor inputs (labour, capital, and raw materials) into output. Productivity grows when output grows faster

than inputs, meaning that the existing inputs are more 'productively efficient'. To illustrate, think about consumer banking. Years ago, bank customers would deal face-to-face with a 'teller' at a local branch, often keeping paper records in a 'passbook'. Later, computerised machines such as ATMs enabled out-of-hours banking; the Internet enabled on-line banking; then smartphones ushered in mobile banking. Branches may have closed and banks have fewer employees, but the value and volume of transactions has increased many times over.

It is difficult to separate the causes of improved productivity. The output per worker in the bank sector (**labour productivity**) has increased dramatically. **Capital productivity** (the value of output divided by the value of all capital equipment inputs) has risen as banking business models changed and technology became more specialised. The bank sector has also benefited from other changes not captured as easily by measures of labour or capital, such as improved general education (more students completing Year 12, for example), more social infrastructure and greater industry competitiveness. These are all sources of **multifactor productivity (MFP)** – a term that captures all of the other factors that improve workers' ability to produce goods and services, apart from the capital equipment they use.

When attempting to measure productivity over the whole economy the range of different outputs need to be added together. The Australian Bureau of Statistics (ABS) calculates productivity using a measure of output called 'gross value added' (GVA), which is the value of the output produced by a firm minus the intermediate inputs used (materials, services and energy used in production). Two main inputs are usually measured:

- labour: typically measured as hours worked by employed people.
- capital services: measured as the flow of services coming from the capital stock. The capital stock includes all of the buildings, machinery and equipment, livestock and planted area used to produce goods and services. It also includes some intangible assets, such as software, research and development and mineral exploration.

Labour productivity is generally used as the measure of overall productivity, acknowledging that labour productivity is itself driven by improved capital equipment and MFP.

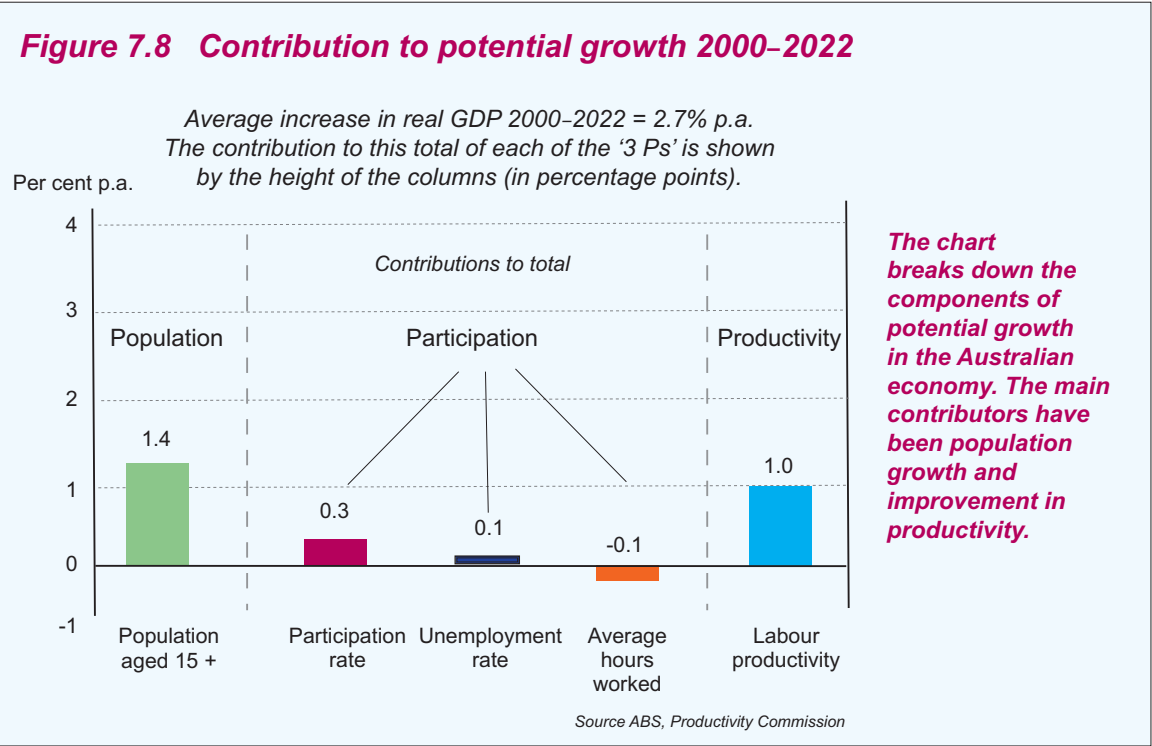
Productivity results vary from year to year. According to the Productivity Commission, labour productivity increased by 1.4 per cent in 2021-22 (compared to a five year average of 1.1 % per cent), and multifactor productivity rose by 2.2 percent (five year average 0.8 percent). Much of Australia's recent economic growth was due to the recovery from the pandemic and higher utilisation of labour and capital. Interestingly, productivity in agriculture leapt in 2021-2022 due to the impact of good weather on the value of output.

Productivity improvements flow through to improved material living standards in several ways:

- goods and services become cheaper (or prices rise at a slower rate) because there are fewer hours of labour needed to produce them;
- because it is based on improved productive techniques and capital deepening (a higher stock of capital per worker), higher productivity is likely to improve the quality of products produced;
- the search for greater efficiency at firm level is likely to lead to process and product innovation which results in new and improved products; and
- rising productivity enables wage rises for workers, meaning higher aggregate spending.

Contributions to growth

Figure 7.8 illustrates the contribution each of these growth drivers (the ‘three Ps’) has made to real GDP in Australia between 2000 and 2022. Over the period, the average real GDP growth was 2.7 per cent per annum. According to the ABS, nearly half of this (1.4 percentage points) was due to an increase in the size of the working age population. The participation rate itself rose by an average 0.16 per cent per annum, but ‘participation in work’ is adjusted upwards to 0.3 percentage points to account for higher employment with a fall in average hours



worked over the period. Over the period, the average increase in productivity accounted for one percentage point of actual growth.

Note that the analysis has centered on the potential rate of economic growth (the 'supply side'). As will be discussed in the next chapter, the actual rate of economic growth in any year depends on the 'demand side' – the willingness of households to buy the goods and services produced. When the economy enjoys a boom, for example, economic growth is above trend because the total level of spending is higher than average. The highest rate of economic growth between 2000 and 2023 was just over 4 per cent in 2003–2004. Output, income and spending rise in a boom and the economy is closer to its capacity. If output, income and spending are below trend, however (an economic downturn), actual economic growth rates will come in below potential. The lowest rate of economic growth in the period 2000–2023 was –0.1 per cent in 2019–20, reflecting the impact of the Covid-19 pandemic on economic activity. The pandemic has had a lasting impact on economic growth, despite the recovery since late 2022.

Review Quiz

1. ***Name the 'three Ps' that drive the potential rate of economic growth.***
2. ***Why would migration contribute more to economic growth in the short term (3-5 years) than natural population increase?***
3. ***Suggest three reasons why the workforce participation rate has risen in Australia.***
4. ***Define the terms 'capital deepening' and 'labour productivity'.***
5. ***Why are actual economic growth and potential growth different things?***

The benefits and costs of economic growth

Like all economic events, growth has both benefits and costs for individuals and groups in our community. Over time, economic growth increases material welfare throughout the economy. Rising real incomes mean people are able to purchase more goods and services and satisfy more wants and needs. As previously described, the average Australian today is about 2 times better off in real GDP per capita terms than the average person in 1980.

Because economic growth is associated with higher incomes and greater production of final goods and services, it stands to reason that there will also be more demand for the factors of production (natural, human and capital resources) used to produce them. As a result, economic growth is associated with greater business and employment opportunities, because individuals and businesses

have an incentive to participate in growth. The demand for economic resources is called **derived demand** – it is based on the demand for the final goods and services that the resources will be used to produce.

Growth has a **fiscal dividend** because rising incomes bring higher taxation receipts for government, which in turn enables more spending on **social overhead capital** – infrastructure, health and education. Growth is associated with improvements in resource use efficiency because it tends to promote the acquisition of knowledge, skills, productivity and technological change. Each of these leads to improved resource use efficiency, and higher quality products.

The benefits of economic growth are not necessarily evenly spread amongst the population. On one measure of income inequality, the **Gini Coefficient**, the distribution of income in Australia is slightly more uneven now than it was in 1960. The share of total income going to the top one per cent of income earners was around 4.5 per cent in 1980, 3.5 per cent in 2000 and over 5 per cent in 2020 (Productivity Commission, 2021). Does this matter? Yes, because a number of society’s problems are associated with income and wealth inequality – health and life expectancy; educational attainment; crime; and social cohesion being a few. These are long term problems, the costs of which are borne by the whole community.

High rates of growth may put pressure on prices, especially if resources are fully employed and the economy is working near its capacity. Growth rates above 5 per cent in developed economies are associated with pressure on resource prices. Imagine you were a construction engineer in a booming economy with cranes all over the skyline – that would be a signal to you that your sector was enjoying good times, so you might think about asking your boss for a pay rise!

Figure 7.9 Benefits and costs of economic growth	
Benefits of economic growth	Costs of economic growth
Increasing real income and material welfare	It may not raise the living standards of everyone in the community at the same rate
Higher quality goods and services	It may bring inflationary pressure
More economic opportunities	It is associated with structural change in the economy
A taxation dividend to government	It is associated with economic ‘bads’, as well as ‘goods’
Increase in leisure time	It is associated with social problems

Although growth creates employment opportunities, it is also associated with **structural change** – changes in the distribution of output, income and employment over time. Structural change is a constant feature of modern economies, as illustrated by:

- the current change in electricity production and distribution systems – away from oil, gas and coal towards renewable sources such as solar and wind power;
- the shift from living in detached suburban houses to apartments and other forms of high density housing; and
- the decline of manufacturing and the rise of the knowledge economy.

These examples reflect changes in both the demand and supply sides of the economy – structural change happens when people want new types of goods and services, and when invention, innovation and technological change makes them possible. Change is also driven by businesses seeking to reduce costs of production.

As part of the structural change process, different sectors of the economy grow at different rates – resulting in reallocation of resources across economic sectors and geographical regions. This sometimes means there are ‘winners’ and ‘losers’ from change, examples being the shift of resources away from the oil, gas and coal sectors into renewable energy, and the shift of jobs from the manufacturing to emerging industries built on biological sciences, artificial intelligence and smart systems. In twenty years, perhaps forty per cent of students reading this book will have a job that has not yet been invented! You may need to retrain at some stage to pick up the skills required for your as-yet-unknown occupation.

Environmental problems are also associated with high rates of economic growth. Growth is measured in terms of the increasing value of output. But GDP does not account for **economic bads** such as climate change, pollution and resource depletion. Typically, such problems arise when the environment is treated like a **free good** and because of the **negative externalities** that arise when social costs or production or consumption exceed private costs. Although a wealthier society may show more interest in environmental matters, its past production and consumption patterns have been the major cause of environmental problems

This brings us back to the concept of **sustainable economic growth** – a rate of growth which can be maintained without creating other significant economic problems, especially for future generations. There is clearly a trade-off between rapid economic growth today, and growth in the future. Rapid growth today may exhaust resources and create environmental problems for future generations, including the depletion of oil and fish stocks, and global warming. The sustainability concept is wider than environmental sustainability. About ten per cent of the world’s population lives on less than \$2 per day. If those people are to share in future economic progress, they must have similar opportunities to those on offer

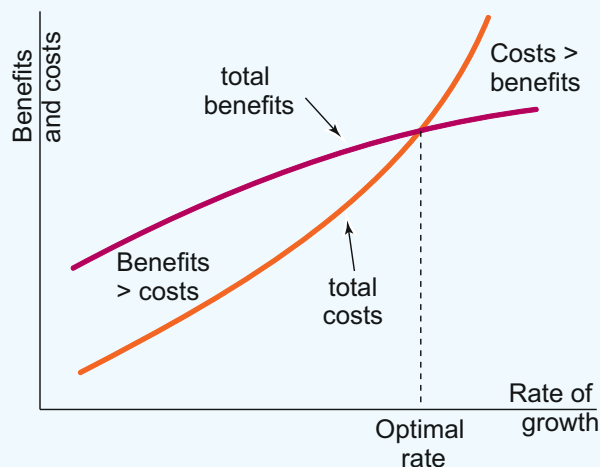
in Australia. The United Nations estimates that nearly 500 million new jobs are needed in the next 15 years to employ labour force entrants. Many workers are loosely attached to the labour force, often meaning their jobs are poorly paid. Economic sustainability in the future means that people should be able to find 'decent' jobs which fund their needs and support others in their community.

The higher levels of material welfare that we enjoy as a result of growth have been associated with **materialism** – where people measure their welfare by the number of material possessions they own, and believe that more money, a better job and higher status and more 'things' enhance their wellbeing. This is not necessarily the case. People may have more material possessions, but they do not of themselves satisfy deep or long term wants. Traditional societies valued collectivism and conformity, where rules and convention were important. By contrast, materialism breeds individualism and even the risk that the things we own end up owning us!

Similarly, high rates of economic growth are associated with social problems such as crime, stress-related diseases, suicide, loneliness and the weakening of the family unit. Perhaps these problems are, to some extent, associated with the pursuit of materialistic goals.

Economic growth is associated with a shift of people from rural to urban areas, because jobs shift from agriculture to manufacturing and services. This has led to a rural-urban divide, often described in Australia by the decline of rural towns and higher population in urban areas. Urban sprawl and congestion are amongst the problems facing Australia in the next twenty years. The issue is not whether economic growth should be an objective in our economy or not. Rather, the task is to suggest an appropriate rate of growth, in recognition of the fact that growth has both benefits and costs. If the community wants the benefits associated with

Figure 7.10 The optimal rate of growth



The model shows that the benefits of growth rise quite quickly at first, then level off as living standards rise. The costs of growth are initially low, but then increase because the opportunity cost of resources rises. The optimum rate of growth occurs at the intersection of the two lines. Up until this point, the community's standard of living still rises if the rate of growth increases.

economic growth, they have to be willing to bear the costs that growth brings. Figure 7.10 illustrates this 'optimal rate' concept. Initially, the total benefits of growth to an economy are much greater than the total costs of that growth. But the benefits of growth rise at a decreasing rate, and the costs of growth increase at an increasing rate.

The intersection of the two curves indicates an **optimal rate of growth**. Up until this point, the community's standard of living rises if the rate of growth increases. If the rate of economic growth exceeds the optimal rate, the costs of growth exceed the benefits. The problem in applying this model is the difficulty in quantifying the benefits and costs to which it refers. As a result, it is difficult to apply the principles of positive economics in deciding what an optimal rate of growth might be. There are many normative questions about what 'should' be.

Review Quiz

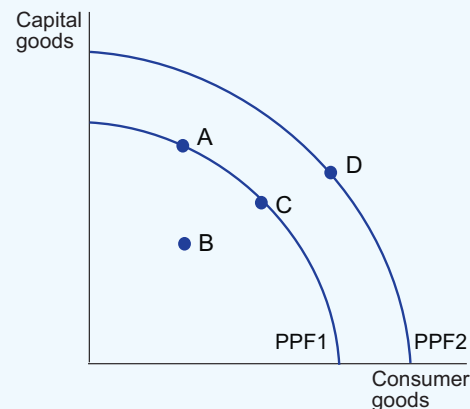
1. Explain three benefits associated with economic growth.
2. Explain three of the costs associated with economic growth
3. What does the phrase 'sustainable economic growth' mean?

Check your understanding

The diagram below shows two production possibility frontiers (PPF) for an economy. Which one of the following movements represents an economy that has experienced economic growth?

- A. A to B
- B. A to C
- C. B to C
- D. C to D

Answer: The movement from A to B would represent a contraction in the economy - real GDP has decreased and unemployment has increased. The movement from A to C represents an increase in the production of consumer goods production and a decrease in capital goods. The movement from B to C represents an increase in real GDP and a decrease in unemployment - but this is not economic growth because the frontier has not shifted. Alternative (D) is correct - the productive capacity of the economy has increased represented by an outward shift of the PPF.



8



The business cycle

Learning objectives

In this chapter, you will learn about

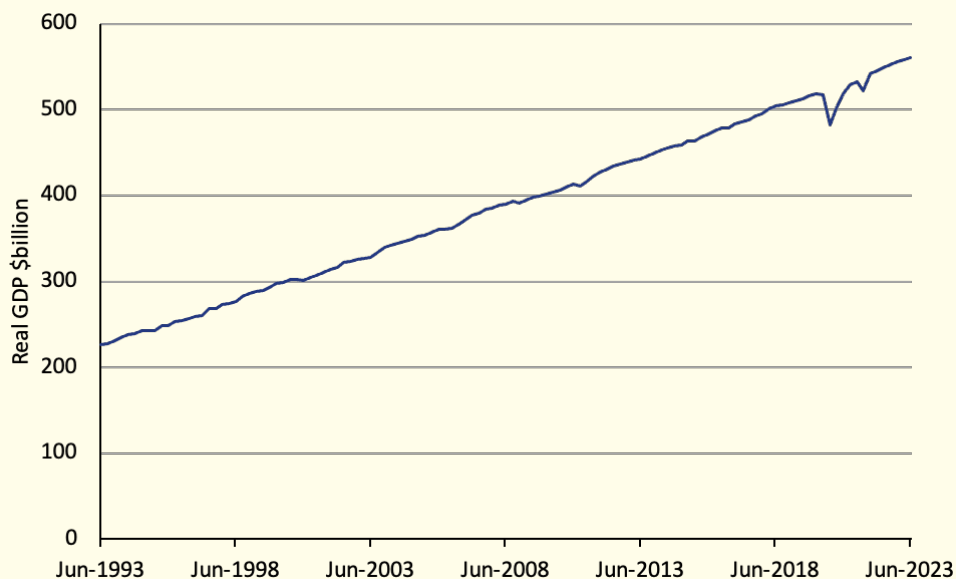
- *the concept of the business cycle*
- *the phases of the business cycle and the characteristics of each phase*
- *indicators of economic activity*
 - *leading indicators*
 - *coincident indicators*
 - *lagging indicators*
- *the impact of events on the business cycle in Australia over the last five years*

The business cycle

In 2020 the Australian economy experienced its first recession in 29 years! This was the result of the Covid pandemic - a global shock that caused significant falls in production and employment in every economy throughout the world. A **recession** is defined by economists as two successive falls in quarterly real gross domestic product (GDP). The previous time the Australian economy was in recession was back in 1991. Australia in fact holds the world record for the longest period of time without a recession - from 1991 to 2020. The subject matter of macroeconomics is concerned with understanding why the level of economic activity fluctuates over time.

The **business cycle** refers to the fluctuations in economic activity around a long term growth path. Economic activity can be measured in a number of ways including production, employment and national income. The main economic indicator that economists use to measure changes in economic activity is real gross domestic product (real GDP). Real GDP measures the value of final goods and services produced in the economy over a period of time. For example for the June quarter 2023, the value of Australia's real GDP was \$560 billion. For the whole 2022-23 financial year, Australia's real GDP was \$2,230 billion. Figure 8.1 shows the level of quarterly real GDP in Australia over the past 30 years. Increasing from \$227 billion in June 1993 to \$560 billion in June 2023. Notice how for most of the period the graph is relatively smooth and linear - showing a fairly constant upward trend.

Figure 8.1 The level of quarterly real GDP (\$ billion)

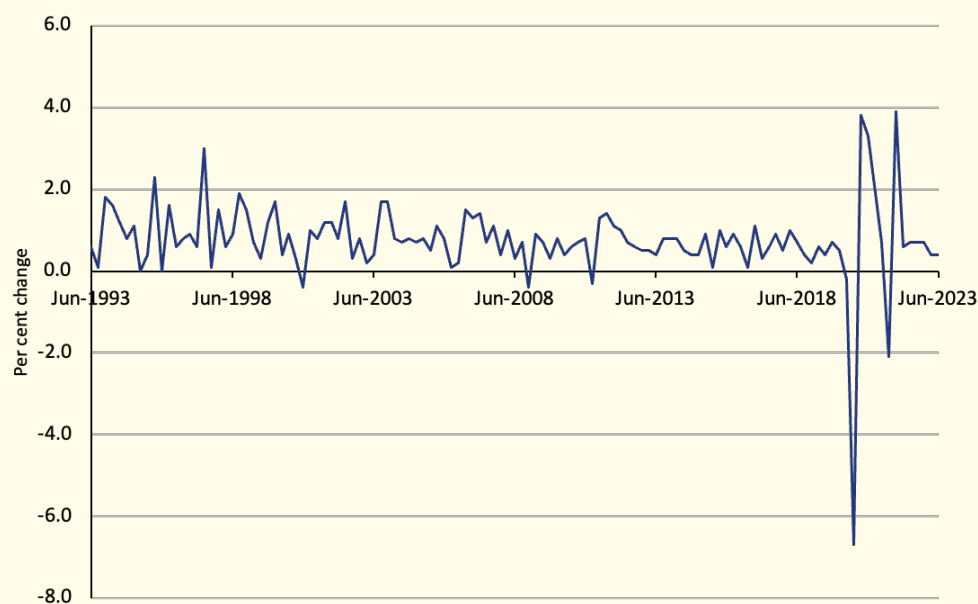


This means that real GDP tends to increase at a fairly constant rate from one year to the next. In fact from June 1993 to June 2023, the Australian economy grew each year at an average rate of around 3 per cent. Notice the two periods where the level of real GDP falls significantly - during 2020 and 2021. What happened in these years? The Covid pandemic caused the economy to shut down and disrupted the smooth linear trend. But in 2022 the economy recovered and bounced back to continue its upward growth path. The Covid pandemic is a good example of a large negative macroeconomic shock disrupting the normal growth trend.

Figure 8.2 shows the percentage growth rate of quarterly real GDP for Australia over the same 30 year period. Now the fluctuations in real GDP become more obvious - quarterly GDP does not change at a constant rate - it is quite volatile. This is especially evident in the period during the pandemic years of 2020-22. The 'normal' quarterly growth rate for Australia is around 0.7% - 0.8%. This equates to an annual growth rate of around 3% (four quarters in a year).

A country's **potential real GDP** is the level of GDP that can be produced when the economy is at full employment or full capacity. This occurs when the unemployment rate is close to 4 per cent - considered to be the 'natural rate' of unemployment. A country's potential GDP will normally grow over time at a steady rate. This is due to population growth; increases in the factors of production such as the labour force and capital stock; as well as improvements in the quality of resources, reflected by increases in productivity. Actual GDP however, can change in an unpredictable and irregular fashion - sometimes economic activity surges and at other times it slows and may even fall.

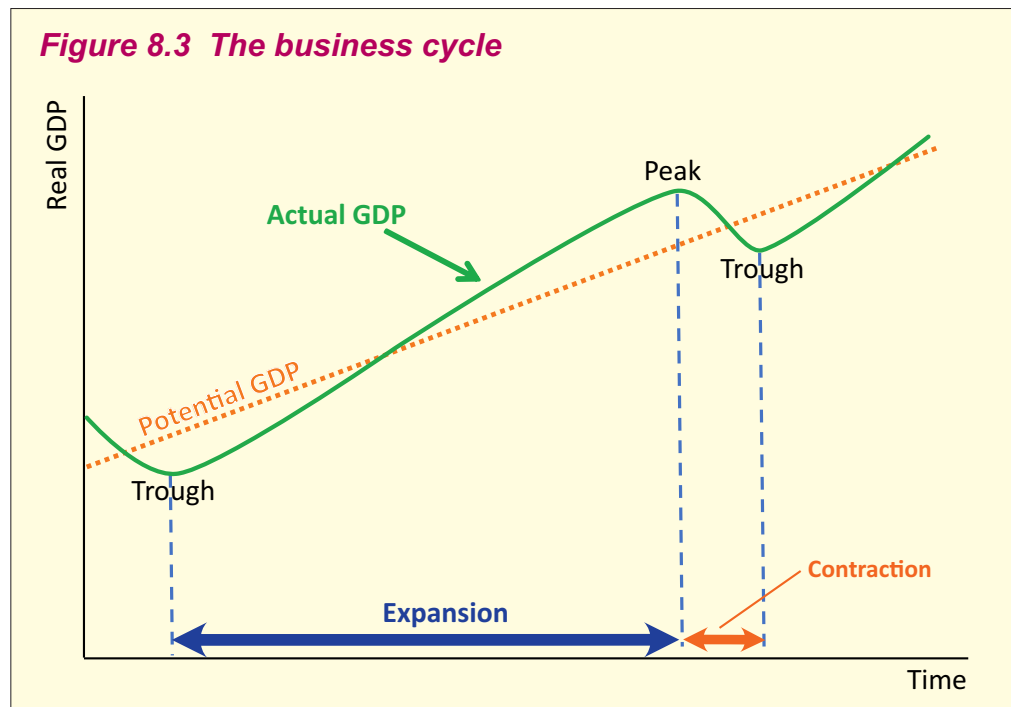
Figure 8.2 The growth rate of quarterly real GDP



This is because actual real GDP is affected by the many shocks that can hit the economy. These shocks may be positive - leading to a strong surge in economic activity - or negative, leading to a slowdown or contraction in economic activity. Figure 8.3 shows a 'stylised' model of the business cycle. Actual GDP fluctuates around a rising potential GDP. For the Australian economy, potential GDP increases at a relatively constant rate of 3 per cent per year. This reflects the annual growth in the labour force and in labour productivity. The concept of a 'business cycle' refers to the expansion and contraction in economic activity that occurs around this long term growth rate. Typically, the business cycle is described as having four **phases** through which an economy travels:

- **expansion**
- **peak** (upper turning point)
- **contraction** (recession)
- **trough** (lower turning point)

One business cycle is measured as the period of time between two troughs (or two peaks). If actual GDP is above potential GDP then the economy experiences a positive output gap and the unemployment rate will fall below 4 per cent - the natural rate of unemployment. If actual GDP falls below potential GDP then the economy experiences a negative output gap and the unemployment rate will rise above 4 per cent. Most of the time the economy will be in an expansion - this is because the economy's potential GDP naturally increases over time as the population grows and as technology improves.



Notice in the business cycle model that an expansion is typically much longer than a contraction. Expansions will usually last up to 10 years while contractions are relatively brief, lasting for one to two quarters.

So in summary we can measure the business cycle can be measured in two ways:

- (i) by measuring the change in the level of real GDP over time
- (ii) by measuring the growth rate of real GDP over time.

Figure 8.4 below shows these two measures for Australia from the past four years - from the June quarter 2019 to the June quarter 2023. Notice that an expansion can be shown by either an increase in the level of real GDP or by a positive growth rate. A contraction, on the other hand, can be shown as a fall in the level of real GDP or as a negative growth rate. Don't make the common mistake of thinking that a fall in the growth rate is a contraction. For example, between Dec 2022 and Mar 2023 the growth rate fell from 3.9% to 0.6%. But real GDP increased. As long as the growth rate is positive between two quarters, the level of real GDP will increase.

Figure 8.4 Australia's business cycle

Quarter	Real GDP \$million	Growth Rate %	Business Cycle Phase
Jun 2019	512265	0.4	Expansion
Sep 2019	515898	0.7	Expansion
Dec 2019	518640	0.5	Peak
Mar 2020	517562	-0.2	Contraction
Jun 2020	482814	-6.7	Recession/Trough
Sep 2020	501105	3.8	Expansion
Dec 2020	517892	3.3	Expansion
Mar 2021	528922	2.1	Expansion
Jun 2021	532500	0.7	Expansion
Sep 2021	521416	-2.1	Contraction
Dec 2021	541672	3.9	Expansion
Mar 2022	545026	0.6	Expansion
Jun 2022	548968	0.7	Expansion
Sep 2022	552670	0.7	Expansion
Dec 2022	556278	0.7	Expansion
Mar 2023	558349	0.4	Expansion
Jun 2023	560335	0.4	Expansion

The most common phase of the business cycle is an expansion. A peak occurs at the end of an expansion and prior to a recession. A trough is the end of a recession. Notice that real GDP fell in Sept 2021 but it was not a recession.

Calculating the GDP growth rate for June quarter, 2023	
Method 1	rate = $\frac{\text{GDP (Jun 2023)} - \text{GDP (Mar 2023)}}{\text{GDP (Mar 2023)}} \times 100$
	rate = $\frac{560.3 \text{ bn} - 558.3 \text{ bn}}{558.3 \text{ bn}} \times 100 = \mathbf{0.4\%}$
Method 2	rate = $\frac{\text{GDP (Jun 2023)}}{\text{GDP (Mar 2023)}} - 1 \times 100$
	rate = $\frac{560.3 \text{ bn}}{558.3 \text{ bn}} - 1 \times 100 = \mathbf{0.4\%}$

We can use the quarterly growth rates to determine the annual rate of growth. We simply add the four quarters in the financial year. For example, for 2021-22, the annual growth rate was equal to 3.1% (the sum of -2.1, 3.9, 0.6, 0.7). While for 2022-23, the annual growth rate was 2.2% (the sum of 0.7, 0.7, 0.4, 0.4).

Referring to the Australian business cycle data in figure 8.4, the economy:

- was in expansion from Jun 2019 to Dec 2019
- reached the peak or upper turning point in Dec 2019
- was in recession between Mar - June 2020
- reached the trough or lower turning point in Jun 2020
- was in expansion from Sep 2020 - Jun 2021
- contracted in Sep 2021
- was in expansion from Dec 2021 to Jun 2023

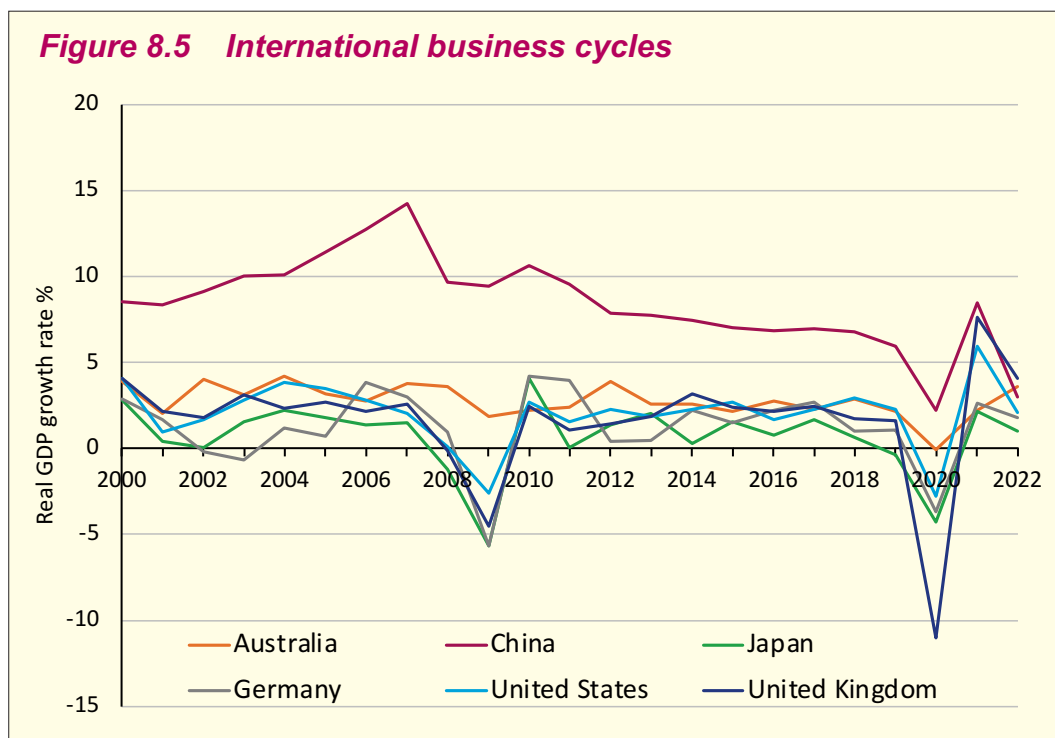
Notice how each time the economy falters, it quickly recovers back to its trend growth line - this is an important feature of the macroeconomy. It demonstrates the resilient nature of the economy to 'bounce back' after experiencing an economic shock.

All economies are subject to the cyclical fluctuations in economic activity and growth. This is especially true in an increasingly globalised and interconnected world. The impacts of events in one part of the world will quickly be transferred around the globe. In the decades prior to 2000 it was often said that if the US economy 'sneezed', Australia would catch a cold. This reflected the importance of the US economy to Australia as an important trading and financial partner. But for the past two decades the most important economy affecting Australia's business cycle is China. The new expression that captures this change is that if China sneezes, Australia will catch pneumonia! China has become Australia's most important export and import partner, dominating our trade flows.

Figure 8.5 illustrates the annual change in real GDP for six economies between 2000 and 2022 - Australia, China, the United States, Japan, Germany and the United Kingdom. Note the broad similarities between each economy's business cycle. This means that there is a close correlation between each country's business cycle - the rises and falls in the growth rates are closely linked. For example, four of the six economies suffered a recession during the global financial crisis (GFC) of 2009. China and Australia suffered a slowdown in economic activity but escaped a recession. All economies, other than China, experienced another recession in 2020 due to the Covid pandemic.

The main reason why business cycle correlation occurs is because most economies are subject to the same global shocks. For example, an increase in world oil prices will affect all economies and lead to a rise in cost inflation and a slowdown in economic growth. A shock in a major economy such as the United States or China will be quickly transferred to other economies that have strong trade or financial links. To help explain this correlation or synchronicity of business cycles, we can divide each country's business cycle into two main parts:

- (i) a global component - which captures the common movements in all countries business cycles and is particularly influenced by trade and foreign investment flows, and
- (ii) a country component - which captures the movements in the business cycle that are unique to the individual country, such as a drought or natural disaster.



Review Quiz

1. Define the term 'business cycle'.
2. What is potential real GDP?
3. Outline two factors that cause potential GDP to increase.
4. What is the 'normal' growth rate for Australia's potential GDP?
5. Which business cycle phase is longer - a contraction or an expansion?
6. Calculate the growth rate if real GDP increases from \$540bn in quarter 1 to \$554bn in quarter 2.

The phases of the business cycle

Expansion

The most common phase of the business cycle is an expansion. The beginning of an expansion occurs with the first of two consecutive quarters of real GDP growth. An expansion is a period during which real GDP increases. An expansion is the phase between a trough and the peak of the cycle. The initial part of the expansion, just after the trough, is often referred to as the **recovery** phase. Expansions are typically much longer than contractions. For example, the Australian economy was in an expansion phase from 1991 to 2020 - a period of 29 years! During an expansion economic activity increases - both production and employment rise. Consumption and investment both increase during an expansion resulting in rising real incomes and rising living standards. Expansions are typically associated with rising share prices and house prices. This would mean that household wealth would normally increase during an expansion.

Peak (boom)

The peak is the upper turning point of the business cycle. It marks the end of the expansion phase and the beginning of the contraction. At the peak or boom of the cycle the rate of economic growth would have started to slow. The reason for this is that at the peak the economy will be operating at full employment. This means that there is no more labour resources to expand production and therefore the growth rate will slow. There are many characteristics of a boom, such as high levels of consumption expenditure; very high levels of business and household confidence; and low levels of unemployment. In fact, the unemployment rate will fall below the natural rate, indicating a shortage of skilled labour. A peak is normally associated with high levels of demand inflation, as excess demand for goods and resources, especially labour, cause wages to rise which then feed into higher price levels. The Reserve Bank will increase short term interest rates in order to reduce the rate of inflation and slow the economy.

Contraction (recession)

The contraction phase is a period when the level of real GDP actually falls or the growth rate of real GDP is negative. Economists will often define a recession as two consecutive quarters of negative economic growth. This means that real GDP has fallen for 6 months or more. A key indicator of a recession is a sharp rise in the unemployment rate. A recession is normally short-lived usually lasting for less than a year. A deep or prolonged contraction lasting more than a year is called a **depression**. Contractions are usually associated with a sharp fall in business and/or consumer confidence. High interest rates during a boom phase may result in falls in both consumption and investment spending causing a decline in economic activity. Lower private spending translates into lower output and income. Many contractions are associated with a sharp decline in the share-market where lack of confidence may start a 'selloff'. The economy can also be hit by external shocks such as a drought or a contraction in the economy of a major trading partner. The Covid pandemic of 2020 provides an excellent example of a negative global shock. In 2020, the Covid pandemic provided an excellent example of a negative global shock which caused a massive disruption to the economy.

Trough

The trough is the lower turning point of the business cycle. It marks the end of the recession phase and the beginning of the expansion. A trough is characterised by low levels of spending and high levels of cyclical unemployment. The labour force participation rate is very low because people feel they have less chance of finding employment. Many businesses are in 'survival' mode. With low demand, prices may fall resulting in a period of deflation where the actual rate of inflation is negative.. Bankruptcies are likely to be high. Consumer and business confidence will be at record lows and savings levels may rise as households adjust their spending and borrowing behaviour. A trough is a turning point because at some stage, spending will begin to rise - firms will need to replace or update worn out capital equipment increasing business investment. During a trough, short term interest rates will be very low which may encourage both households and firms to begin borrowing on the expectation that conditions will improve. Government spending is usually high during a trough with increased welfare payments directed to boost both consumer and investment spending.

Check your understanding

The economy has gone into a recession. You have majored in economics and, because of the recession, have difficulty in finding a job. Should you go back to university and get a second major?

Answer: No, the recession will most likely be short-lived and you will be able to find employment during the recovery.

Indicators of macroeconomic activity

Macroeconomic indicators are economic variables that provide insight into the health of the economy. All economic agents from households, to businesses and the government are interested in the current and future state of the economy. Economic indicators are useful in that they can confirm trends in economic activity as well as predict future economic activity. Company managers want economic information to help them answer questions such as 'should I hire more staff' or 'should I invest in a new warehouse?' Households want to know about employment trends, price levels and interest rates. The government and policy makers are interested in trends in the labour market and household spending patterns. The term 'macroeconomic indicators' covers a very large field of data and information. Broad indicators such as GDP, inflation and unemployment give a general overview of the state of the economy. Partial indicators help to complete the picture by drilling down into different sectors of the economy.

Real GDP is considered the 'father' of all macroeconomic indicators because it is a summary statistic measuring the aggregate level of economic activity. Changes in real GDP will help confirm the position of the economy in the business - whether it is in an expansion phase or heading for a contraction. GDP data is released every quarter (3 months) by the Australian Bureau of Statistics (ABS). The average growth rate for the Australian economy is around 3 per cent per annum, so we would expect quarterly growth rates of around 0.7 to 0.8 per cent. Some economic variables move with real GDP and some move in the opposite direction. A variable that increases during an expansion and falls during a contraction is called a **procyclical** variable. Examples of these variables are consumer spending, investment, employment and household confidence. A variable that decreases during an expansion and increases during a contraction is called a **countercyclical** variable. Examples of these variables are unemployment, business failures and government welfare spending.

Economists also classify economic indicators by their timing relative to the business cycle. There are three main types:

- leading economic indicators
- coincident economic indicators
- lagging economic indicators

Leading indicators change before a direction becomes evident in the rest of the economy. For example a leading indicator will increase before the level of economic activity actually increases. They therefore predict trends in economic activity. Examples of leading indicators include building approvals; share prices; levels of inventory held by firms; new employment vacancies; levels of business confidence. Leading indicators tend to reflect the expectations of households and firms about the future of the economy.

Share prices are the most well-known and widely followed leading indicator. Why? Because share prices are based in part on what companies are expected to earn, so if share prices rise, the market is expecting the economy to improve and for business profits to increase. Building permits are another good example of a leading indicator. An increase in the number of building permits will mean that house construction will increase 6 to 12 months forward. The construction sector has strong multiplier effects on many retail sectors such as home furnishings. The importance of leading indicators is that they provide an early indication of significant turning points in the business cycle.

Coincident indicators are those that move in line with the level of economic activity - increasing when the level of economic activity rises and decreasing when the level of economic activity falls. In other words, coincident indicators change simultaneously with economic conditions. These indicators are used to identify the current state of the economy. Factory production, employment and retail sales are all excellent examples of coincident indicators. During an expansion, employment levels would increase causing both household income and consumption to rise all correlating with an increase in real GDP.

Lagging indicators are variables that change sometime after the level of economic activity changes. For example, the unemployment rate will increase after the level of economic activity declines. Similarly the inflation rate tends to rise after the level of economic activity increases. Unemployment and inflation are classic examples of lagging economic indicators. Changes in these variables are the result of changes in real GDP, not the cause. These variables change only after macroeconomic conditions have already changed. Lagging indicators are used to confirm economic trends that have already been predicted by leading indicators or shown by coincident indicators. The importance of lagging economic indicators is that they represent ‘the truth’ - they confirm where the economy has been.

Figure 8.6 Types of economic indicators		
Leading indicators	Coincident indicators	Lagging indicators
Share prices Building approvals Levels of stock (inventory) held by retail firms Manufacturers' new orders Business and consumer confidence Consumer expectations New employment vacancies New business startups	GDP Manufacturing output Sales of consumer durables Industrial production Retail sales Job advertisements Motor vehicle sales Saving ratio Household income	Unemployment rate Wages Inflation rate (CPI) Interest rates Consumer debt Business profits Bankruptcies

Where can information about economic indicators be found? Many institutions, both public and private, collect and publish economic data, including:

- The Australian Bureau of Statistics (ABS), which releases economic data on a daily basis.
- The Reserve Bank of Australia (RBA), which maintains economic and financial data, and publishes a Chart Pack which is updated monthly.
- Many of the major banks have economic departments that publish economic data.
- Industry bodies in retail, building and construction; real estate; mining and tourism sectors.

Figure 8.7 shows several examples of important economic indicators. Careful collection of economic data enables economists to understand current trends, and make forecasts about future conditions. The publication of this data is often delayed, however, because it takes time to collect and compile the statistics.

Check your understanding

1. Which one of the following combinations of economic indicators is most likely to occur in the expansion phase of the business cycle?

	<i>Growth of GDP</i>	<i>Inflation rate</i>	<i>Unemployment</i>	<i>Investment</i>
A.	<i>Decrease</i>	<i>Increase</i>	<i>Increase</i>	<i>Decrease</i>
B.	<i>Increase</i>	<i>Decrease</i>	<i>Decrease</i>	<i>Increase</i>
C.	<i>Increase</i>	<i>Increase</i>	<i>Decrease</i>	<i>Increase</i>
D.	<i>Increase</i>	<i>Decrease</i>	<i>Increase</i>	<i>Decrease</i>

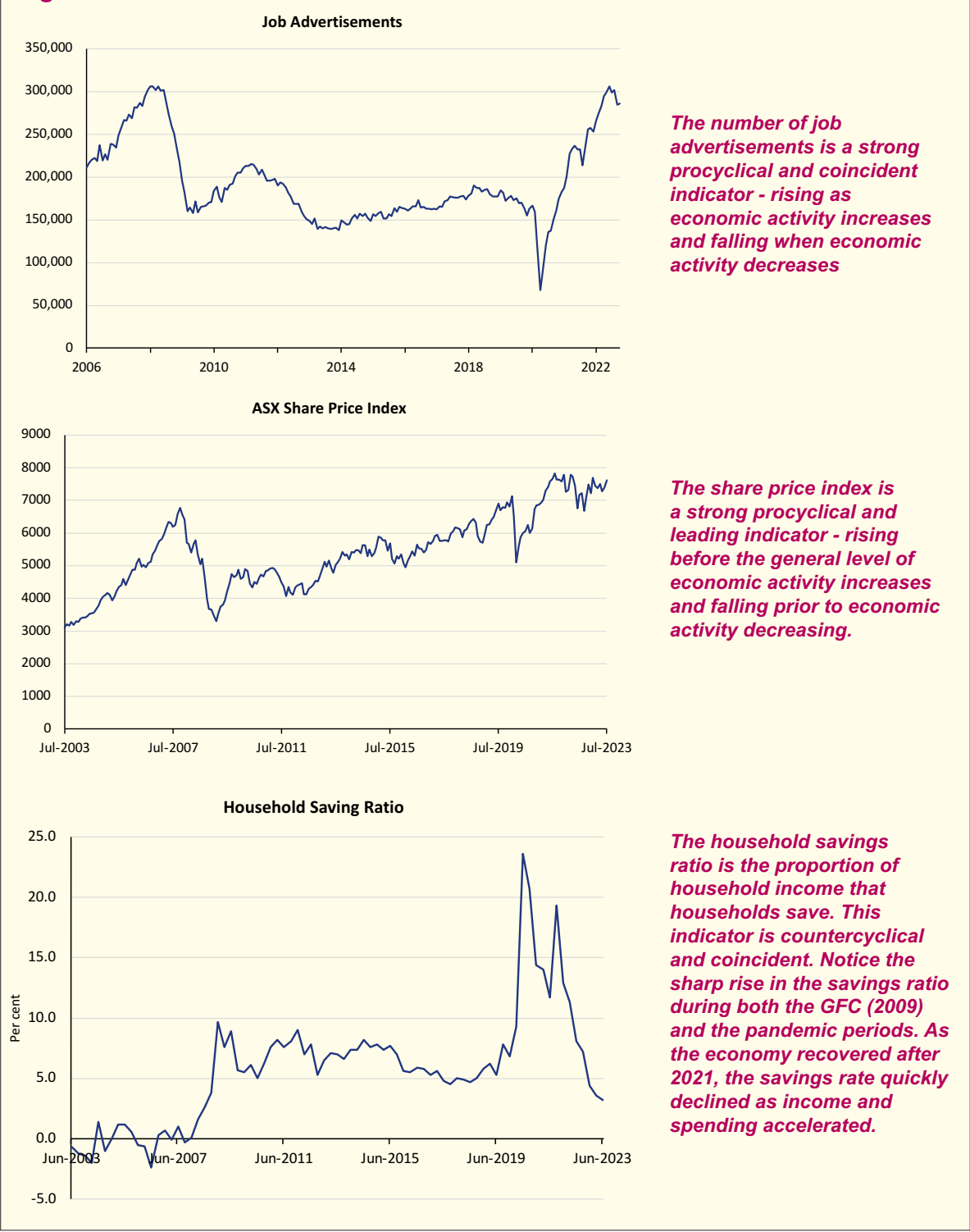
Answer: Real GDP, inflation and investment are all procyclical indicators so during an expansion they will all increase. Unemployment is a countercyclical indicator so during an expansion it will decrease. Alternative C is the correct answer, A, B and D are incorrect.

2. When the economy reaches a trough in a business cycle, which of the following will occur?

- A. *Income, production, and employment will continue to fall.*
- B. *Income, production, and employment will begin to rise.*
- C. *Income and production will rise, but employment will continue to fall.*
- D. *Employment rises, but income and production will continue to fall.*

Answer: A trough is the lower turning point, so production and employment will begin to rise and this will increase income. Alternative B is correct - A, C and D are incorrect.

Figure 8.7 Economic indicators



Recent economic events

The table below highlights the changes in four key macroeconomic indicators for Australia since June 2019 (*Source: ABS*). Up to the March quarter 2020, the economy was in an expansion with rising real GDP and falling unemployment. The **Covid pandemic** plunged the economy into a recession in the first two quarters of 2020 with the unemployment rate peaking at 7.4%. Notice the dramatic fall in the inflation rate from 2.2% in March 2020 to -0.3% in June (deflation). In the September quarter of 2020 the economy began its rapid recovery with the unemployment rate quickly falling and the inflation rate rising - typical characteristics of a strong expansion. By the end of 2021 the economy had reached full employment, with the unemployment rate close to the natural rate of 4 per cent.

During 2022 and 2023 the Australian economy continued to expand entering a **boom** phase of the business cycle with record low unemployment rates. Inflation had now become public enemy No. 1 with both demand and cost factors causing the inflation rate to reach its highest level in over 30 years.

Quarter	Real GDP \$bn	Consumption \$bn	Unemployment Rate %	Inflation Rate %	Business Cycle
Jun-2019	512.3	269.9	5.3	1.6	Expansion
Sep-2019	515.9	269.9	5.2	1.7	
Dec-2019	518.6	271.1	5.1	1.8	Peak
Mar-2020	517.6	267.5	5.2	2.2	Recession
Jun-2020	482.8	233.8	7.4	-0.3	
Sep-2020	501.1	252.0	6.9	0.7	Recovery/ Expansion
Dec-2020	517.9	264.0	6.6	0.9	
Mar-2021	528.9	267.6	5.6	1.1	
Jun-2021	532.5	270.2	5	3.8	
Sep-2021	521.4	257.0	4.7	3	
Dec-2021	541.7	273.3	4.2	3.5	Boom
Mar-2022	545.0	278.4	3.9	5.1	
Jun-2022	549.0	284.5	3.6	6.1	
Sep-2022	552.7	286.7	3.6	7.3	
Dec-2022	556.3	287.5	3.5	7.8	
Mar-2023	558.3	288.3	3.5	7	
Jun-2023	560.3	288.7	3.5	6	

9



Inflation

Learning Objectives

In this chapter you will learn about:

- *the concept and measurement of inflation*
- *the distinction between headline and underlying inflation*
- *the causes and types of inflation, including demand pull and cost push*
- *the effects of inflation*
- *the impact of recent events on inflation in Australia in the last five years.*

The concept and measurement of inflation

Inflation is one of the most familiar terms in economics. It describes price increases that occur across a range of goods and services over time. Economists define **inflation** as a persistent and appreciable rise in the general or average level of prices.

In developed economies, moderate inflation is the norm rather than the exception. Over three decades prior to 2022, average price increases in Australia were less than three per cent per annum, perhaps leading to a view that inflation was not a significant problem. Indeed, for a short period in 2017-2018, there was some concern that prices would fall and the world would have a period of **deflation**. Since 2022, however, inflation has re-emerged, bringing with it a number of important questions for our economic welfare. How will inflation impact on the cost of living and household purchasing power? How will it effect business costs? What measures can the government take to bring it back under control?

The measurement of inflation - the CPI

The most familiar measure of inflation in Australia is the **Consumer Price Index (CPI)**. The CPI measures changes in the prices of a **basket** of goods and services (a sample) bought by Australian households from one month to the next. The list of items covered in the CPI basket “ranges from steak to motor cars, and from dental fillings to restaurant meals” (ABS, 2018 – Guide to the Consumer Price Index: 17th series). The items are classified into eleven major groups, 33 subgroups, and 87 classes of expenditure. To maintain its data, the ABS records the prices of about 900,000 separate items each month.

A key point to understand is that price changes of items in the basket don't have equal importance! The average household would probably consider a 10 per cent rise in the price of fuel to be more significant for their budget than a 10 per cent rise in the price of hire cars! To account for this, the ABS attaches a **weight** to each item in the CPI basket. Weights reflect the relative importance of the items as measured by their shares in the total consumption of households. The weights are based on data from the Bureau's Household Expenditure Survey.

Figure 9.1 shows the weights applied to each of the 11 groups of items in the CPI basket. Spending on the housing group, for example, currently accounts for nearly a quarter of an average family's expenditure. The group includes the prices of items like rent, new home purchases, property rates and utility charges. Other 'high weight' groups are food and transport. The ABS reviews the weights of items in the basket in January every year to ensure they are an accurate reflection of household spending patterns. Weights are likely to rise or fall depending on changes in consumer preferences and their reactions to price changes. For example, the weight applied to the recreation and culture group in the pandemic fell to 8.7

The composition of the basket reflects the consumption preferences of Australian households.

Figure 9.1 CPI groups - changing weights

Group	Weight – contribution to CPI (%)		
	2011	2018	2023
<i>Year of weight update ›</i>			
Housing	22.3	23.2	22.2
Food and non-alcoholic beverages	16.8	15.8	17.0
Transport	11.6	10.5	10.7
Alcohol and tobacco	7.0	7.4	7.7
Furnishing, household equip. and services	9.1	8.9	8.8
Recreation & culture	12.6	12.6	11.9
Health	5.3	5.7	6.2
Insurance and financial services	5.0	5.9	5.1
Education	3.2	4.3	4.4
Clothing and footwear	4.0	3.3	3.2
Communication	3.0	2.6	2.2

Sources: ABS, Monthly CPI Indicator.
Weighting Pattern, July 2023.

per cent of the total – spending on that group had fallen markedly because travel was restricted and recreation venues such as theatres and stadiums were closed or restricted to smaller attendances.

Index numbers are used in statistics to simplify the measurement of changes across values, quantities or prices. Instead of reporting hundreds of different price changes for various goods and services, an index summarises all price movements into one number – in this case, the Consumer Price Index. To explain how index numbers are calculated, a hypothetical index has been constructed in figure 9.2. The weight of each item is determined by the proportion of income spent by households. In this example, households spend more on bread, so it is weighted at 40, whereas the weight attached to chocolate is 10.

Figure 9.2 Inflation calculations - index numbers

Item	Weight	PERIOD 1 (Base)		PERIOD 2	
		\$ Price	W x P	\$ Price	W x P
Bread	40	3.20	\$128.00	3.40	\$136.00
Fish	30	8.00	\$240.00	7.80	\$234.00
Lettuce	20	1.15	\$23.00	1.20	\$24.00
Chocolate	10	2.50	\$25.00	2.80	\$28.00
TOTAL	100		\$416.00		\$422.00
PRICE INDEX			100.0		101.4
		Rate of inflation		1.4%	

In each period, the price of the item weight is then multiplied by its weight (P x W) to determine how much the household would have spent. Total expenditure on all items in each period is then calculated (\$416 in period 1 and \$422 in period 2). Period 1 is called the **base period**, and is allocated the index number 100. The base period is that to which others will be compared. To calculate the **price index** for period 2, the total household expenditure for that period (\$422) is expressed as a proportion of expenditure in the previous period (\$416). Hence the index for period two is 101.4 (\$422/\$416). Note that the index is a summary measure for the four items in our hypothetical food basket. As described earlier, the ABS has hundreds of thousands of items in the official CPI basket.

The rate of inflation

The **rate of inflation** is the rate of change in the price index from one period to another. In the example developed in figure 9.2, the rate of inflation for the four items is 1.4 per cent.

Figure 9.3 shows Australian CPI data for the period 2015 to 2023, as at June each year. The rate of inflation (rate of change of prices) for each year is calculated from the CPI, using either of the methods shown in the left panel of the table. The CPI stood at 126.1 in June 2022. By June 2023, the CPI had risen to 133.7. The 2023 figure, as a proportion of the 2022 figure, was 1.0603, so the rate of inflation over the year 2022-2023 was 6.03 per cent (6.0 per cent if rounded to one decimal place). Quarterly and monthly rates of inflation are calculated in the same way as the annual rates (by substituting ‘quarter’ or ‘month’ for ‘year’ in the formula). The annual rate is the sum of any four consecutive quarterly rates. We could also calculate the percentage rate of price changes over the whole period – 2023 prices are 24.4 per cent higher than they were in June 2015.

Figure 9.3 Calculating the rate of inflation

Year ended June	CPI
2015	107.5
2016	108.6
2017	110.7
2018	113.0
2019	114.8
2020	114.4
2021	118.8
2022	126.1
2023	133.7

Calculating the annual inflation rate for 2022-23	
Method 1	rate = $\frac{\text{CPI (2023)} - \text{CPI (2022)}}{\text{CPI (2022)}} \times 100$
	rate = $\frac{133.7 - 126.1}{126.1} \times 100 = 6.03\%$
Method 2	rate = $\frac{\text{CPI (2023)}}{\text{CPI (2022)}} - 1 \times 100$
	rate = $\frac{133.7}{126.1} - 1 \times 100 = 6.03\%$

Source: ABS Consumer Price Index, Australia.

Headline and underlying measures of inflation

The CPI is the **headline** measure of inflation in Australia – the broad measure of changes in the cost of purchases made by wage and salary households in capital cities.

Figure 9.4 reports inflation rates by CPI group over a five year period. Note that price movements across the groups don’t move uniformly, as illustrated by:

- falling prices in the transport group in 2019-20, reflecting the impact of lower demand for fuel during the early part of the Covid-19 period. Fuel prices bounced back, however, in the two subsequent years, before leveling off in 2023;
- prices in the communications group fell in three of the five years shown, perhaps because technological change has cut the costs of phone calls and mobile services, and because markets for those services have become more competitive; and
- housing prices rose markedly in 2022 and 2023, reflecting higher rents, and increase in mortgage payments as interest rates rose.

The ABS adjusts the headline data to produce measures of inflation which more accurately reflect medium term trends. The statistics are adjusted to account for seasonal factors (such as changes in demand and supply in fruit and vegetable markets) and to account for ‘volatile’ movements in prices such as automotive fuel prices and housing costs. The **underlying** measures give a better picture

Figure 9.4 Australian inflation rates, by CPI group

Group	% price increase year to June				
	2019	2020	2021	2022	2023
Food and non-alcoholic beverages	2.4	4.1	0.7	5.9	7.5
Alcohol and tobacco	5.9	8.4	6.7	2.2	4.7
Clothing and footwear	0.2	0.5	0.3	1.6	0.3
Housing	0.5	0.1	-0.2	9.0	8.1
Furnishings, household equip and services	-0.4	-9.8	16.9	6.3	6.3
Health	3.0	0.9	4.8	2.4	4.9
Transport	1.7	-7.5	10.7	13.1	1.9
Communication	-4.4	-3.6	-1.3	0.0	0.7
Recreation, sport and culture	2.2	-0.3	2.5	4.5	6.8
Education	2.8	-1.0	3.7	4.7	5.2
Insurance and financial services	0.9	-1.7	0.6	3.4	8.5
All groups	1.6	-0.3	3.8	6.1	6.0

Source: ABS: Consumer Price Index, Australia (June reference period, various issues)

Figure 9.5 Underlying inflation measures

Inflation Measures	% change year-on-year (June)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Headline CPI	1.6	-0.3	3.8	6.1	6.0
Seasonally adjusted	1.5	-0.5	3.7	6.1	6.1
Trimmed mean	1.6	1.2	1.6	4.9	5.9
Weighted median	1.3	1.3	1.7	4.2	5.5

Source: ABS: Consumer Price Index, Australia (June reference period, various issues)

of the 'true' rate of inflation. Apart from adjusting for seasonal and volatile price movements, the ABS also calculates trimmed mean and weighted median measures. To calculate the **trimmed mean**, the ABS arranges the price movements in all 87 expenditure classes from largest to smallest then 'trims away' the top 15 and bottom 15 per cent. Trimming the price change removes the impact of the largest or smallest price changes. The **weighted median** is the rate of price change of the item at the middle of the price changes in the CPI basket (the 50th percentile by weight).

As figure 9.5 suggests, the difference between headline and underlying results is often quite small. That was not the case during the pandemic, however. Underlying inflation was two per cent less than headline CPI due to the volatility of prices in some groups. For example, retail fuel prices for ULP fell from a high of \$1.60 per litre early in 2020 to \$0.95 in May, leveled off at around \$1.20 for the rest of 2020, then rose to new highs around \$1.75 in November, 2021. Fuel prices continued to surge during 2023 reaching a record price of over \$2 per litre.

There are some other points to be aware of when reading CPI data. Firstly, the CPI only reports price movements in capital cities. Secondly, The CPI is not regarded as a 'true' cost-of-living index because it does not reflect changing consumer preferences or the substitutions that consumers make from day to day in response to relative price changes (consumers would be expected to buy more chicken and less beef if the price of beef rises during a drought, for example). Thirdly, the CPI does not account for changes in the quality of goods over time, and is thus likely

Get the latest inflation data ...

The Australian Bureau of Statistics (ABS) updates inflation data every month. The release, titled 'Consumer Price Index, Australia', can be found from the ABS home page at abs.gov.au.

to overstate price increases. That said, the CPI is an important macroeconomic indicator and a key consideration in decisions taken by businesses (contract prices, for example) and governments (for example, welfare payments such as pensions, and the formulation of government economic policy).

The ABS publishes other price indices report price changes in more specific groups of goods and services, examples being the producer price index (PPI); the Import Price Index that tracks the prices of goods imported into Australia; the Export Price Index that tracks prices received for exports; the wage price index (WPI) and a number of Selected Living Cost Indexes.

Figure 9.6 shows the annual rates of inflation in Australia over the period 1980-2023. The persistent inflation problems of the 1970s and 1980s was brought to a halt by the 1991 recession, when household and business spending fell. Subsequently, Australia experienced mild inflation (in the 2 - 4 per cent range, apart from 2000-2001 after the introduction of the GST). Indeed, the possibility of deflation (falling price levels) was a topic of interest amongst economic commentators between 2017 and 2019. The CPI did fall in 2019-2020, due to the initial impact of the pandemic.

As figure 9.6 shows, rates of inflation have increased markedly since 2021. The pandemic brought about a significant shift in the balance of demand and supply which has played out in prices around the world. The causes of this are discussed in the next section.

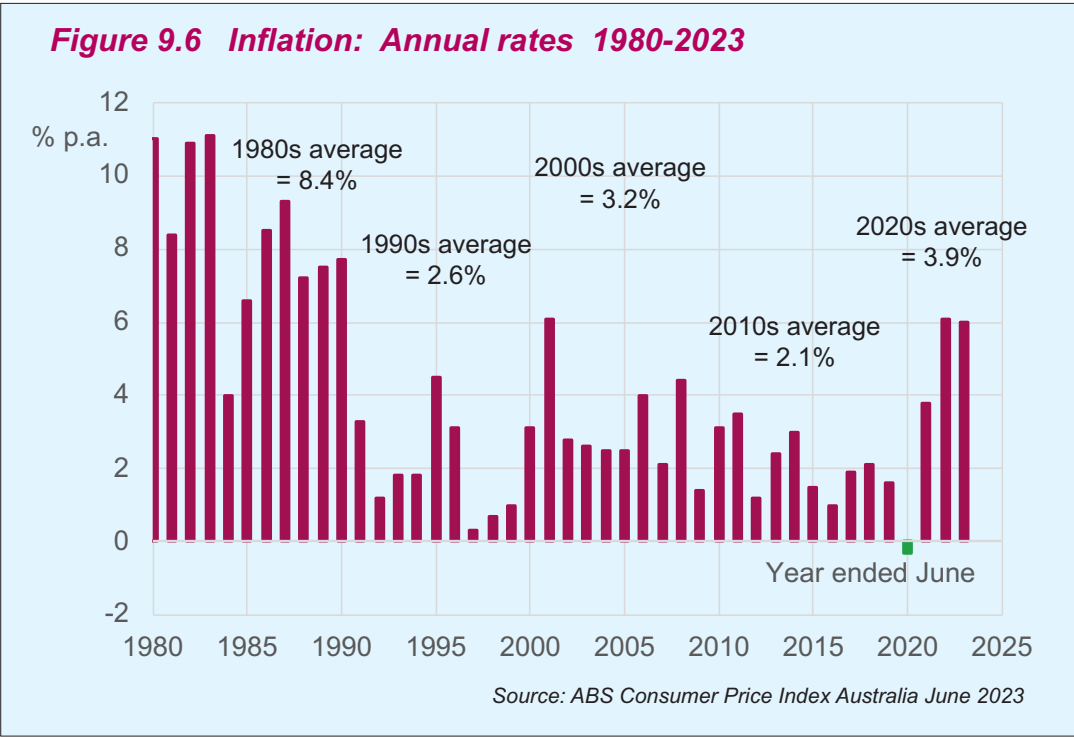


Figure 9.7 International inflation rates

World Bank data for 204 countries showed that 12 had inflation rates above 30% p.a. in 2022 (hyperinflation).

Selected inflation rates: 2022			
Country	Rate (% p.a.)	Country	Rate (% p.a.)
USA	8.3	Indonesia	4.2
Canada	6.8	New Zealand	7.2
France	5.2	Greece	9.6
Germany	7.9	South Africa	7.0
UK	11.1	Argentina	94.8
Japan	2.5	Singapore	6.1

Rates are price changes for calendar 2022

Review Quiz

1. Why are goods and services in the CPI basket of goods given a 'weight' ?
2. In year 1, the CPI was 132.4. In year 2, the CPI stood at 136.7. How should the annual rate of inflation be calculated?
3. Why is an 'index' used to compile data about price increases?
4. In what way is the 'trimmed mean' a truer measure of inflation the headline CPI?

Types of inflation

In this section, we examine the factors that influence inflation in order to understand what has caused recent inflationary pressure.

Cost push inflation

Cost push inflation is the result of an increase in the cost of goods or services that are important in the production process. Episodes of cost push inflation are related to **supply side** events that drive up the cost of essential inputs in factor markets. Such episodes can be attributed to events such as:

- natural disasters such as flood, fire and drought;
- geopolitical events;
- rising import prices as a result of currency depreciation;
- other events driving the cost of business (such as wage rises) or the final price of goods, such as taxes.

Because these ‘supply-side’ events are often unanticipated, they are often referred to as ‘supply shocks.’ Weather events and natural disasters are examples of these shocks. Depending on their severity and geographic spread, these events could create a shortage of agricultural commodities and may damage transport infrastructure such as roads and rail. Shortages flow on to increases in the price of fresh and processed food. Other typical effects include higher insurance premiums as insurers recover funds paid out to settle claims. In 2011, Tropical Cyclone Yasi caused \$500 million damage to cane crops in Queensland, cutting exports of raw sugar. Australian sugar prices rose 6 per cent and world prices almost 4 per cent, reflecting Australia’s importance as a sugar producer. More recent examples of supply shocks in Australia include Cyclone Debbie in Queensland in 2017, fires in NSW in 2019, and floods on the east coast of Australia in the first half of 2022. It was estimated that the floods added 0.2 percentage points to the CPI in the second half of 2022. The insurance claims (\$16bn) from these floods also contributed to higher costs for both households and firms.

The onset of the Covid-19 pandemic in February 2020 was a significant shock to global supply chains. Big manufacturers of fabricated items such as computers, cars and TVs had become dependent on ‘just-in-time’ inventory management, where the product components are shipped from their source, rather than held in storage where they will be used in production or distribution. Lockdowns affecting workers in those factories, and in the transport sector that supports them, quickly led to parts shortages and reduced manufacturing capacity. International freight delivery times increased significantly as aircraft movements were restricted, and there were queues of ships waiting to enter major seaports. Shipping costs rose to a level eight times higher than their 2017-2019 average!

Geopolitical events may have a significant effect on prices. The inflation problems of the 1970s started when the Organisation of Petroleum Exporting Countries (OPEC) decided to reduce their production of oil to drive up prices – and hence their profits. World oil prices tripled and soon flowed through to retail fuel prices – forcing up transport costs across the economy. More recently, the Russian invasion of Ukraine in February 2022 triggered a massive shock to global energy and food markets, especially in the ‘Euro area’ which had relied heavily on imports of oil, gas, timber, food and fertiliser from Ukraine and Russia. Prior to the war, Russia was the world’s largest exporter of natural gas and the second-largest exporter of crude oil. In Australia, fuel prices increased by 35 per cent between the March quarters of 2020 and 2021.

A decrease in the value of the Australian dollar compared to other currencies – **depreciation** – will increase the prices Australian households and firms pay for imported products and inputs (imported inflation). A decade ago, one Australian dollar bought more than one United States dollar. In early March, 2021, AUD1 bought 77 US cents. In late 2023, the Aussie dollar depreciated to about 64 US cents – the rising cost of imported products is making it hard to control inflation.

A supply chain is the sequence of stages involved in the production and distribution of a good.

In Australia, 50 per cent of employees were trade union members in the 1960s - now it is 15 percent.

Wages are a significant portion of production costs in most businesses. Wage growth tends to become inflationary if it exceeds productivity growth, because the margin between the value of output and the cost of inputs falls. Wages growth is more likely when the unemployment rate is low and there is a 'tight labour market'. In July, 2022, the Australia's unemployment rate fell to 3.4 per cent – its lowest level since 1974. There has been a shortage of workers in many areas, and especially in agricultural and hospitality sectors. The tight market has resulted in an increase in Australia's wage price index (WPI), reaching 3.7 per cent in March 2023. This is lower than the CPI, indicating that wages are not keeping up with prices. This could reflect the less unionised labour market is, less collective bargaining between employer and worker groups, and the fact that wage rises are no longer linked to CPI rises.

In Australia, the most recent example of a tax having an inflationary impact, albeit temporary, was the introduction of the GST in 2000-2001 (as evident in figure 9.6. By themselves, these cost pressures would likely result in short periods of inflation, to which businesses and households could adjust. For example, high food prices resulting from a cyclone will fall when other sources of supply are used, or when people seek lower priced substitutes for those in shortage.

Demand pull inflation

The general description of **demand pull inflation** is 'too much money chasing too few goods'. The reference to 'too much money' means that households and businesses are spending more than they normally would, causing prices to be 'bid upwards' as buyers compete for the goods and services that are available.

Higher aggregate demand is usually associated with periods of expansion in the **business cycle**. Indicators that suggest that prices might come under demand pressure include:

- high levels of consumer spending, especially on discretionary or high-value items;
- rising wages that increase households' disposable income;
- high levels of borrowing to fund discretionary purchases;
- rises in property or share market asset prices that might encourage spending due to the **wealth effect** (when households feel that the value of their assets has risen); and
- low levels of spare capacity in key industries;

Each of these events would tend to bid up prices in relevant markets. Excess demand also occurs in producer markets. A high level of demand for labour in some industries, or in some locations, will force their prices (wages) up. Demand pressure has also contributed to recent inflation. The early stage of the pandemic in 2020 caused considerable 'pent-up' demand in the economy, for three reasons. Firstly, households had changed their spending patterns in the early stages of

the pandemic. Shutdowns meant they were unable to spend on services such as recreation, entertainment, meals, accommodation and tourism. Instead, many households increased spending on goods – examples being furniture (perhaps to create a home office) and home exercise equipment. Many used their down-time to conduct renovation projects. Secondly, the household saving rate doubled to 16 per cent for most of 2020, reflecting uncertainty about the future, but building a pool of funds to spend when the first vaccines were introduced and confidence started to return. Thirdly, 2020 was a time of considerable uncertainty. The Treasury thought it possible that unemployment could rise to 15 per cent, and GDP could fall by 20 per cent (Treasury, October 2021). The Government announced unprecedented policy measures to support businesses and households.

In the first six months of the JobKeeper program, about 900,000 businesses affected by shutdowns or trading restrictions received support covering 3.5 million employees, at a cost of \$11bn each month. Jobseeker benefits for unemployed people were doubled for six months. In November, 2020, official interest rates were cut to 0.1 per cent and other measures introduced to maintain liquidity (ability to spend) in the economy. Many people took advantage of the low rates to borrow, especially as it had been announced that they would continue until 2024!

Inflation expectations

The big question over 2022-2023 was whether inflation would be temporary, or whether it would last for several years. Inflation can ‘feed on itself’, especially when people start to expect that it will continue. This occurred in many countries in the 1970s and 1980s, and the resulting wage-price spiral wasn’t broken until 1991, when a recession cut aggregate demand and started disinflation.

Expectations are important influences on economic behaviour. For example, if firms expect that inflation is rising, they anticipate that their costs will rise, which will flow through to decisions they make about the prices of the products they sell. Similarly, if workers expect future inflation to be higher, they may demand higher wages to make up for the expected loss of their purchasing power. These behaviours, sometimes called **inflation psychology**, mean inflation could become self-fulfilling, last for a longer period of time, and become more difficult to control.

Recent inflation in Australia

Inflation in Australia was relatively mild for most of the thirty years up until the September quarter of 2020. Indeed, inflation was less than 2 per cent per annum in the second half of the 2010s, and some economists were worried that a period of **deflation** was imminent. Sustained deflation, in which prices fall steadily over a period of several years, is associated with depressions, such as occurred in the 1930s. Initially, deflation increases consumer purchasing power, but if it continues,

Annual Inflation rates

2019: 1.6%
2020: -0.3%
2021: 3.8%
2022: 6.1%
2023: 6.0%

deflation cuts business confidence (lower investment and rising unemployment), and signals weak economic growth. Since the end of 2020, however, prices have again risen around the world. In the first half of 2020, the disruptions associated with the pandemic strained the ability of firms around the world to produce and deliver goods. When households and businesses were locked down, spending on services such as travel and accommodation; cafe and restaurant spending, and spending on leisure and recreation fell. In the June quarter, the CPI fell by 1.9 per cent.

For the first six months of the pandemic, the fall in aggregate demand had outweighed the inflationary impact of supply problems. This started to change late in 2020. Supply chain problems continued, and the pent-up demand and change in household spending patterns mentioned earlier saw the emergence of market bottlenecks and the combination of high demand and low supply created pressure on prices. The highest quarterly CPI increase (2.1 per cent) was recorded in March 2022, and annual rates for the financial years of 2022 and 2023 were around 6 per cent. At the time of writing (late 2023), there were some signs of disinflation (a fall in the inflation rate).

Should Australia's most recent increase in price levels be attributed to demand or cost pressures? This is a difficult question to answer, as cost and demand causes can be difficult to tease apart. For example, a wage rise increases the cost of supply for firms, but also increases the income of households, enabling them to purchase more goods and services. Reserve Bank of Australia research concludes that supply

RBA Media release

Inflation in Australia has passed its peak and the monthly CPI indicator for July showed a further decline. But inflation is still too high and will remain so for some time yet. While goods price inflation has eased, the prices of many services are rising briskly. Rent inflation is also elevated. The forecast is for CPI inflation to continue to decline and to be back within the 2–3 per cent target range in late 2025.

High inflation is weighing on people's real incomes and household consumption growth is weak, as is dwelling investment. Notwithstanding this, conditions in the labour market remain tight, although they have eased a little. Given that the economy and employment are forecast to grow below trend, the unemployment rate is expected to rise gradually to around 4½ per cent late next year. Wages growth has picked up over the past year but is still consistent with the inflation target, provided that productivity growth picks up.

Returning inflation to target within a reasonable timeframe remains the Board's priority. High inflation makes life difficult for everyone and damages the functioning of the economy. It

erodes the value of savings, hurts household budgets, makes it harder for businesses to plan and invest, and worsens income inequality. And if high inflation were to become entrenched in people's expectations, it would be very costly to reduce later, involving even higher interest rates and a larger rise in unemployment. The recent data are consistent with inflation returning to the 2–3 per cent target range over the forecast horizon and with output and employment continuing to grow. Inflation is coming down, the labour market remains strong and the economy is operating at a high level of capacity utilisation, although growth has slowed.

There are significant uncertainties around the outlook. Services price inflation has been surprisingly persistent overseas and the same could occur in Australia. The outlook for household consumption also remains uncertain, with many households experiencing a painful squeeze on their finances, while some are benefiting from rising housing prices, substantial savings buffers and higher interest income.

Source: RBA Media Release, Monetary Policy Decision.
Philip Lowe, Governor. 5 September 2023.

factors accounted “for at least half of inflation in Australia over the past year or so” (RBA Bulletin, June 2023).

In response to inflationary pressures, **central banks** such as the Federal Reserve Board in the US, the Bank of England and the Bank of Japan raised official interest rates in an attempt to restrict spending and control rising prices. In Australia, the Reserve Bank’s **cash rate** was at a record low of 0.1 per cent throughout 2021 in response to Covid pandemic. From May 2022 to November 2023, the cash rate was increased 13 times to reach 4.35 per cent – the fastest and largest rise in the history of Australian monetary policy.

Review Quiz

1. *Provide three examples of events that might cause a period of cost push inflation.*
2. *Describe the causes of demand pull inflation.*
3. *What role do consumer and business expectations play in causing inflation?*
4. *The return of inflation in 2022-23 was driven by a mix of demand and cost pressures. Provide two examples of each.*

The effects of inflation

Most economists consider moderate inflation to be a sign of a healthy economy. It encourages consumption and investment because it brings forward spending in anticipation of higher prices in the future. It encourages borrowing as debtors are able to repay loans with inflated money. But inflation tends to be a burden for the economy, especially if rates creep above four or five per cent. Inflation effects everyone because it reduces **real income** or **purchasing power** (the amount of goods and services that can be bought with an amount of money). An inflation rate of 3 per cent per annum means that a dollar will only be able to buy 97 cents worth of goods and services at the end of the year.

Inflation affects **interest rates**, the level of which is important to many households and businesses. Lenders such as banks need to maintain a margin between their cost of funds and the rate at which they lend those funds. This is how they cover their costs and make a profit. If the interest rate was 7 per cent per annum, and inflation was 8 per cent, lenders would in effect be getting a negative return and would thus have no incentive to lend money! Hence, the **real interest rate** (the nominal interest rate minus the inflation rate) must be positive (probably by at least 2–3 per cent) to cover costs. So inflation places upward pressure on the **nominal interest rate** (the interest rates published by the banks). Higher rates are good for savers, but not for borrowers.

Inflation affects a country's **international competitiveness**. A country's exports are at a disadvantage in relation to overseas competitors when domestic inflation is greater than it is overseas. Assume a buyer in Japan could buy a product from either New Zealand or Australia, and her decision is made on the basis of price alone (i.e. the quality of the competing products are similar). If inflation levels in New Zealand were 4 per cent p.a., and prices in Australia were increasing at 7 per cent p.a., it is likely that over time the buyer will tend to buy from New Zealand, as the price is rising at a slower rate than the Australian product.

It follows that ongoing inflation tends to result in currency **depreciation** (because there is less foreign demand for a country's goods). This has both positive and negative effects, depending on whether we consider exporters (like farmers and miners) or importers (like businesses importing capital equipment, or importers of household electrical goods). Depreciation makes exports appear cheaper for overseas buyers, so we would expect them to sell greater quantities. For importers, on the other hand, depreciation means that one Australian dollar exchanges for less units of an overseas currency. This means the cost of imports will tend to rise, which is inflationary if it is passed on to buyers. The net effect of depreciation on inflation depends upon the relative price elasticities of imports and exports – that is, the responsiveness of buyers to price changes in exports and imports.

Inflation can impact on production decisions throughout the economy. Ongoing wage inflation may cause **capital-for-labour substitution**, where business owners try to replace labour with machines (which don't ask for pay rises). Rising costs have been responsible for many **structural changes** in our economy. As mentioned, there were significant increases in oil prices in the 1970s which led, amongst other things, to the demise of the large 'family car' as consumers sought greater fuel economy. Average fuel consumption has only fallen by about 2 litres per 100 Km over the period!

Excessive inflation creates **uncertainty** for decision-makers. A builder issuing a fixed price contract with a home buyer may find that the contract price does not cover costs when the house is complete in twelve months. Investment decisions are more risky because decision-makers are not certain what prices will be in the future. If inflation leads to higher risk associated with long-term capital expenditure, then it also leads to reduced output and employment opportunities.

Inflation impacts on **economic efficiency** and the level of output produced in the economy. This is explained by the uncertainty which continual price increases bring to productive decisions, and by the possibility that inflation diverts resources away from productive activities (making goods and services for sale) to speculative activities (the buying of assets in the expectation that their prices will rise, such as houses, antiques, precious metals and shares). Speculative activity has a negative impact on the potential output of the economy if it becomes an easier way to create or maintain wealth than creating value through production.

In extreme cases, **hyperinflation** (rates of inflation above 30 per cent per annum) leads to significant economic disruption. People lose confidence in money's two main functions – as a measure of value, and as a store of value – and it becomes difficult to maintain normal trading relationships. In late 2023, the inflation rate in Argentina was about 110 per cent per annum. Price rises stem from a 2018 'currency crisis' which saw the peso depreciate from 18 peso per USD to 41; 'printing money' during the pandemic to pay for salary support and cash handouts; and a drought which cut many agricultural exports in half. The country's political turmoil has been central to its poor economic performance, but this showed little signs of improvement in the run up to an election in October 2023. In September, the central bank raised its main rate of interest to 75 per cent as it tried to rein in the soaring cost of living. The poverty rate was above 40 per cent. The currency sunk further – below 350 per USD.

How do Argentinians cope? With supermarket prices increasing 8 or 9 percent every month, the buying power of the peso has collapsed (except for the few people paid in US dollars). Many stores allow customers short term interest free credit so they can buy an item and pay for it in instalments. Many households try to buy in bulk, form communities to barter or swap items like clothing and furniture, or even 'spend now rather than later' to avoid the peso devaluing in their hands!

Inflation affects everyone because it erodes purchasing power and creates uncertainty. But the burden of inflation does not fall evenly on everyone in the community. Living standards of low income earners and recipients of transfer incomes (such as pensions) will fall during periods of inflation unless their payments are **indexed** to rise along with prices. Australian welfare payments such as the age pension are indexed to the CPI, although they are only updated twice a year.

Inflation has different consequences for **creditors** (lenders) and **debtors** (borrowers). Lenders 'lose' unless the rate of interest they are charging is higher than the inflation rate (i.e. a positive real rate of interest). Savers, who are essentially households lending their surplus income to banks or financial institutions, see the real value of their deposits fall during inflationary periods. Consider a \$1000 savings account, earning an interest rate of 3.5 per cent when annual inflation is 2 per cent. The real interest rate is thus 1.5 per cent. At the end of the year, interest earned is \$35, but inflation has eroded \$20 of this amount, leaving the saver only \$15 better off in real terms. Borrowers tend to benefit from inflation in the long term, because they can build up their assets on borrowed money, knowing that the real value of their repayments will fall over time (see sidebar).

Parts of the economy that have **market power** (perhaps business owners who can pass on price increases to their customers, or workers who can negotiate wage increases) seem more capable of maintaining their real incomes. People who are able to anticipate inflation may be able to arrange their financial affairs to benefit from expected price increases.

'Pay as you go' (PAYG) taxpayers suffer **bracket creep** as income rises with inflation, making taxpayers liable for higher marginal rates of taxation. Australian taxpayers face more bracket creep than they used to because there are now fewer tax brackets, so Australia's income tax system less **progressive**.

The redistributive effects of inflation partly depend upon how well price increases were anticipated by households and businesses. If the extent of price movements is anticipated, then redistributive effects may not be as significant. For example, if banks and their customers both correctly forecast the inflation rate, nominal interest rates on both deposits and loans would rise, resulting in little real effect. Mild inflation may not have much effect on most members of the community. Although prices rise, incomes generally rise at a similar rate (although there may be a time-lag). To some extent, therefore, inflation is an illusion, because although nominal prices are rising, real prices may change very little. If a worker's money income rose by five per cent, and prices rose by four per cent, then the worker is only one per cent better off in real terms!

Review Quiz

1. *How does inflation affect household purchasing power ?*
2. *If the nominal interest rate was 5% per annum, and the current inflation was 3%, what is the real rate of interest?*
3. *An overseas buyer wants to buy salmon from Canada, where inflation is 2% p.a. Australian salmon is rising in price at 5% p.a.? Is Australia's fishing industry at a competitive disadvantage? Explain.*
4. *Explain why borrowers gain and lenders lose when inflation occurs.*

Check your understanding

Which of the following might increase demand-pull inflation?

- A. *Decrease in raw material prices*
- B. *Decrease in wage rates*
- C. *Increase in government spending*
- D. *Increase in tax rates*

Answer: Demand pull inflation is associated with increases in spending. Alternatives A, B and D are associated with factors that would cause an increase in production costs. Alternative C is the correct answer.

10



Unemployment

Learning Objectives

In this chapter you will learn about:

- *the concepts of unemployment, full employment, the non-accelerating inflation rate of unemployment (NAIRU), the participation rate, and underemployment*
- *the measurement of unemployment*
- *the types and causes of unemployment, including cyclical, structural and frictional*
- *the effects of unemployment, including the GDP gap*
- *the relationship between unemployment and inflation - the Phillips Curve*
- *the impact of events on the trends in unemployment in Australia over the last five years*

Labour market concepts

The term **labour market** refers to the supply of and demand for labour – supply being the willingness of people to hire their labour to firms, and demand being the willingness of employers to hire labour. You may already participate in the labour market courtesy of a part-time or casual job. You may also be wondering what the job market will be like when you graduate from school or further education. Will good jobs be plentiful, or will it be hard to find a suitable position? The answer depends on the total number of jobs available, and on the number of people competing for them – in other words, the state of the labour market.

As at March, 2023, Australia’s population was about 26.5 million people, rising at about 2 per cent each year. Not all people work, perhaps because they are under the minimum work age (15 years), they have retired, or they choose not to seek paid employment. The **labour force** (or work force) is the term applied to the people who are either working, or seeking work. As shown in figure 10.1, about 14.5 million people were in the labour force in June, 2023.

The proportion of the working age population that is in the labour force is known as the **participation rate**. In August 2023, the participation rate was 67 per cent. As shown in figure 10.2, labour force participation has trended upwards over time, increasing about four percentage points since 1990. Male participation rates have fallen, from about 76 per cent in 1990 to 71 per cent in 2023. This trend reflects higher education retention rates (finishing higher levels of education before joining the workforce), changing social attitudes, and the fact that males are retiring earlier.

In contrast, female participation rates have risen – from 53 per cent in 1990 to 63 per cent in 2023. Higher levels of education, changing attitudes towards gender

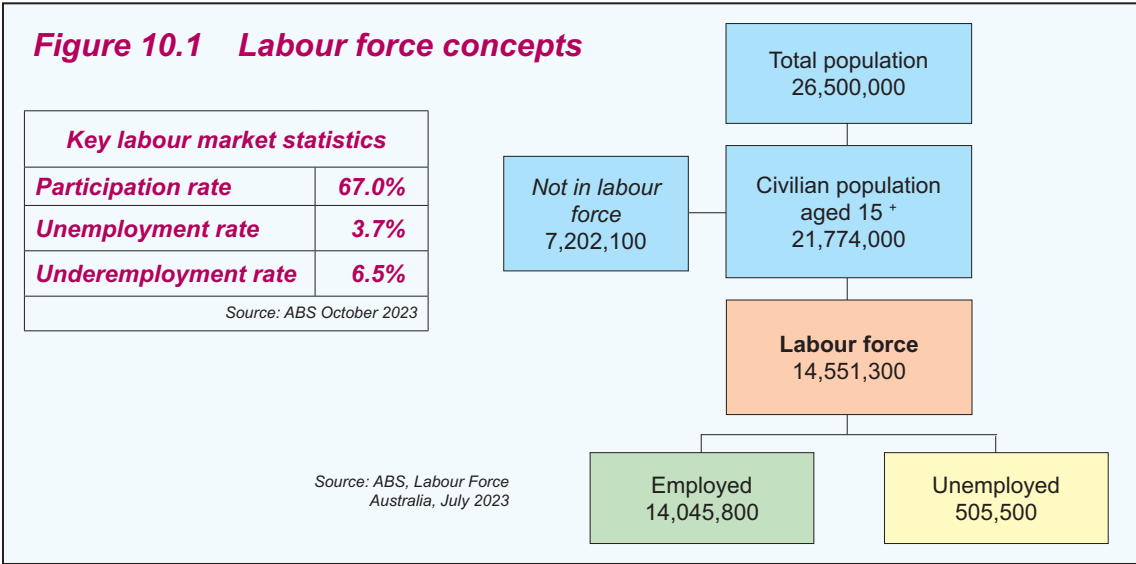
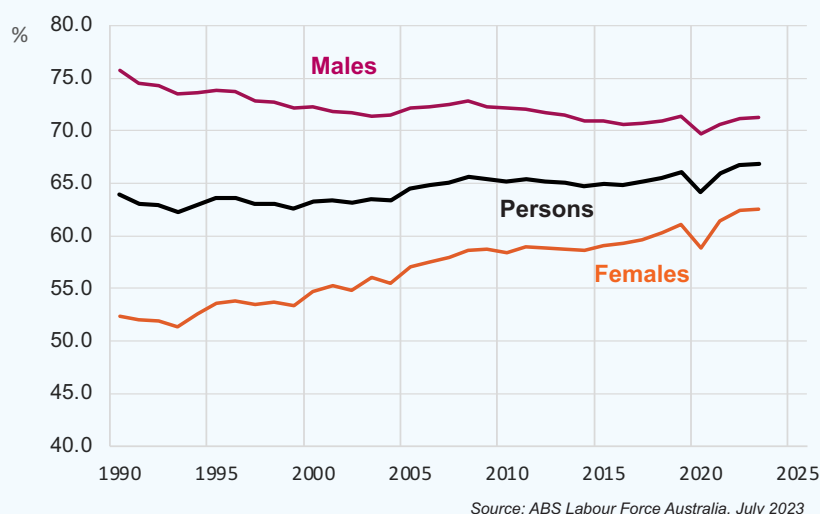


Figure 10.2 Australia's participation rates: 1990-2023

The participation rate is the proportion of the working age population engaged in the labour force - either currently employed, or currently seeking employment.

For many years, male participation in work has been declining, but female participation has been increasing - causing a slight increase in the overall participation rate.

roles, falling fertility rates, improved access to childcare and increasingly flexible working arrangements all help to explain the trend to higher female participation. There has been a very large increase in the number of married women participating in part-time or casual employment – 56 per cent of married women worked in 2017, compared with 25 per cent in 1965.

Some fluctuations in the participation rate are to be expected over the course of the business cycle, because the apparent number of job opportunities influences peoples' decisions to seek work. In a slowdown, some job seekers may become discouraged if they feel they have limited prospects of obtaining employment. A strong economy, on the other hand, will encourage people to enter the job market. The rate might rise or fall about 1 to 1.5 per cent over the course of a cycle.

Changes in labour force participation can affect monthly unemployment data – an increase in economic activity after a period of slow economic growth, for example, might not translate into shorter unemployment queues if more people decide to seek work because they think they have a greater chance of finding a job!

A discouraged worker is someone who would like a job but has given up searching for one.

The measurement of unemployment

The ABS conducts a monthly labour force survey to collect data about Australia's labour market activity. **Unemployment** occurs when people who are willing and able to work cannot find paid work for at least one hour per week. This definition is in line with those applied internationally. To be classified as unemployed, an individual in the survey must have worked zero hours in the reference week; have been actively seeking work in the month prior to the survey; and have carried

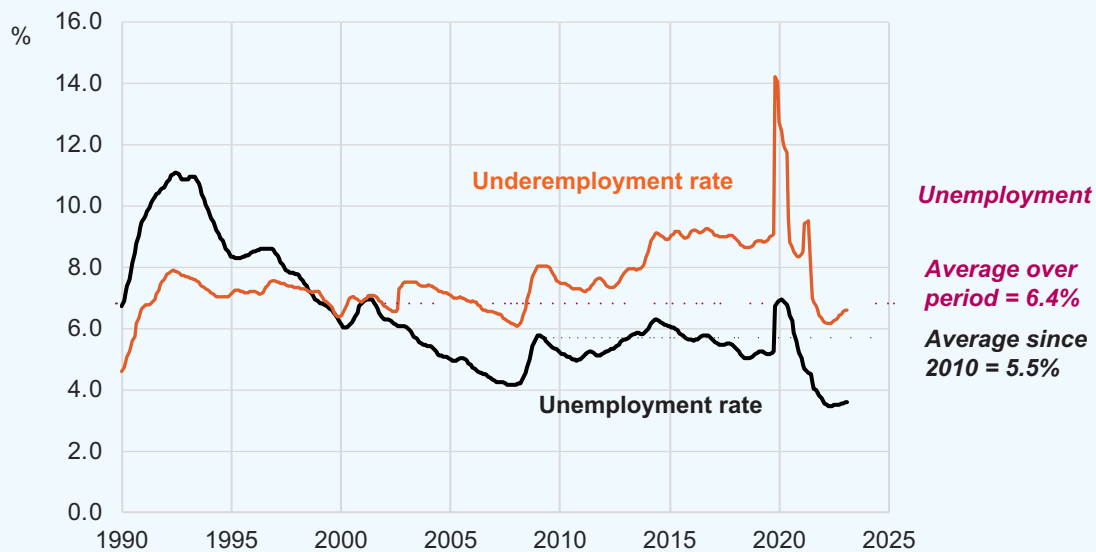
out specific kinds of tasks to suggest they were actively seeking work, such as contacting employment services; responding to job advertisements; or sending their resume to an employer. As indicated in figure 10.1, about a half a million people were unemployed in mid-2023.

The **unemployment rate** is the proportion of the labour force who are willing and able to work, but were not in paid work for at least one hour in the week that data was collected. Figure 10.3 shows the extent of unemployment in Australia over the period 1990 to 2023. The average rate of unemployment over the whole period was 6.4 per cent. Peaks in unemployment followed economic downturns in 1990-1991 and 2008-2009 (the Global Financial Crisis), and the early stages of the Covid-19 pandemic. Unemployment peaked at 7.6 per cent of the work force in mid-2020, but recovered quite quickly to fall below 5 per cent in mid-2021, and then to the record low rate of 3.5% as at June 2023. Since, then the unemployment rate has ticked up a little, to 3.7 per cent.

According to ABS data in mid-2023, more than a million workers holding part-time positions would have preferred to work longer hours. These people are classified as **underemployed**. Underemployment is most prevalent in the accommodation and food services, arts & recreation services and retail trade industries, which all have a relatively high proportion of part-time staff. Younger workers are more likely to identify as seeking more hours.

As figure 10.3 illustrates, there has been a long term upward trend in underemployment over the period covered. This probably reflects the more flexible nature of the labour market, and the likelihood that business owners react

Figure 10.3 Australia's unemployment record: 1990-2023



Get the latest labour force data ...

The Australian Bureau of Statistics (ABS) issues monthly updates of labour market statistics in its publications Labour Force, Australia, and Labour Force, Australia (detailed)

These releases can be accessed from the ABS home page at www.abs.gov.au

to changing business conditions by adjust employee hours, rather than their ‘head count’. Notice that the underemployment rate also kicked upwards in periods of softer economic growth in the early 1990s, 2009 and 2015. Underemployment spiked upwards in 2020, reflecting the disruption associated with the pandemic.

Taken together, the unemployment and underemployment rates represent the labour force **underutilisation rate**. In June 2023, unemployment was 3.5 per cent of the workforce, and the underemployment rate was 6.4 per cent, meaning the underutilisation rate was 9.9 per cent – the first time it had fallen below 10 per cent in 40 years, but still representing significant spare capacity in the economy.

Among other labour market statistics, the ABS also publishes measures of:

- **part-time employment**, which now makes up about one-third of the workforce. This partly reflects workers wanting more flexible work, but also a trend for businesses to seek organisational flexibility and to be able to respond to fluctuations in demand for their goods and services. Hence the hours of work for part-time staff are susceptible to the economic cycle.
- **hours worked**, which offers an insight into current economic conditions, and points to likely changes in unemployment in the next couple of months. During an economic downturn, for instance, reducing hours tends to be the first response taken by businesses because it is preferable to laying off staff, especially those who have experience with the firm.
- the duration of unemployment (the period of time spent in unemployment). About 30 per cent of all unemployed people were classified as **long term unemployed** (having been unable to find a job for more than one year) as at June, 2023.
- **youth unemployment**, which is consistently higher than adult unemployment. In mid-2023, the unemployment rate for 15-19 year-olds was 14.4 percent, and 7.5 per cent for the 20-24 year cohort. The underutilisation rate for 15-24 year-olds was 26.5 per cent!

A standard working week is 38 hours. There are, however, many people working longer than this in their main job, and a large number of people working a second job. Over the years, the proportion of workers holding multiple jobs was about 5-6 per cent, but this had risen to a record 6.7 per cent in June, 2023. This amounted to

Key labour market measures

- Participation rate = $[\text{labour force} / \text{working age population}] \times 100$
- Unemployment rate = $[\text{number of people who are unemployed} / \text{labour force}] \times 100$
- Underemployment rate = $[\text{number of part-time workers seeking more work} / \text{labour force}] \times 100$.
- Underutilisation rate = unemployment rate + underemployment rate

958,000 people. Many cited cost-of-living pressures as the main reason for taking on a second position. Perhaps there should be an 'over-employment' classification in the labour force data!

Review Quiz

1. *How is the unemployment rate measured?*
2. *What is meant by the 'participation rate'?*
3. *Distinguish between unemployment and underemployment.*
4. *An ABS survey showed that both employment and unemployment increased in the same month. How could this be explained?*

The types and causes of unemployment

Unemployment is regarded as **voluntary** when a worker decides to leave a job to search for another position. **Involuntary unemployment**, on the other hand, occurs when a worker is laid off from their place of work (perhaps because there is not enough demand for their services, or for other reasons such as business restructuring).

Economists generally define three main categories of unemployment – frictional, cyclical and structural.

Frictional unemployment

There is a constant flow of people into and out of the work force. About 1.3 million Australians changed their job in the last financial year (9.5 per cent of the work force) according to the Australian Bureau of Statistics. This includes school-leavers trying to find their first job; people unhappy in their current position seeking better pay or conditions; people seeking work closer to home; and those rejoining the work force after taking some time off.

The processes of finding work, or of finding the best person to fill an advertised vacancy, will take some time and involve considerable effort. Employers have to post job vacancies, read resumes and conduct interviews. Job seekers need to find suitable positions, write applications and prepare for interviews. As a result, there is always some level of unemployment that comes about just because of the day-to-day dynamics of matching people and jobs. In economics, this is described as **frictional unemployment** – a relatively short-term form of joblessness when a worker is between jobs.

On the ‘demand side’ of the labour market, about 470,000 new businesses start operating each year, and 300,000 close their doors.

In economics, the term ‘friction’ is used to explain why markets don’t work perfectly (why they can’t match demand and supply to ‘clear’ the market quickly). Frictional unemployment is also called **search unemployment**, because finding a suitable job involves ‘search costs’ – the time and effort involved in finding a job, or a suitable candidate. Even in the same occupation, the search process can be time-consuming. An accountant, for example, might work in a suburban practice that deals with small business and taxation matters, yet be seeking a position in a central business district (CBD) firm that does more advisory work with larger companies. She might have to leave the first job to devote enough time to finding a more suitable one.

Frictional unemployment is likely to be of short duration (less than three months). It has costs for the individuals involved and for the economy (such as lower productivity), but it is beneficial if the search process leads to better outcomes for workers and their employers.

Depending on the phase of the business cycle, it is likely that one to one-and-a-half per cent of the workforce is frictionally unemployed. During a downturn, people are probably more reluctant to leave a job if they think it will be difficult to find a new one! Conversely, we would expect more job search in a strong economy. As we will discuss, job search is a key reason why unemployment never actually gets to zero!

Duration of unemployment (% of total)	June 2023
< 4 weeks	20
4-12 weeks	22
13-26 weeks	20
26-52 weeks	10
52-104 weeks	19
> 2 years	9

ABS. Labour Force Australia, Detailed July 2023

Cyclical unemployment

The demand for labour is derived from the demand for final goods and services. Therefore, **cyclical unemployment** can be expected to follow the ups and downs of the business cycle (see chapter eight). When there is a slowdown in the level of economic activity, unemployment will tend to rise in occupations where income or revenue has fallen. On the other hand, when the level of consumer and business spending is high, we would expect strong demand for labour to meet demand, and cyclical unemployment will fall.

Many economists refer to cyclical unemployment as **demand-deficient unemployment**. Cyclical downturns feature restrained spending on consumer durables, reductions in the level of business investment, and lower business and consumer confidence. As a result, business profitability is under pressure, and firms may ‘shed’ labour in order to reduce costs and remain viable.

As shown in figure 10.3, unemployment increased rapidly in Australia's two recessions and one downturn since 1990. The rate of unemployment rose by 4 per cent in the early 1990s; by 2 per cent in the GFC; and about 1.5 per cent at the onset of Covid-19 (although a larger increase had been expected).

Cyclical unemployment is more likely in some sectors of the economy than others. Building and construction employment tends to soften when growth slows, as it does in sales-oriented jobs like discretionary good and motor vehicle retailing. Jobs in hospitality and tourism will be also harder to find, reflecting the impact of a downturn on disposable income. A downturn would tend to have less impact in job markets associated with education, health and the public service, because demand for those occupations depends more on population size and its service requirements than variations in economic activity. Cyclical unemployment is likely to be of medium duration (between three months and a year).

Cyclical unemployment falls in periods of economic expansion. Indeed, the peaks of economic activity in 2000 and 2007 featured cyclical unemployment rates near zero. Supposedly, everyone with sufficient skills who wanted a job could find one! In June, 2023, the record low unemployment rate (3.5 per cent) indicated that the labour market was similarly tight (although the post Covid-19 market may be a little unusual because migration was lower and people seem to have become more interested in flexible work).

Structural unemployment

Structural change refers to shifts in the way an economy, industry or market operates

An economy's 'structure' is the framework of its economic system. It reflects the way in which questions about production and distribution have been answered in the past, and describes the economic institutions; the ownership of resources; the products produced; the way markets work; and the way the benefits of economic activity are distributed among stakeholders.

The structure of the economy changes over time, and this has significant implications for the composition of employment (the industries and jobs in which people work) and the knowledge and skills people need to get those jobs. In Australia, some structural trends have been evident for many years, such as the decline of manufacturing and the rise of services. Others are more recent – the increase in 'outsourcing'; the fragmentation of supply chains and changes in energy generation being examples.

Some recent examples of structural change may be familiar:

- the Covid-19 pandemic triggered a shift in how and where Australians work. More than 40 per cent of employed people were regularly working from home during mid-2023 (ABS);
- Australia has the world's highest per-capita penetration of solar energy, with almost one in three homes hosting solar panels (National Energy Market);

- record sales of electric vehicles in the first six months of 2023 took the number of EVs on Australian roads to roughly 130,000 (Electric Vehicle Council); and
- the global artificial intelligence (AI) market is expected to grow at a compound annual growth rate of 40 per cent between 2023 and 2030.

As new industries grow, and others decline, it is very likely that there will be some mismatch between the knowledge and skills required, and those on offer in the supply side of the labour market. This is known as **structural unemployment**. You no longer see job advertisements for bank tellers; coal miners; typists; book-keepers and telephone operators. There is, however, demand for the technical, problem-solving and interpersonal skills that underpin ‘knowledge economy’ jobs.

In theory, structural unemployment should be temporary, as those that have been displaced can re-train, re-skill or move to another area to get a job. The duration of unemployment may be quite long, however, especially for older workers, those who work in unskilled positions, or have less formal education. As the sidebar on a previous page shows, over 30 per cent of the unemployed at June 2023 were long term unemployed (defined as having been unemployed for more than one year).

Structural unemployment also tends to affect some sections of the economy more than others, such as older manufacturing suburbs or regions, industries based on less renewable natural resources such as coal-mining or timber-milling, and industries in sectors of the economy that are ‘mature’.

In September, 2023, the government released “Working Future” - a white paper on jobs and the labour market.

Figure 10.4 Occupation change projections

Occupational change - projections (selection), 2021 - 2026	Projected rate of change (%)
ICT support and test engineers	44
Database and systems administrators	39
Audiologists and speech pathologists	35
Management and organisation analysts	32
Aged and disabled carers	29
General clerks	-9
Machine operators	-10
Printers	-12
Engineering production workers	-14
Bank workers	-17
Secretaries	-19

Structural change determines ‘jobs-in-demand’ in future years. The majority of occupations projected to grow strongly are skill level 4 or 5 jobs. Skill level is measured by:

- *the level or amount of formal education and training*
- *the amount of previous experience in a related occupation, and*
- *the amount of on-the-job training*

Source: ABS, ANZSCO - Australian and New Zealand Standard Classification of Occupations

Source: www.jobandskills.gov.au
Accessed August 2023

Over time, the demand-generation effects of new technology tend to outweigh its displacement effects. But the pace of change in recent years has been rapid, and structural unemployment has been persistent as a result.

Review Quiz

1. *Three key words that describe frictional unemployment are 'voluntary', 'search' and 'temporary'. Explain.*
2. *Why is cyclical unemployment described as 'demand deficient' unemployment?*
3. *Suggest two occupations that are likely to be affected by movements in the business cycle, and two that are unlikely to be impacted.*
4. *Explain why structural unemployment is considered a 'normal' type of unemployment*

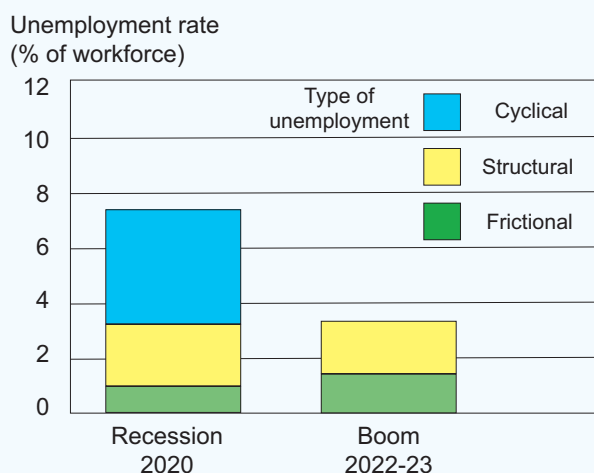
The natural rate of unemployment

The natural rate of unemployment consists of just frictional and structural unemployment.

Referring again to figure 10.3, we see that the lowest rates of unemployment in Australia since 1990 occurred in 2007-2008, when the unemployment rate was in the low four per cent range, and in 2022-2023, when unemployment was also below four per cent. Why doesn't unemployment ever seem to get near zero per cent? What does 'full employment' actually look like? In a normal dynamic economy there will always exist both frictional and structural unemployment. Over time, workers change jobs, new graduates enter the labour force and changes in technology will cause structural change. Full employment is associated with the economy operating at full capacity where cyclical unemployment equals zero. This is equivalent to the economy operating on its production possibility frontier. But even at full employment, there will always exist some frictional and structural unemployment. This rate of unemployment is known as the '**natural rate**' (U_n).

$$U_n = \text{frictional unemployment} + \text{structural unemployment}$$

In Australia the natural rate of unemployment is currently estimated to be around 4 per cent. This rate could, for example, consist of 2 per cent frictional and 2 per cent structural. The natural rate can and does change over time. In the 1960s it was around 1.5 per cent whereas during the 1980s, it had increased to over 5 per cent. It is important to remember that natural rate is an estimate, as there is no specific measure of the three types of unemployment. Figure 10.4 helps us to understand the concept - it breaks down the unemployment rate into its three components (frictional, structural and cyclical) for a recession period (such as in 2020), and a boom period (such as 2022-23). In the Covid recession of 2020, the unemployment rate increased to 7.5 per cent of the work force, and 1,012,600 people were without a job. Of this, perhaps one percentage point was due to frictional unemployment

Figure 10.5 Unemployment and economic cycles

This chart compares the three types of unemployment in a recession (2020) and a boom period (2022-23). Cyclical unemployment rises significantly in a contraction, but will be zero in a booming economy.

and 2.5 percentage points was due to structural unemployment (the mismatch between worker skills and market requirements). The other four per cent could be attributed to cyclical unemployment resulting from the contraction in economic activity.

In contrast, the Australian economy in the period after the pandemic was very strong. The average monthly unemployment rate during the first 6 months of 2023 was just 3.5 per cent. Job vacancies more than doubled between August 2020 and August 2022. The labour market was very tight – labour shortages were evident across many sectors including construction, hospitality and professional services. How would a boom period be reflected in the three types of unemployment? The frictional component would likely have increased, because workers would be encouraged to re-enter the labour force as the economy improved. Structural unemployment would have accounted for perhaps two percentage points of total unemployment, reflecting an on-going mismatch between worker skills and modern market requirements. Together, frictional and structural components accounted for 3.5 percentage points of total unemployment. The cyclical component, however, had fallen to zero due to the strong demand for labour.

In the 1960s, the natural rate of unemployment was around 1.5 per cent of the workforce. This is much lower than the estimated rate of four per cent rate for today's economy. Why has the natural rate increased? The answer is quite complex, influenced by a large number of changes that have affected the labour market:

- Rapid technological change has increased the level of knowledge and skills demanded in many types of work. This has been driven by the penetration of computers into production, communication and household products.

- The Internet has become a tool for through which job seekers can search for jobs with relative ease. Social networking sites such as LinkedIn have changed how people find work and promote their knowledge, skills and experience. More informed workers are more likely to change jobs.
- The world is now more integrated economically and socially due to globalisation. Integration has had positive effects such as increasing trade opportunities and world economic growth.
- The rise of concerns about the environment and the climate has caused rapid growth in some sectors, and decline in others (such as coal mining and timber milling from old-growth forests).
- The casualisation of the workforce and the outsourcing of many jobs. In the past, many expected to spend much of their working life employed by the same company! Today, it is more likely for people to expect many job and career changes in their working life.

These factors have had a significant impact on the 'noncyclical rate of unemployment' over time.

The Phillips curve

The Phillips Curve indicates that there is a negative relationship between inflation and unemployment.

Changes in unemployment and inflation are closely linked to the business cycle model. Inflation is a procyclical variable - demand inflation will tend to rise as the level of economic activity increases. In a boom phase of the business cycle, demand inflation will be very high, while during a recession inflation will fall to below 2 per cent and may even be negative (**deflation**). A negative rate of inflation can occur if the price level falls from one quarter to the next. Unemployment on the other hand, is a countercyclical variable - cyclical unemployment will fall as the level of economic activity increases. In a boom phase of the business cycle, the unemployment rate will fall below the natural rate, while during a recession it will increase relatively quickly. It is important to note that the unemployment rate can never be negative. If we compare the unemployment rate and the inflation rate over a period of time then we are likely to see a negative relationship - as unemployment falls, inflation should rise (and vice versa).

The logic behind this negative relationship is that as economic activity increases, the unemployment rate will fall. Excess demand in the labour market will lead to increasing wages as employers compete for workers. Higher wages increase production costs and this is normally passed onto consumers as higher prices, thus leading to a rise in the rate of inflation. This negative relationship between unemployment and inflation was first researched by a New Zealand economist in 1958 (William Phillips) and now bears his name - the **Phillips Curve**. It highlights one of the most important relationships in macroeconomics.

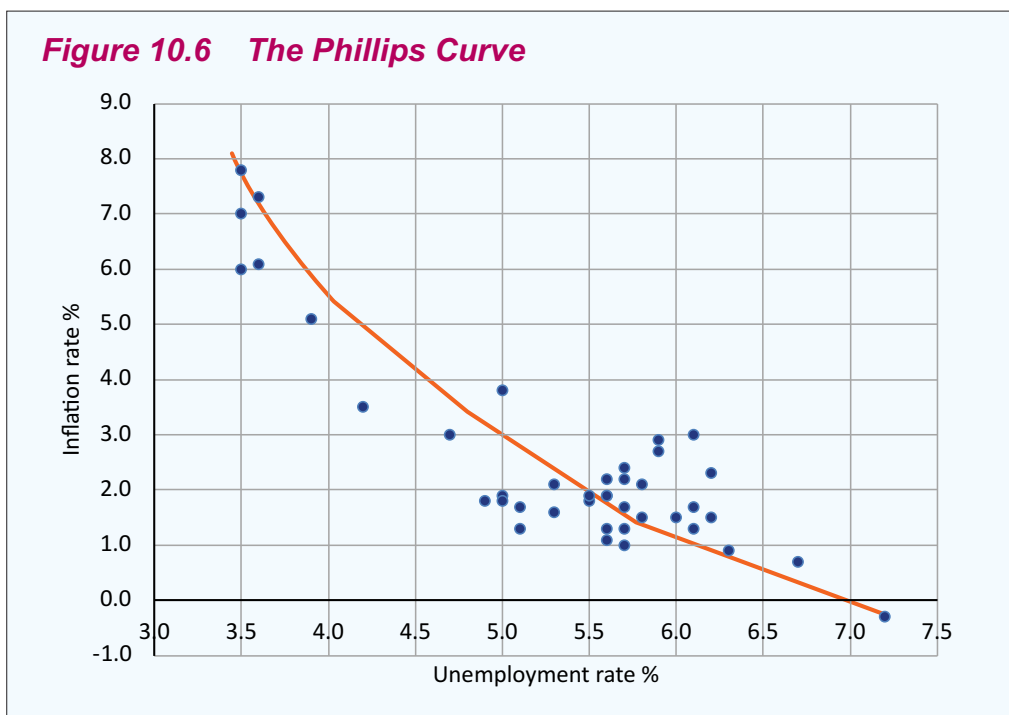
Figure 10.6 The Phillips Curve

Figure 10.6 plots Australian unemployment and inflation data for each quarter from 2013 to 2023. Inflation is plotted on the vertical axis while the unemployment rate is plotted on the horizontal axis. The curved line is the 'line of best fit' and reveals a definite Phillips curve for the period. It is evident that as the unemployment rate decreases (rises), the inflation rate increases (decreases). The curved line suggests that a 1 per cent change in the unemployment rate causes a 2 per cent change in the inflation rate. A movement down along the Phillips curve would indicate that the economy is slowing with rising unemployment and falling inflation.

The Phillips curve is a useful policy tool for the Government and the Reserve Bank when assessing their policy objectives. It suggests that there is a 'tradeoff' between inflation and unemployment. If policymakers want to reduce unemployment to low levels because they believe the costs of unemployment are too high, then they risk the negative costs of high inflation. If policymakers believe that high inflation has more significant costs, then they can reduce the level of economic activity, but the tradeoff will be that unemployment will increase.

The NAIRU

In the previous section, we discussed the concept of the natural rate of unemployment – the level of unemployment associated with the economy operating at full capacity (operating on the production possibility frontier). The natural rate is a medium to long-run concept of unemployment that captures the presence of structural and frictional unemployment in the labour force. The data in figure 10.6

The NAIRU is the lowest rate of unemployment achievable without driving inflation above acceptable levels.

prompts a slightly different question – what is the rate of unemployment below which the inflation rate starts to rise beyond acceptable levels (usually regarded as 2-3 per cent)? In other words, what is the **non-accelerating inflation rate of unemployment (NAIRU)**. This (rather clumsily named) concept is used by economists to assess the extent of labour market ‘slack’ and its influence on the price level.

The Organisation for Economic Cooperation and Development (OECD) estimated the NAIRU in its member countries in 2020. The estimates ranged from 2.9 per cent in Japan to 14.9 per cent in Spain. For Australia, the NAIRU estimate was 4.5 per cent. In other words, if conditions in the economy are such that unemployment falls below 4.5 percent, it is likely that price increases will accelerate beyond the 2-3 per cent level that is regarded as acceptable. Like the natural rate, the NAIRU is not directly ‘observable’ - there is no metric that could easily be applied to measure it accurately. It may be lower than 4.5 per cent if we take into account current high levels of underemployment, where changes in hours worked are a more flexible way to react to changes in economic conditions.

Check your understanding

An economy experiences a contraction in economic activity. Which one of the following most accurately describes the likely effects of this?

- A. Inflationary pressure rising; unemployment falling*
- B. Inflationary pressure rising; unemployment rising*
- C. Inflationary pressure falling; unemployment falling*
- D. Inflationary pressure falling; unemployment rising*

Answer: In a contraction we would expect inflation to decline and unemployment to rise. Alternative D is the correct answer.

The effects of unemployment

Unemployment has significant affects for individuals, their families, their communities, and the economy. In this section, we focus on its economic impact. We should acknowledge that mild unemployment has some economic benefits. The constant flow of people into and out of the work force that we categorised as frictional unemployment has benefits for the individuals involved, and for the economy. A new job might provide individuals with improved pay and conditions, more opportunities, new knowledge and skills, or perhaps a better ‘work-life balance’. From a ‘whole economy’ point of view, better use of resources increases **efficiency** and **productivity**.

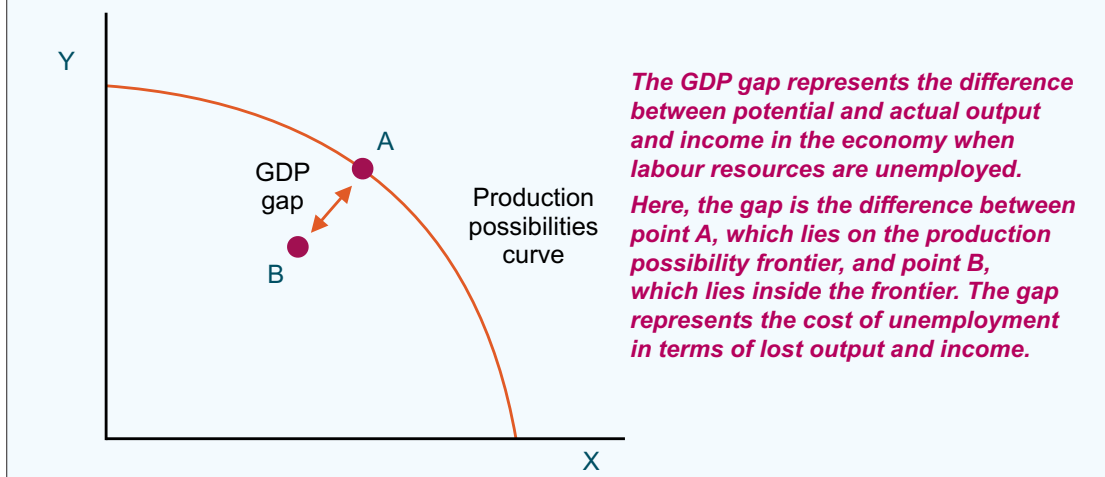
Further, the prospect of becoming unemployed due to structural change is probably an incentive for individuals to improve their workplace performance through skills acquisition and training, so that they have transferable skills in the event of becoming unemployed.

The GDP gap

To illustrate the economic impact of unemployment, we apply the **production possibility frontier (PPF)** model described in chapter 1. Productive efficiency is achieved when available resources are used to produce as many goods as possible. This outcome occurs at all the points on the production frontier. Point A in figure 10.7 is an example of such a point. At point B, however, production is inefficient as resources (in this case, labour) are not fully utilised. Actual levels of output, income and employment in the economy are less than the potential levels. This is called a **GDP gap**.

With a few assumptions, it is possible to estimate the **direct costs** of the GDP gap – lost income for households, lost tax revenue for government, and the cost of unemployment benefits. In July, 2023, the AWOTE (average weekly ordinary time earnings) for full-time employees was approximately \$1850 (ABS). There were 530,000 people unemployed, so the direct cost to the community in lost income and taxation revenue was around \$52 billion per year, equivalent to 2.4 per cent of GDP. Unemployed people usually qualify for the JobSeeker allowance which for a single person over 21 years of age is approximately \$700 per week. If we multiply this by the number of unemployed people, the cost of unemployment benefits exceeds \$19 billion per annum, or 0.8 per cent of GDP. Thus the total direct cost in terms of lost income and the cost of welfare were about 3.2 per cent of GDP in 2023.

Figure 10.7 Unemployment costs: the ‘GDP gap’



Unemployment results in a lower **standard of living** for affected households because they have less disposable income. Lower spending flows reduces sales revenue for businesses making it harder to fund spending on research, innovation, capital equipment and employee training. We also need to consider the **indirect costs** of unemployment – the opportunities or benefits that could have been obtained had the lost taxation and welfare payments been spent on infrastructure, health, or education.

Unemployment represents wastage of **human capital** – the stock of knowledge and skills held by workers. Unemployed people are missing out on the on-the-job training that comes from contact with customers and other workers. About 20 percent of the 500,000 people unemployed in mid-2023 were **long term unemployed**, meaning they had not held a paid job for at least a year. The effects of unemployment may be particularly long-lasting for those who have low levels of educational qualifications and skills, and those who cannot easily adapt to the changing requirements of the workforce. Some of these are likely to become **discouraged workers** – people who have been unemployed for so long that they eventually give up the search for a job and leave the labour market.

Unemployment tends to affect some groups of people more than others. The unemployment rate for the 15-24 year age group is typically twice the official unemployment rate. Many young workers nowadays find it difficult to get strong attachment to the work force until their late twenties. Despite the fact that unemployment benefits are available, they do not provide for a comfortable lifestyle. There are real personal, family and social disadvantages associated with unemployment, particularly for those who have been out of work for a long period of time. These disadvantages also contribute to the financial and opportunity costs of unemployment for society.

Check your understanding

Unemployment rose in an economy despite overall economic growth. This is most likely to be explained by an increase in

- A. cyclical unemployment.*
- B. job vacancies.*
- C. structural unemployment.*
- D. the school leaving age.*

Answer: If the economy is growing then cyclical unemployment would decrease. An increase in job vacancies would indicate that unemployment would be falling. An increase in the school leaving age would reduce the unemployment rate. Therefore alternative (D) is the only correct answer - economic growth often results in structural change causing structural unemployment to increase.

11



Government in the macroeconomy

Learning Objectives

In this chapter you will learn about:

- *the size and composition of Commonwealth government revenue and spending in Australia*
- *the distinction between direct/indirect taxation and progressive/regressive/proportional taxation*
- *types of Commonwealth taxes*
- *the concepts of income and wealth*
- *the measurement of income and wealth distribution*
- *the macroeconomic objectives of the Australian Government*

The economic role of government

Over time, Australia has developed a three-tier system of government. Each tier has different roles and responsibilities. The main functions of the national (Commonwealth) government include national defence and security; immigration and border protection; social security; infrastructure and transport; environmental protection; and economic management. The eight state and territory governments are responsible for the provision of law and order, health, education and transport, some of which are done in conjunction with the Commonwealth. Local and municipal governments (of which there are more than 500) are typically responsible for functions such as urban planning, refuse collection and recycling, parking, and the maintenance of parks and gardens in geographic areas of varying size – sometimes just a few suburbs.

Australia has just over two million public sector employees, about 80 per cent of whom are employed by state governments, 12 per cent by the Commonwealth, and 8 per cent in local governments. The government sector produces about a fifth (by value) of all the goods and services produced in the Australian economy each year. Government or its agencies own about 20 per cent of the transport and construction industries; communication; electricity, gas and water services, but less than 10 per cent of industries such as finance, manufacturing and agriculture.

In general terms, government institutions create the framework of the society and economy in which we live. Australia's political and legal institutions support a high degree of individual freedom; create the foundation to support property rights and rules and regulations; and often take direct action to improve social outcomes.

More specifically, the economic roles of the government in a **modified market economy** such as Australia can be categorised as:

- the provision of public goods and services;
- the regulation of business enterprises;
- the redistribution of income; and
- macroeconomic management.

The first two of these roles were introduced earlier in this book. In chapter 4, we described how the government can use tools such as taxes and subsidies to increase the efficiency of markets. In chapter 5, the policy options to influence market power; to correct for externalities and to reduce market failure associated with public goods and common resources were described.

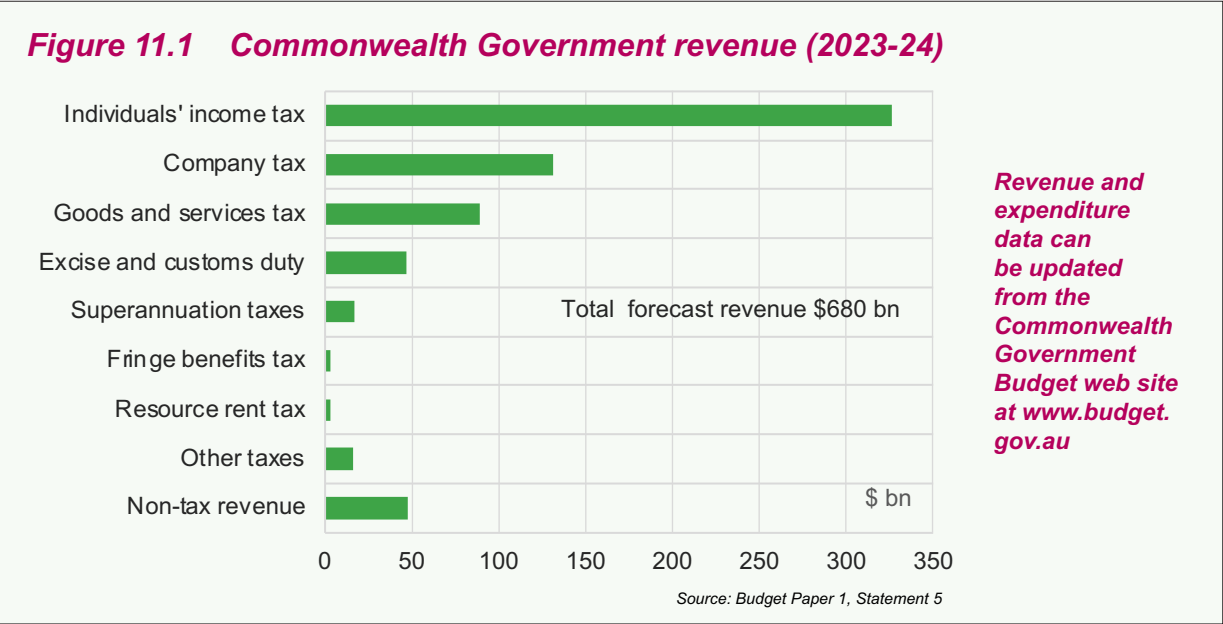
Obviously, carrying out these functions costs a lot of money! Sections 11.2 and 11.3 of this chapter discuss the ways in which the Commonwealth Government raises and spends funds, and includes some discussion of the economic principles that apply to Australia's taxation system. Later sections introduce the income redistribution and macroeconomic management roles of government.

Commonwealth Government revenue

Each year (usually in May) the Commonwealth Government delivers its **budget** – a plan for how it will collect and spend money in the coming year. As shown in figure 11.1, the Commonwealth Government planned to collect \$680 billion in revenue in the 2023-2024 financial year. Ninety-two per cent of that revenue is raised by various forms of taxation. Most people complain about having to pay tax, even though they recognise that taxation finances a wide variety of goods and services that are essential for the operation of the economy and civil society. **Income tax** has been the major method of raising government revenue since the late 1930s. Prior to that, the bulk of taxation was levied on sales of goods; property holdings; and customs duties. Uniform income taxation laws came into force in Australia in 1942, when the Commonwealth government took over the collection of income tax from the states. The ‘bases’ from which the government collects the various types of tax in Australia are discussed below. In doing so, we also discuss some of the economic principles of taxation.

Income tax

The largest component of planned Commonwealth Government revenue in 2023-2024 was individuals income tax (\$326 billion, or 48 per cent of total revenue). Recent Australian Tax Office (ATO) figures indicate there are about 15 million individual taxpayers in Australia.



Individual taxpayers pay tax on money they earn from:

- paid employment (wages or salaries);
- income received from trusts, partnerships or businesses;
- investment income such as rent on property, interest on savings accounts or dividends on shares in public companies;
- capital gains (when an asset such as property; a parcel of shares; or a collectable item is sold for a price greater than its purchase price);
- welfare payments including the age pension and Jobseeker; and
- foreign income from any source.

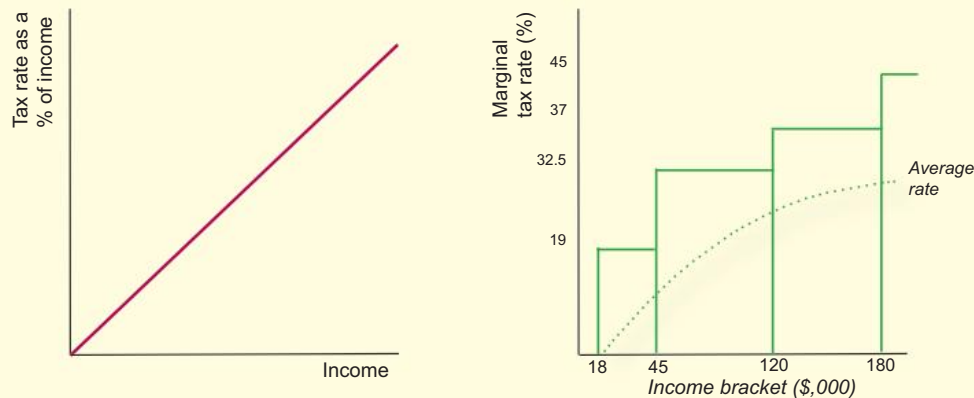
Personal income tax is classified as a **direct tax**, because it is deducted from the taxpayer's weekly or monthly wage or salary and sent directly to the tax office. Australia now uses a 'single touch' payroll system, in which employers report tax payments direct to the ATO.

In general, a direct tax is imposed on income while an indirect tax is imposed on expenditure.

Income tax is **progressive** in nature. This means that as people earn a higher income, they pay a higher proportion of that income as tax. In practice, Australia has a system of tax steps (income brackets) to simplify the relationship between income received and tax payable. In each bracket, the **marginal rate of tax** is higher (the marginal rate being the proportion of each additional dollar of income that will be paid in tax). The sidebar on the next page provides more detail. No tax is payable until assessable income exceeds \$18,200. This is known as the 'tax-free threshold'. The other four brackets specify increasingly higher marginal rates of tax. In the second bracket, the marginal rate of tax payable is 19 cents in each dollar. Thus, a taxable income of \$30,000 in 2022-2023 would have attracted taxation of \$2242.

Figure 11.2 A progressive tax

A progressive tax means the rate of tax paid rises as income increases. Australia's income tax system is progressive but the marginal rate rises in a series of 'income brackets'.



The **average rate of tax** (tax payable divided by income) is 7.5 per cent. A person earning \$60,000 falls into the third bracket, and would pay \$9,967 in tax (16.6 per cent of their income). A gross income of \$90,000, which falls in the 32.5 per cent marginal rate bracket, would attract tax of \$19,717 (an average rate of 21.9 per cent of income). Someone on \$200,000 is on the highest marginal rate (45 cents in every dollar of income) and would pay 27 per cent of their income in tax. So the essence of progressive income tax is that higher rates of tax are deducted as income rises. Both the marginal and the average rate of tax rise as we move into higher tax brackets. Note however that the calculations exclude the Medicare surcharge – a 2 per cent levy to finance the national health scheme.

Marginal rates of tax	
Income \$	MRT
2022 - 2024	
0-18,200	nil
18,201-45,000	19
45,001-120,000	32.5
120,001-180,000	37
>180,000	45

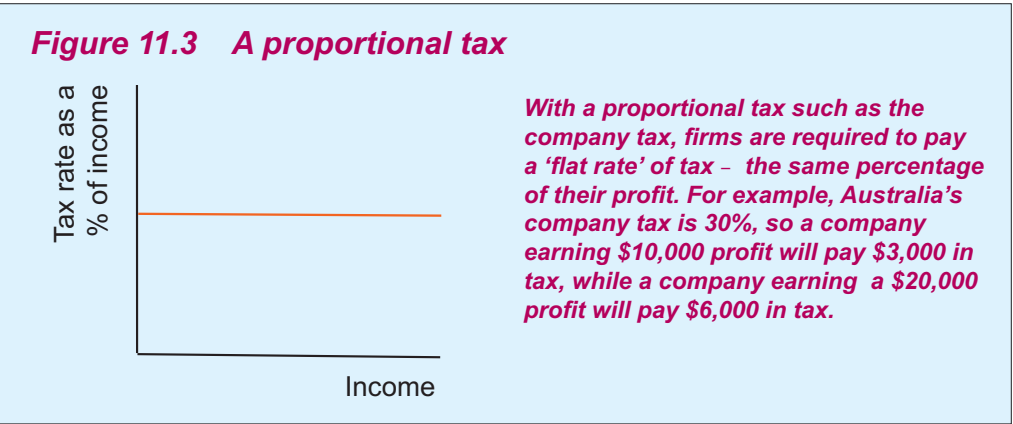
Proposed for 2024 - 2025	
0-18,200	nil
18,201-45,000	19
45,001-200,000	30
>200,000	45

Source: Australian Tax Office, 2023.

Company tax

In Australia, registered companies range from single-director companies with no employees, up to the largest public companies (most of which are listed on the Australian stock exchange). Companies pay tax on their profit (sales and other revenue, less cost-of-sales expenses). Companies are subject to a ‘flat’ tax rate of 30 per cent on their taxable income, no matter how large that profit may be. Small or medium businesses (those with a turnover less than \$50 million) are subject to a reduced tax rate of 25 per cent. Company taxes were forecast to raise 19 per cent of government revenue in 2023-24. About 2,500 companies pay 65 per cent of the total corporate tax paid.

Company tax is also a direct tax because it is levied on the company as the taxpayer. The cost burden of the tax falls directly on owners and shareholders, but it is likely that the tax is passed on to consumers if the tax is factored in as a cost of production. Company tax is classified as a **proportional tax**, because all companies pay the same percentage of their profit in taxes. For the standard rate of company tax in Australia (30 per cent), a \$10,000 profit is liable for \$3,000 tax and a \$20,000 profit attracts \$6,000 taxation. Figure 11.3 illustrates a proportional tax.



Goods and services tax (GST)

The third largest item of tax revenue is the Goods and Services Tax, for which forecast revenue was \$89bn in 2023-24). GST is levied at the rate of 10 per cent on goods and services sold domestically for consumption. The tax is included in the final price of the good, paid by consumers at point of sale, and passed to the government by the seller. Most basic foods, some education courses and some medical, health and care products and services are exempt from GST.

All of the revenue raised by the GST is distributed to the states, with the amount received depending on a Commonwealth Grants Commission assessment of the spending needs and revenue-raising ability of each state.

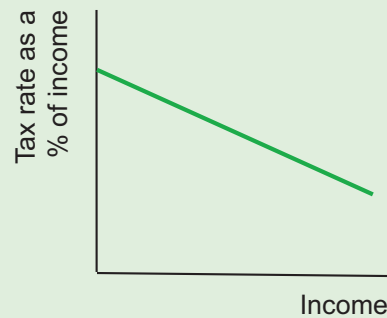
GST, like the sales taxes that preceded it before 2000, is an **indirect tax**. It is a tax on spending – collected by the seller of the good or service, but included in the price and thus paid by the buyer. Importantly, sales taxes and the GST are regarded as **regressive** taxes (refer to figure 11.4). This means it takes a larger percentage of income from low-income earners than from higher-income earners. GST on a \$30,000 car would be \$3,000. For a taxpayer earning \$60,000 per annum, the tax would therefore be 5 percent of their income. Someone earning \$120,000 would still pay \$3,000 GST on the car, but that is just 2.5 per cent of their income! Taken at face value, this may seem ‘unfair’. But for a retailer to ask every customer about their income before calculating the amount of tax would be unmanageable!

Excise and customs duty

Excise and customs duties were forecast to contribute \$47bn to Commonwealth Government revenue in 2023-24. Excise duty is a tax on alcohol, fuel and tobacco products. The wholesaler of the product pays the tax on the basis of total sales. For example, a fuel retailer such as BP or Shell would pay 46 cents in tax on each litre of petrol sold in its retail network over a period of time. As the tax is passed on to the consumer, excise tax is an indirect tax because it is a tax on expenditure. As the rate of tax is constant (see sidebar), excise tax is also regressive – it is a greater burden on lower income earners.

Figure 11.4 A regressive tax

A tax such as the GST is also a flat rate tax, but it is considered regressive because it takes a larger percentage of income from low-income earners than from higher-income earners. For a \$70,000 car, the \$7,000 GST is a much higher proportion of income for someone earning \$120,000 p.a. than it is for someone earning \$180,000.



One explanation for placing excise taxes on some goods is to create a disincentive to consumption! Products such as alcohol, tobacco and gambling are proven to have considerable direct and indirect costs for individuals, their families and the community. To discourage consumption, they have been taxed at increasing rates over time. For example, the excise on cigarettes is currently \$1.16 per stick (up from 19 cents per stick in 1999). But excisable goods tend to be relatively **price inelastic** due to their necessary or addictive nature, so increases in price will not necessarily reduce consumption a great deal. They are, however, effective in raising government revenue, some of which can then be applied to educational campaigns to reduce consumption. For example, the ‘quit smoking’ campaigns have sent effective health messages to smokers, and they have been reinforced by the financial disincentive of rising excise rates.

Excise tax rates	
Good	Tax rate
Petrol	46.0c per litre
Diesel fuel	46.0c per litre
Cigarettes	\$1.16 per stick
Brandy	\$91.43 per litre of alcohol
Beer	\$52.49 per litre of alcohol

Source: Australian Tax Office, 2023

Customs duty (otherwise known as a **tariff**) is a tax levied on some types of imports when they enter the country through a ‘customs port’ such as an airport or seaport. Many years ago, tariffs were levied at high rates on imports regarded as a ‘competitive threat’ to Australian domestic industries. In 1987, for example, imported dairy products attracted a tariff of 22 per cent; imports of clothing and apparel were dutiable at 90 per cent, and imported motor vehicles 57.5 percent. The protective argument behind tariffs was that they raise the price of the imported product to a level comparable with Australian-manufactured products, thus reducing demand for the import and helping domestic firms to maintain their market share.

Customs duty has fallen over time to 5 per cent of the Australian dollar value of imports. The tariff reduction is a result of a process of ‘trade liberalisation’ that started in Australia in the early 1980s. As a result, customs duty is now responsible for just 2.5 per cent of government revenue. Tariff reductions were phased in over many years, allowing Australian companies time to innovate and cut costs to make sure they remained competitive against imports.

Taxes on superannuation

Most Australians holding superannuation accounts pay a 15 per cent tax on their contributions. This is generally less than the marginal rate of tax that would have been applied on income tax. This is known as a concessional contribution rate – its purpose being to encourage people to contribute to superannuation in preparation for retirement. Superannuation taxes were forecast to contribute \$17bn to government coffers in 2023-24 (about 2.5 per cent of total revenue). Superannuation contributions tax is also regressive, except that the concessional rate ceases after superannuation contributions exceed \$25,000 in any one year.

Fringe Benefits Tax

Fringe Benefits Tax (FBT) is levied (at the highest marginal tax rate) on the value of non-cash benefits given to employees as part of their salary package (such as company cars, school fees for children, and low interest loans). FBT was introduced in the mid-1980s in the interests of **vertical** and **horizontal equity** – the principle that people should pay tax according to their ability to pay, and those on the same income level should pay similar amounts of tax. These are regarded as important principles that should feature in any ‘good’ tax system (see box 11.1 at right).

Resource Rental Taxes

A number of countries levy resource rental taxes. In principle, resource rent taxes are imposed over and above company tax in industries where companies are extracting finite resources such as oil, gas and minerals, on the basis that these resources belong to citizens at large, and not just the company that has exploration and extraction rights. Australia levies a Petroleum Resource Rent Tax (PRRT) at the rate of 40 per cent of taxable profits on oil and gas production, but it collects only a small amount of overall tax revenue – some \$2.4bn in 2023-24. The taxable profit derived from a petroleum project in a year of tax is the excess of assessable revenue over the deductible expenditure and transferred exploration expenditure.

Other revenue

The Commonwealth Government also collects revenue from the sales of goods and services it provides to the public or business; from interest on funds it holds in various accounts; from dividends and distributions from the operations of companies in which it holds an interest; and even on fines and penalties levied on illegal behaviour! This non-tax revenue was forecast to raise \$50bn in 2023-2024.

Review Quiz

- 1. List two taxes that are levied on income in Australia, and two levied on expenditure.**
- 2. Explain why personal income tax is considered to be direct and progressive.**
- 3. Explain why sales tax is considered regressive.**
- 4. Suggest why excise duty is levied on tobacco products, but not on cafe meals.**
- 5. A commentator suggests the introduction of a flat rate 20 per cent income tax. How this might be evaluated against the principles of tax.**

Box 11.1 Is our taxation system good?

Is our taxation system good, or fit-for-purpose? To evaluate the system, it is important to understand some concepts and principles on which a tax system might be judged.

The criteria against which any change to the tax system should be judged probably boils down to a three-part question: “is it fair, is it simple, and is it efficient?” These principles are not new. Adam Smith’s “An Inquiry into the Nature and Causes of the Wealth of Nations” (1776) outlined four basic criteria to use in determining how ‘good’ a taxation system is. Smith’s ‘Canons of Taxation’ were equity, economy, certainty and convenience. A taxation system that achieves these characteristics will help improve the standard of living, because it will provide revenue for the government at minimal overall cost to taxpayers.

Fairness can also be called equity. A ‘good’ tax system will feature both horizontal and vertical equity. Simply put, taxpayers who earn the same amount of income should pay the same amount of taxation (horizontal equity), and taxpayers who have a greater ability to pay tax should pay higher amounts of tax (vertical equity).

A good tax system should be relatively simple. This can be interpreted in two ways. Firstly, all participants in the system should be able to understand what taxes they are obliged to pay, and how much they are liable to pay. Secondly, the process of collection should be as convenient

as possible for both taxpayers and the collectors. Finally, the tax system should be efficient. The benefits of the tax must outweigh the costs of its collection. This is the same principle we apply to all other economic decisions – go ahead with an activity if its benefits outweigh its costs. An economical tax must minimise ‘excess burden’, which occurs if the tax distorts decision-making or operates in a discriminatory manner. Consider two products, A and B, which are popular consumer items with similar characteristics (e.g. apples and pears). If apples were taxed, but pears weren’t, rational producers would produce more pears because sales revenue would be greater at the lower, non-taxed, price. This would provide them with an unfair advantage over producers of apples.

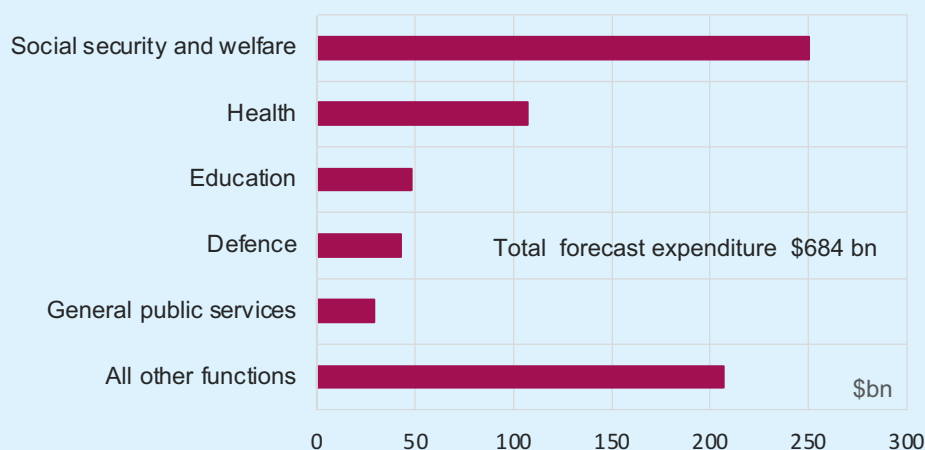
Could our tax system be better? Over the last forty years, Australia’s taxation system has seen many changes to address issues of efficiency and equity. These included introduction of a Capital Gains Tax in 1985; a Fringe Benefits Tax (1986); the GST in 2000; and self-assessment of tax liability (the tax office relies on information provided by the taxpayer and no longer checks all tax returns). Tax reform is an area of opportunity if improvements can be made to raise more money more efficiently. But reform is an area of controversy. Even when arguments for reform are solid, such as those made by the Henry Review of the tax system in 2009, governments of all persuasions find reform a politically difficult task.

Commonwealth Government expenditure

Over thirty years, Commonwealth Government expenditure has averaged just over 25 per cent of GDP (Gross Domestic Product). As shown in figure 11.5, planned spending for 2023-2024 was \$684 billion (in nominal or current dollar terms). The main types of expenditure are described below.

Social security and welfare

Social security and welfare is the largest functional expenditure of the Australian Government, accounting for about 36 per cent of all expenditure, or \$250 billion. At the moment, about 5.5 million Australians receive some form of income support payment, the main types being:

Figure 11.5 Commonwealth Government expenditure (2023-24)

Source: Budget Paper 1, Statement 6

- the age pension – 2.6 million Australians receive a full or part pension;
- unemployment benefits – about 1.3 million people received assistance, mainly from the Job Seeker Payment
- assistance to people with disabilities (about 1.1 million recipients)
- parenting payments – about 2.5 million people receive a family tax benefit to assist with costs associated with bringing up children; and
- payments to students – of which there are about 250,000 recipients.

Health

Health expenditure has accounted for around 15 per cent of all Australian Government expenditure in recent years. The main items of spending are:

- Medicare and private health insurance rebates (around \$40bn);
- pharmaceutical benefits;
- contributions to state governments' public hospital funding; and
- health services payments associated with delivery of programs in population health, disability insurance (NDIS); health infrastructure and medical research.

Education

The Commonwealth Education budget includes funding for child care, primary and secondary schools, technical education and university teaching and research. In addition, budgets usually extend funding to programs that promote excellence, access and equity in education.

Defence

The defence budget for 2023-24 accounted for 6 per cent of all Commonwealth spending (and about 2 per cent of GDP). Defence spending is forecast to rise as a result of the recommendations of the 2023 strategic review into defence spending, initiated as a result of geo-political tension in Europe and the Asia-Pacific region.

General assistance

General revenue assistance (also called 'untied funding') is paid to the States and Territories and local government to spend on any purpose. This is distinct from funding provided by the Australian government to other levels of government for agreed specific purposes such as building hospitals, infrastructure or funding schools. General assistance is largely funded by the GST, which is collected by the Commonwealth but transferred to the states and territories. General revenue assistance was forecast to be around 12 per cent of Government expenditure for 2023-24. Over \$200bn was spent on other functions, including transport and communication, public order and safety, fuel and energy, and recreation and culture.

Current and capital spending

Each of these types of spending include both current and capital funding. **Current spending** refers to funds necessary to keep government departments operating, such as salaries, rent, utility bills, and office supplies. There are over 65 Commonwealth departments and agencies employing 160,000 people in total.

Capital spending involves the acquisition of physical assets such as buildings and infrastructure, financial assets and provision of funds to state governments to purchase assets. Total general government capital investment amounts to \$10bn overall. Currently, the largest capital expense program is in the Defence budget to support planned spending on military equipment such as ships, submarines, aircraft and missile systems.

Review Quiz

1. *List the three largest social security payments in the 2023-24 Commonwealth Budget.*
2. *Distinguish between tied and untied funding.*
3. *Using relevant examples, distinguish between current and capital spending.*

Income distribution

Income and wealth

Income and **wealth** are different concepts – one represents a flow of funds, the other a stock of assets. They are closely linked, however, because the more income a household has, the greater its capacity for building wealth over time. Figure 11.6 illustrates the key components of income. Most households have more than one source of private income (such as a wage or salary; interest on a bank account; dividends from investments; income from superannuation). Private income may be supplemented by **transfer payments** from the government, such as a pension or allowance. Together, these constitute **gross income**. Direct and indirect taxes are deducted from gross income to determine **disposable income**. Most households also receive some form of **indirect benefits** (social transfers) such as assistance with school fees or health care costs, which add to **final income**.

In the latest year for which figures are available (2019-20) the mean household income was \$58,500 and the median was \$50,000 (the mean or average is higher because it includes a few very high incomes).

Wealth, on the other hand, refers to the current value of the assets a household has accumulated over time such as savings; investments; capital gains on property assets and inheritance. Net wealth is the difference between a household's assets and its liabilities. Household assets are generally held as property, shares, savings and superannuation, while liabilities include mortgages, other loans and credit card debt. The mean net household worth of the 'poorest' 20 per cent of households

Figure 11.6 Components of final income

Income from personal exertion is private income. For some, private income is supplemented by direct welfare payments and/or cash benefits.

Income is taxed (direct tax), as is expenditure (indirect tax).

Nearly all households' disposable income is supplemented by indirect benefits - subsidies and concessions for education, health and childcare.

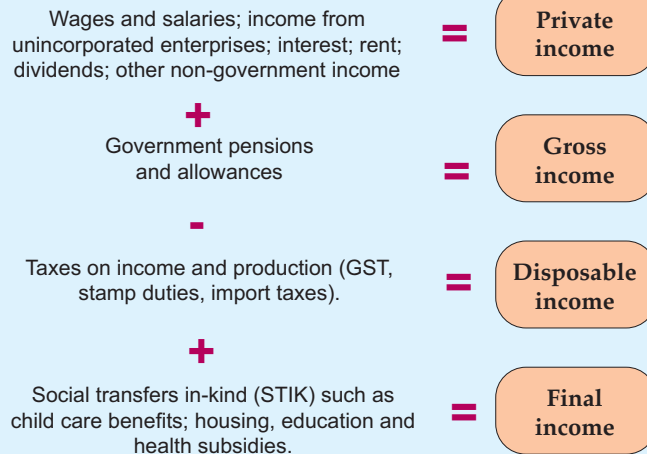
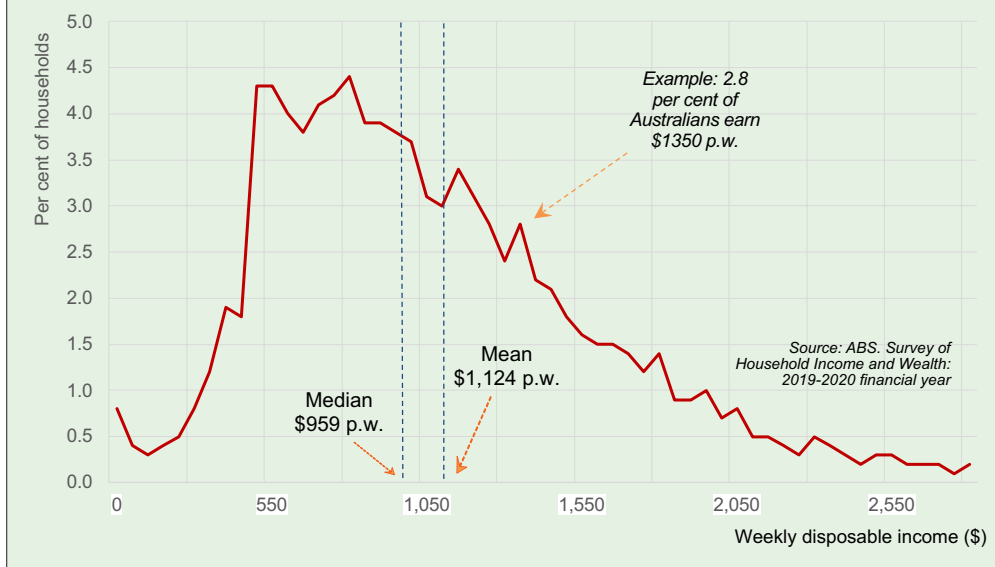


Figure 11.7 Distribution of household income, 2019-20

was \$35,200 in 2017-18; the wealthiest 20 per cent had average wealth exceeding \$3.2 million! Overall, average household net worth was \$1.04 million!

The distribution of income

Very few Australians live in **absolute poverty** (below a subsistence level of income). About 20 per cent of Australians live in **relative poverty**, however, meaning they do not achieve what our society defines as minimum **standard of living**. Figure 11.7 shows the distribution of household disposable income in Australia for 2019-20. The distribution of income is asymmetric – a small proportion of households have high incomes, and a larger number of people have lower incomes. The data has been ‘equivalised’ – adjusted for household size. The distribution of income has become slightly flatter over the last ten years – a smaller proportion have low incomes, and a higher proportion earn higher incomes! The mean disposable income (\$1124 per week) is higher than the median (\$959) – to be expected as the small number of households that earn very high incomes distort the distribution.

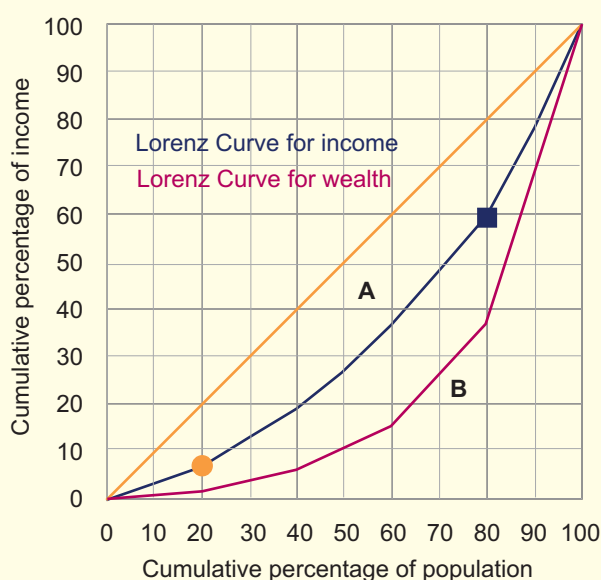
Economists apply a number of measures to describe income and wealth distribution. One of these is the **Lorenz Curve**, which maps the cumulative proportion of the population, ranked by income, against their cumulative share of income. The horizontal axis shows the cumulative percentage of population, while the vertical axis describes the cumulative percentage of income. The diagonal line describes perfect equality of income. Whenever some degree of income inequality exists, the Lorenz Curve will bow outwards, moving south-east of the diagonal line. The further the curve lies from the diagonal, the greater

Figure 11.8 The Lorenz Curve

The Lorenz Curve can be used to illustrate income or wealth distribution. If income was distributed equally, the Lorenz Curve would be the diagonal straight line. The blue line indicates the degree of inequality in income Australia in 2017-18. The orange circle shows that the lowest 20% of income earners in Australia earned 7.5% of total income. The blue square shows the top 20% of income earners earned 40.4% of total income. The crimson line is a Lorenz Curve for wealth in the same year.

The Gini index for income is region A / A+B. This index was 0.32 in 2017-18.

Source: ABS 6523.0 - Household Income and Income Distribution, Australia, 2017-18.



the inequality of the distribution of income. Any point on the curve shows the proportion of income earned by a given proportion of the population.

The Lorenz Curve in figure 11.8 is based on Australian Household Income data from 2017-18. The orange circle on the blue line shows that the lowest (poorest) twenty per cent of the population (x-axis) earned just 7.5 per cent of total income (y-axis). The black square shows that 80 per cent of the population cumulatively earned around 60 per cent of income – in other words, the top 20 per cent of the population earned 40 per cent of total income! A Lorenz Curve can also be drawn for Australia's household wealth. The wealth curve shows greater inequality – the top quintile of wealth-holders hold about 63 per cent of total wealth – the lowest quintile just 0.7 per cent!

Economists also use a measure called a **Gini coefficient** (or Gini Index) to measure the degree of income inequality in a country. The coefficient is the proportion of the area to the south-east of the diagonal that is accounted for by the area between the Lorenz Curve and the diagonal. The result is a number between 0 and 1. A society in which final income was equally distributed would have a Gini coefficient of zero. Absolute inequality, on the other hand, would yield a Gini coefficient of 1. In the last 20 years, Australia's lowest Gini coefficient was 0.291 (2004, 2009) and the highest was 0.33 (2007). Income equality in Australia increased between 1950 and 1980, declined over the next two decades, and has since remained fairly steady.

Like all statistics, the Gini coefficient may not always tell an accurate picture. Consider country X in which the top 50 per cent of the population receives all the income earned in equal amounts (that is, total income is distributed equally

Figure 11.9 Gini coefficients

The larger the coefficient, the greater the degree of income inequality in the country.

South Africa appears to have the highest Gini coefficient as at 2022 (0.63) and Slovakia the lowest (0.23)

Gini coefficients for selected OECD countries			
United States	0.39	France	0.30
United Kingdom	0.37	Switzerland	0.30
Spain	0.33	Ireland	0.29
Australia	0.32	Germany	0.29
Portugal	0.32	Sweden	0.28
Canada	0.30	Norway	0.26

Source: Australian Institute of Health and Welfare (AIHW) 2021 - based on OECD data

amongst 50 per cent of the population). The Gini coefficient for country X would be 0.5. In country Y, where 25 per cent of all income is earned equally by 75 per cent of the population with the remaining income earned equally by 25 per cent of the population would also have the same Gini coefficient – 0.5. Country Y would be judged to have a more even distribution of income.

A number of factors help to explain inequality in income and wealth in the Australian economy. These include:

- personal traits (physical characteristics; personality and talent; attitude to risk-taking; knowledge and skills);
- occupational conditions (required education and training, work responsibility; hours worked; presence of danger; geographical location);
- opportunity (socio-economic and family background, access to higher education); and
- other factors (for example, sickness; disability; age; involuntary unemployment; and 'luck').

Income redistribution

There seems little point discussing income distribution without introducing the role of the government in redistributing income from wealthier households to poorer ones.

As discussed earlier in the chapter, one of the reasons for government intervention is to redistribute income (and by extension, wealth) from the rich to the poor, the aim being to ensure that all people in Australian society are able to achieve a reasonable minimum standard of living. The key element of **income redistribution** is **direct taxation**. Personal income tax is progressive, so high income earners pay a greater proportion of their income in tax than low income earners. For example, a taxable income of \$30,000 for the tax year 2021-2022 attracts taxation of \$2242 (an average rate of tax of 7.5 per cent). A person earning \$60,000 is required to

pay \$9,967 in tax (16.6 per cent of their income), and a gross income of \$90,000 would attract a tax of \$19,717 or 21.9 per cent of income. Someone on \$150,000 per annum pays 27 per cent of their income in tax.

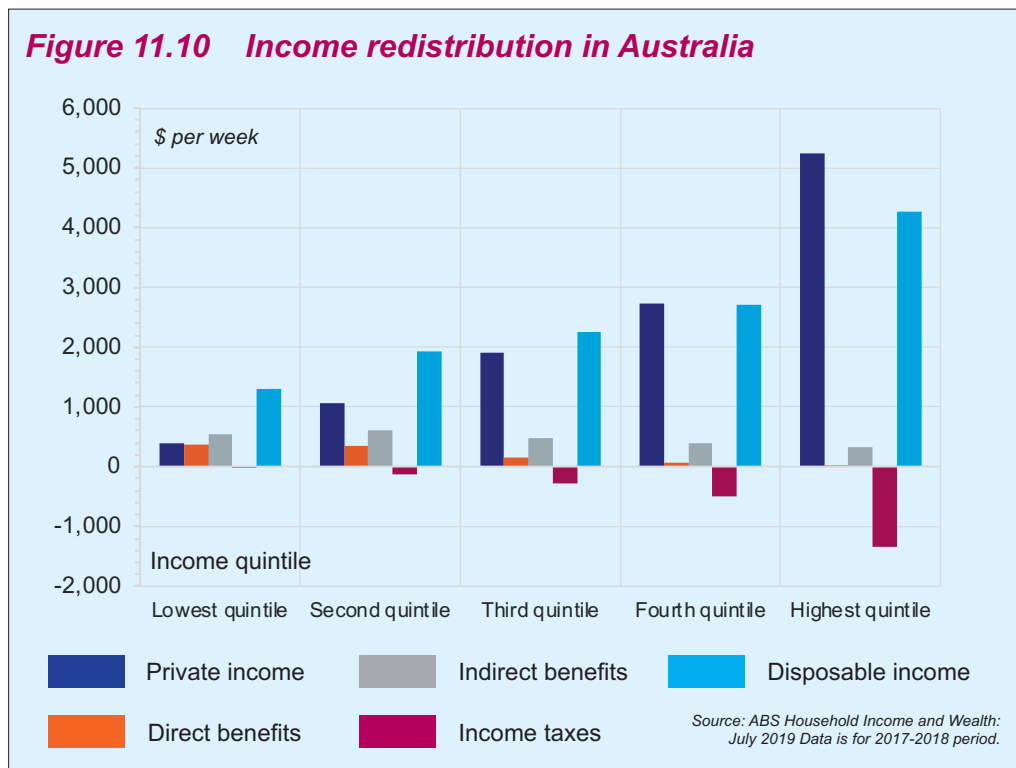
The government also uses its spending powers to redistribute income. Direct **transfer payments** (pensions and benefits) provide cash support for a number of groups of Australians – the aged; the unemployed; the sick and disabled; sole parents and children (family allowance). Social security and welfare accounts for the greatest proportion of Commonwealth Government spending in Australia – usually about 40 per cent of the Budget.

Indirect government payments (**social transfers in-kind**) also redistribute income from the highest earners to the lowest. Public services like education, social housing and health are provided at less than their full cost, as they are subsidised by government. These subsidies help to redistribute income and enable all Australians to have access to basic services. If these services were provided by the market, it is likely that some households would not be able to afford them, so they would be underconsumed – fewer people would obtain educational qualifications, find housing or be able to seek medical treatment.

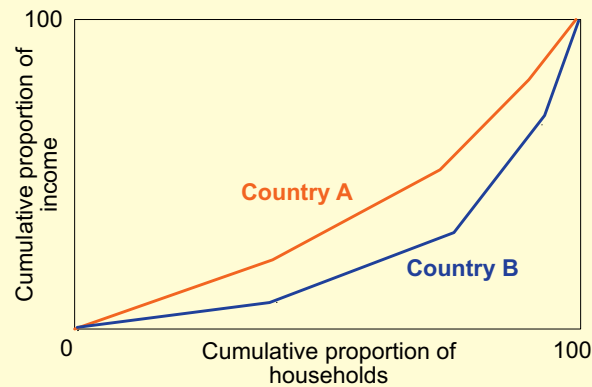
Figure 11.10 illustrates the effect of government taxes and benefits on income distribution in 2017-2018. The private income of people in the first income quintile (the lowest one-fifth of income earners) is supplemented considerably by direct and indirect benefits, and they pay little taxation, bringing their final income to just over \$1200 per week. At the other end of the scale, people in the highest income quintile pay a significant proportion of their income in taxation, but still receive some indirect benefits. The final weekly disposable income of this group is \$4200. In broad terms, the private income of those in the top income bracket is 14 times that of people in the lowest quintile, but income redistribution policies mean final income is just 3.5 times as high!

A very small proportion of the Australian population lives in desperate poverty today – much smaller than would be the case if there were no redistribution policies in place in the modified market. But government benefits are also available to high income earners, mainly through subsidies for education and health expenses.

Should all inequalities be removed by income redistribution? Like all economic issues, the optimal degree of income redistribution comes about where the extra benefits to be gained from redistribution equal the extra costs of redistribution. It may not be sensible to impose higher tax rates on people who appeared well-off if such a tax removed the incentive to work and create wealth. On the other hand, people receiving higher JobSeeker benefits during the early period of the pandemic in 2020 noted that they could actually save some money each fortnight, and thus felt much more positive about their economic situation.

Figure 11.10 Income redistribution in Australia**Review Quiz**

1. Distinguish between income and wealth.
2. What does the Gini coefficient measure?
3. How does progressive taxation (such as income tax) help to redistribute income from the wealthy to the poor?
4. In the Lorenz diagram below, which country has the higher Gini coefficient?



Macroeconomic objectives

Western governments have played an active role in macroeconomic management since the 1950s. The key macroeconomic objectives are:

- sustainable economic growth;
- price stability; and
- full employment.

Economic growth is the increase in the real output of goods and services produced in a country. Growth is usually measured by the annual change in real Gross Domestic Product (GDP). For Australia, a desirable rate of growth is in the region of 3 per cent per annum. If growth is slower than this, it can be difficult to achieve full employment if at current rates of population increase. If growth is too rapid, on the other hand, there may be some pressure on the price level if total demand is growing faster than the capacity of the economy.

High rates of growth also make it difficult to ensure the sustainability of scarce resources. The use of the term 'sustainable' recognises that economic growth has both benefits and costs, and that an appropriate rate of growth is one that can be maintained without creating significant problems for future generations.

Price stability refers to low rates of inflation. Australia's official inflation target is between 2 and 3 per cent per annum. As discussed in chapter 9, achieving price stability is important because inflation adversely affects the spending power of households and firms; erodes international competitiveness; distorts the distribution of income; and influences the allocation of resources throughout the economy. The importance of price stability as a macroeconomic objective has increased in recent years as the Covid-19 pandemic and the invasion of Ukraine by Russia caused world-wide supply chain problems in production and transport; and led to pent-up demand for goods and services that were in short supply, or could not be accessed at all in 2020-21. Inflationary pressure was exacerbated by the low interest rate monetary policies employed by many governments in an attempt to boost spending and keep businesses operating.

Full employment occurs when everyone who is willing to work can find employment. This does not mean a 'zero' rate of unemployment. Rather, the objective is to achieve a rate of unemployment consistent with the **natural rate of unemployment** – currently around 4 per cent of the workforce. In fact, there are labour shortages in many sectors of the economy (possibly a result of the disruptions caused by the pandemic). At the time of writing, unemployment in many countries is close to the natural rate, despite the problems the world economy has faced since 2020.

In setting these objectives, economists recognise that the economic problem applies as much to national objectives as it does to personal goals – at any point

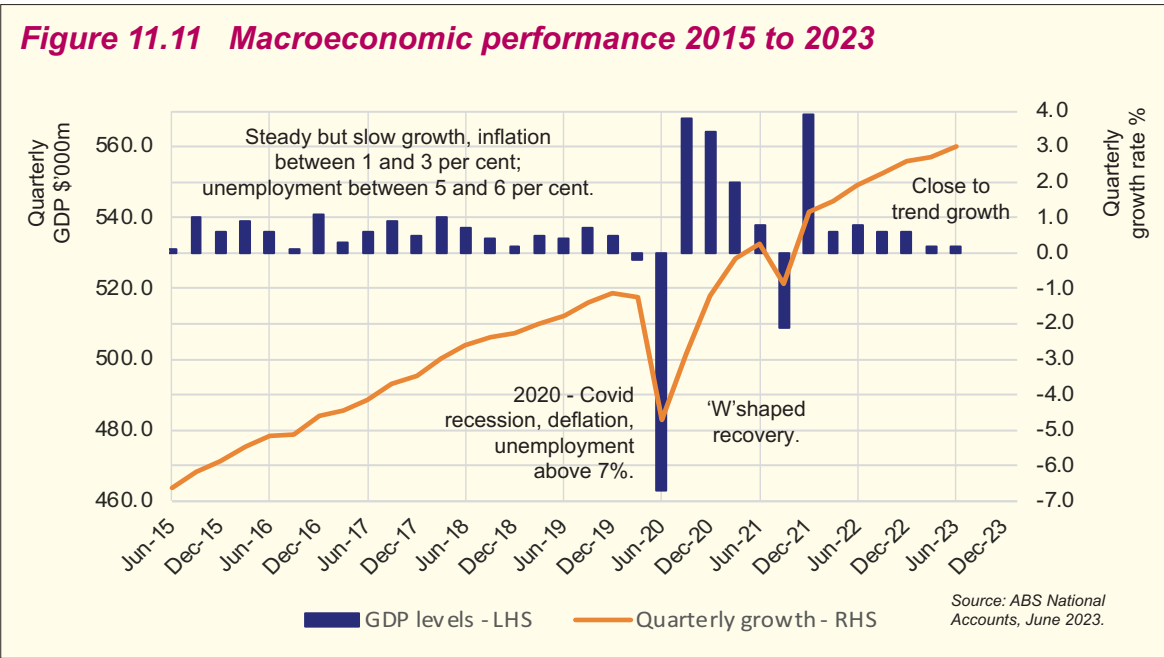
in time, the nation has limited resources with which to meet its unlimited wants. Not all objectives can be achieved at once, so there are choices to be made and trade-offs to be considered. It is not possible to achieve all the objectives simultaneously because they are not all compatible. Growth and full employment tend to be compatible because both rely on expanding economic opportunities, for example. Other objectives may bring about conflicts in policy making, such as the inflationary risks associated with attempts to reduce unemployment. As a result, choices once again have to be made between alternative courses of action, and national economic objectives have to be prioritised.

Have macroeconomic goals been achieved?

Figure 11.11 describes the path of economic growth in Australia over the last decade. The period can perhaps be divided into three parts.

In the first period, between 2015 and the end of 2019, economic growth averaged 2.5 per cent on a year to year basis, somewhat less than the long term average (and target rate) of 3 per cent. Unemployment was about one per cent higher than the natural rate over this period, and inflation was less than 2 per cent per annum. In short, the second half of the 2010s featured a growing, but sluggish economy.

The onset of the Covid-19 pandemic in early 2020 caused considerable disruption. The Australian economy entered a recession for the first time in 28 years, and there was considerable uncertainty at the time about how long the pandemic would last and how much damage it would do to the economy. GDP fell by 0.2 per cent in the March quarter, then by a record 6.7 per cent in the June quarter (although the



decline was only -0.1 per cent in year-on-year terms). Unemployment rose to 7.4 per cent, up from 5.2 per cent six months earlier. Underemployment exceeded 10 per cent, meaning nearly 20 per cent of the work force were 'underutilised'. Inflation fell by nearly 2 per cent in the June quarter.

Economic activity recovered in the second half of 2020, growing 3.8 per cent in the September quarter and 3.4 per cent in the December quarter. The recovery slowed in March, June and September of 2021, due to a new Covid variant causing the resumption of lockdowns in Victoria and New South Wales. The orange line in figure 11.11 shows a 'W-shaped' recovery over an 18-month period before trend growth was resumed. Recovery featured strong growth in the labour market, with unemployment falling below 4 per cent early in 2022. Inflationary pressure rose significantly in this period, as supply chain problems drove up some costs, and pent up demand (supported by low interest rates on borrowed funds) drove prices in some sectors.

The third period was from early 2022 onwards. Growth resumed a more normal pattern of increasing about 0.7 per cent a quarter, but then slowed in the first half of 2023, when a through-the-year growth of just 2.1 per cent was recorded in the June quarter. Unemployment fell to levels not seen in fifty years (around 3.5 per cent for all of 2022-2023). Unemployment at or below the natural rate was explained by number of job vacancies which grew as the economy recovered after the pandemic, but could not be filled due to low levels of migration. The strength of the labour market continued to absorb people who had been long-term unemployed. Inflationary pressure has remained, and is a key concern for governments and central banks around the world, most of whom have increased official interest rates to reduce demand pressure on prices.

Review quiz

- 1. List the economic roles of government in a modified market economy.***
- 2. In the 1950s and 1960s, rapid economic growth was a target of many economies. This is not the case today. Explain.***
- 3. List three adverse effects of a high rate of inflation.***
- 4. Explain what is meant by the 'natural rate' of unemployment.***
- 5. Can the three main macroeconomic goals be achieved at once? Which goal do you think is most important currently. Explain why.***

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