economics for today is written specifically for the increasing number of Australian business students undertaking a one-semester course in economics. The book introduces the key concepts of micro- and macroeconomics for such students.

Featuring a concise, easy-to-read style, the text covers all the core economic concepts without going into excessive technical detail. The first part of the book explains the logical basis of economic thinking and then focuses on microeconomic analysis, particularly the role of demand and supply in determining prices. The second part explains macroeconomic issues, including how the supply of and demand for money influences the economy. Examples are drawn from recent events in the Australian, New Zealand and South-East Asian economies, making it an interesting and accessible text for students who may not carry on with further study in economics.

Each chapter features:
- Analyse the issue - articles and examples with questions that test students' understanding in relation to the applicable economic concept.
- You make the call - challenges to students to generate critical thinking
- International focus - examples and questions based on international economic issues
- Internet applications - activities and notes that encourage students to visit Internet sites for further information
- End of chapter questions - study questions and problems, online exercises and multiple-choice questions

Also available is a comprehensive supplements package, comprising:
- an online MyCourse study guide linked to the text, and website material at www.thomsonlearning.com.au/layton
- Instructor's Manual and PowerPoint® slides on CD-ROM
- ExamView® testbank on CD-ROM

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Preface

Text with a mission

The purpose of Economics for Today is to teach, in an engaging style, the basic principles of microeconomics and macroeconomics to students who will take a one-semester course in economics. With the growth of business studies in areas outside economics, including the increasingly popular MBA, there has been a huge increase in the number of students studying introductory economics as a terminal course. This book is aimed at these students. It also provides a firm foundation for students who will progress to further studies in economics.

Rather than taking an encyclopaedic approach to economic concepts, Economics for Today focuses on some of the most important tools in economics, such as supply and demand analysis, and applies them to clearly explain real-world economic issues.

Every effort has been made to make Economics for Today the most 'student friendly' text on the market. This book was written to simplify the often confusing array of economic analyses that forces some students simply to memorise in order to pass. Instead, it presents a straightforward and balanced approach that effectively teaches the application of basic economic principles. After reading this book, the student should be able to say 'the economics stuff in the news finally makes sense'.

How it fits together

The text presents the core principles of microeconomics and macroeconomics in an international context. The first ten chapters introduce the logic of economic analysis and develop the core of microeconomics. Here students learn the role of demand and supply in determining prices in markets characterised by varying degrees of competition. This part of the book explores issues such as minimum wage laws, market failure, economies
and diseconomies of scale, competition policy and aspects of microeconomic reform. The next eight chapters develop the macroeconomics part of the text. Using the modern aggregate demand and aggregate supply model, the text develops a clear and workable understanding of the determinants of changes in the price level, national output and employment in the economy. The study of macroeconomics also includes a discussion of a nation's monetary system, explaining how the supply of, and demand for, money influence the economy. It also introduces the student to important issues relating to the conduct of modern monetary and fiscal policy. Throughout the book, the significance of international influences on national economies is recognised, and to further underline the great importance of international considerations in understanding modern macroeconomics, the final chapter is devoted to international matters. For example, students will learn how the supply of and demand for currencies determine exchange rates, and what the implications are of a high or low value for the dollar.

Text flexibility

*Economics for Today* is easily adapted to lecturers' preferences for the sequencing of microeconomics and macroeconomics topics. The text can be used in a macroeconomic–microeconomic sequence by teaching the first four chapters and then Chapters 11 to 18. The microeconomics content can then be covered with Chapters 5 to 10. This approach allows students to identify with macro issues – which tend often to be in the news – before studying microeconomics.

The book has eighteen chapters and will allow students to easily cover approximately one and a half chapters each week over twelve teaching weeks. Alternatively, some chapters and some parts of chapters can be omitted at the discretion of the lecturer. Some proposals along these lines are included in the Instructor's Manual.

An alternative placement for Chapter 18, 'International trade and finance', is also possible. As well as incorporating international issues throughout, *Economics for Today* explicitly addresses international influences on national economies in Chapter 18. Some instructors may prefer to cover Chapter 18 earlier – immediately after Part 4, for example.
Special features

Each chapter contains a number of current real-world exercises and topics for discussion:

- **Online exercises** at the end of each chapter guide students to websites to use as a basis for problem-solving exercises.
- **Internet margin notes** throughout the text provide Internet addresses of sites relevant to the topics being discussed, and encourage students to visit the sites for more information.
- **You make the call** sections in each chapter ask students to answer a simple question related to the topic being discussed. Answers are provided at the end of the chapter.
- **International focus** sections in each chapter highlight chapter topics in a global context.
- **Analyse the issue** sections in each chapter provide a brief case study for students to analyse.
- The **summary** at the end of each chapter includes graphs and causation chains to refresh students' memories of the chapter topics.
For the student

As you read this text you will find a wealth of features in every
chapter to enhance your study of economics and enable you
to understand its relevance to your life and future career.
Please take note of the following features:

- **analyse the issue**
  Analyse the issue boxes present topical case studies or articles, relating to the chapter content, which will allow you to test your knowledge of the material and sharpen your analytical skills.

- **you make the call**
  You make the call exercises help you connect the theory of economics that you are learning in the chapter to real-world applications. By discussing the issues and answering the questions raised you will be able to apply the theory and gain a better understanding of economics. Suggested answers are included at the end of chapter.

- **international focus**
  International focus boxes present topical case studies or articles that provide applications of economic theory in the global environment.

- **Internet applications**
  Internet applications are integrated throughout the text in the margin. The websites listed will help you with your analysis of material covered in the chapter.

- **Online exercises**
  Online exercises are also included at the end of each chapter.
Definitions of key terms are included in the margins to help you identify key concepts in each chapter.

Key concepts are listed in point form at the end of each chapter and summarised to help you ensure that you have a good understanding of the content covered in each chapter.

Study questions and problems are included at the end of each chapter to encourage you to work independently or with other students to further explore the concepts you have learnt.

Multiple-choice questions are also included at the end of each chapter to allow you to test your comprehension of key concepts.

Marginal revenue product (MRP): The increase in total revenue to a firm resulting from hiring an additional unit of labour or other variable resource.
Resources guide

To supplement your reading of Economics for Today, and further expand your study and understanding of introductory economics, you can utilise the following online resources:

http://www.mycourse.com

Thomson Learning has developed the MyCourse online tool specifically to help you study introductory economics. You can review the objectives and summaries of each chapter and take practice tests that involve true/false, multiple-choice and short-answer questions. What's more, you will receive your test results instantly.

http://www.infotrac-college.com

Included with this text is a passcode that gives you a four-month subscription to InfoTrac College Edition. This online library will provide you with access to full-text articles from hundreds of scholarly and popular periodicals, including The Economist and the Economic Bulletin.


For updates and news relating to Economics for Today please go to the companion website.
For the instructor
Thomson Learning is pleased to provide you with an extensive selection of
electronic and online supplements to help you lecture in introductory
economics. These resources have all been specifically developed to
supplement Economics for Today.

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ExamView® helps you create, customise and deliver tests in minutes —
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Wizard guide you step by step through the test-creation process,
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are creating on the screen exactly as it will print or display online. With
ExamView's complete word processing capabilities, you can add an
unlimited number of new questions to the bank, edit existing questions
and build tests of up to 250 questions using up to 12 question types.

The Instructor's Manual provides you with a wealth of content to help
you set up and administer your introductory economics subject. It
includes chapter outlines, instructional objectives, critical thinking/group
discussion questions, hints for effective teaching and summary tests with
answers. It also provides solutions to the "Analyse the issue" questions,
'study questions and problems', 'Online exercises' and 'Multiple-choice
questions'. Also included on the CD-ROM are PowerPoint presentation
slides that include images and figures from Economics for Today. You
can use this presentation as is or edit it to your own requirements.

Thomson Learning has developed the MyCourse online tool specifically
for you to enhance your course with online content. MyCourse delivers
e-content, specific to Economics for Today, to you and your students.
It's an easily customisable online syllabus builder and course
ehancement tool hosted by Thomson Learning. You can also add your
own content, hyperlinks and assignments. Students can review the
objectives and summaries of each chapter and take practice tests that
involve true/false, multiple-choice and short-answer questions.

For request copies of these instructor resources please contact Thomson Learning
Email: customerservice@thomsonlearning.com.au
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Introducing the economic way of thinking

Welcome to an exciting and useful way of looking at the world called ‘the economic way of thinking’. As you learn this reasoning technique, it will become infectious. You will discover that the world is full of economic problems requiring more powerful tools than just common sense. As you master the methods explained in this book, you will appreciate that economics provides a valuable approach to solving many real-world puzzles and issues. The economic way of thinking is important because it provides a logical framework which can be used to help understand a wide range of economic issues and events. Just to give a sneak preview, you will study the perils of government price-fixing. You will also find out why governments provide for coastal surveillance rather than leaving it to
the private sector. You will investigate whether you should be concerned if the federal government does not balance its budget. You will learn that the island of Yap uses large stones with holes in the centre as money. And the list of interesting and relevant topics explained continues throughout each chapter. As you read these pages, your efforts will be rewarded by an understanding of just how economic theories and policies affect our daily lives – past, present and future.

Chapter 1 acquaints you with the foundation of the economic way of thinking. The first building blocks are the concepts of scarcity and choice. The next building blocks are the steps in the model-building process that economists use to study the choices people make. Then we look at some pitfalls of economic reasoning and explain why economists might disagree with one another.

In this chapter, you will learn to solve these economics puzzles:

- Do journalists understand the factors causing the ups and downs in the stock market?
- Why would you purchase more Coca-Cola when the price increases?
- Could raising the minimum wage hurt low income earners?
- How can we explain the relationship between the weather in Boston and the state of the US economy?

The problem of scarcity

Our world is a finite place where people, both individually and collectively, face the problem of **scarcity**. Scarcity is the condition in which human wants are forever greater than the available supply of time, goods, services and resources. Because of scarcity, it is impossible to satisfy every desire. Pause for a moment to list some of your unsatisfied wants. Perhaps you would like a bigger home, more restaurant meals, cleaner air, better health care, shelter for the homeless, more leisure time and so on. Unfortunately, nature does not offer the Garden of Eden, where every desire is fulfilled. Instead, there are always limits on the economy's ability to satisfy unlimited wants. Alas, scarcity is pervasive, so 'You can't have it all'.

You may think your scarcity problem would disappear if you were rich, but wealth does not solve the problem. No matter how affluent an individual is, the wish list continues to grow. We are familiar with the 'rich and famous' who never seem to have enough. Although they live well, they still desire finer homes, faster planes and larger yachts. In short, the condition of scarcity means that individuals, whether rich or poor, are dissatisfied with their material well-being and would like more. What is
true for individuals also applies to society. State governments are searching for innovative ways to raise taxes for the funding of schools. The federal government's desire to spend on the poor, higher education, highways and defence exceeds the tax revenue it receives to pay for these programs. So not even the Australian government escapes the problem of scarcity.

Of course, scarcity is a fact of life throughout the world, regardless of whether a country has a command economy tightly controlled by government or a capitalist economy which relies primarily on free markets. In much of South America and Africa the problem of scarcity is often life-threatening. On the other hand, in North America, Europe, Australasia and much of Asia, there has been substantial economic growth and development. Although life is much less gruelling in the more advanced countries, the problem of scarcity exists because individuals and countries never have as much of all the goods and services as they would like to have.

**Scarce resources and production**

Because of the economic problem of scarcity, no society has enough resources to produce all the goods and services necessary to satisfy all human wants. Resources are the basic categories of inputs used to produce goods and services. Resources are also called factors of production. Economists divide resources into three categories: land, labour and capital (see Exhibit 1.1).

**Resources**
The basic categories of inputs used to produce goods and services. Resources are also called factors of production. Economists divide resources into three categories: land, labour and capital.
Land

Land is a shorthand expression for any natural resource provided by nature. Land includes those resources that are gifts of nature available for use in the production process. Land includes anything natural above or below the ground, such as forests, minerals, oil, wildlife and fish. Other examples are rivers, lakes, oceans, the atmosphere, the sun and the moon. Pursuits such as farming, fishing, manufacturing and retailing all use land to a greater or lesser extent. Two broad categories of natural resources are renewable resources and non-renewable resources. Renewable resources are basic inputs that nature can automatically replace without interference from human beings. Examples include lakes, crops, animals and clean air. Non-renewable resources are basic inputs that nature will not automatically replace. There is only so much coal, oil, copper and iron ore in the world.

Labour

Labour is the mental and physical human capacity of workers to produce goods and services. The services of farmers, factory workers, lawyers, professional football players and economists are all labour. Both the number of people available for work and the skills or quality of workers measure the labour resource. One reason nations differ in their ability to produce is that human characteristics, such as the education, experience, health and motivation of workers, differ among nations.

Entrepreneurship

Entrepreneurship is a special type of labour. Entrepreneurship is the creative ability of individuals to seek profits by combining resources to produce new or existing products. The entrepreneur is a motivated person who seeks profits by undertaking such risky activities as starting new businesses, creating new products, or inventing new ways of accomplishing tasks. Entrepreneurship is a scarce human resource because relatively few are willing or able to innovate and make decisions involving greater than normal chances for failure.

Entrepreneurs are the agents of change who help bring material progress to society. The birth of the Levi Strauss Company is a classic entrepreneurial success story. In 1850, at the age of 24, Levi Strauss sailed from New York to join the California Gold Rush. His idea was not to dig for gold, but to sell cloth. When he arrived in San Francisco, he had sold most of his cloth to those on the ship. The only cloth left was a roll of canvas for tents and covered wagons. On the dock, he met a miner who wanted a pair of pants that would last while digging for gold. Presto! Strauss knew a good thing when he saw it, so he hired workers, built factories and became the largest pants maker in the world. As a reward for bearing business risks, organizing production and introducing a product, the Levi Strauss Company earned profits and Strauss became rich and famous.
Capital

Capital is the physical plant, machinery and equipment used to produce other goods. Capital goods are human-made goods that do not directly satisfy human wants. Capital before the Industrial Revolution meant a tool, such as a hoe, an axe or a bow and arrow. In those days, those items served as capital to build a house or to provide food for the dinner table. Today, capital also consists of factories, office buildings, warehouses, robots, trucks and distribution facilities. University buildings, the printing presses used to produce this textbook, and software, are also examples of capital.

The term capital as it is used in the study of economics can be confusing. Economists know that capital in everyday conversations means money or the money value of assets, such as stocks, bonds or the deeds to real estate. This is actually financial capital. In the study of economics, capital does not refer to money assets. Instead, capital in economics means human-made factors of production, such as factories or machinery. Money is not capital; it simply gives a measure of the value of assets, including capital goods.

CONCLUSION Financial capital, which represents the monetary value of a wide range of assets, should not be confused with the economist's definition of capital which encompasses only human-made goods used to produce other goods and services.

Economics: the study of scarcity and choice

The perpetual problem of scarcity forcing people to make choices is the basis for the definition of economics. "Economics is the study of how society chooses to allocate its scarce resources to the production of goods and services in order to satisfy unlimited wants." You may be surprised by this definition of economics. People often think economics means studying supply and demand, the stock market, money and banking. In fact, there are many ways one could define economics, but economists accept the definition given here because it includes the link between scarcity and choices.

Society makes two kinds of choices: economy-wide or macro choices, and individual or micro choices. The prefixes macro and micro come from the Greek words meaning 'large' and 'small', respectively. Reflecting the macro and micro perspectives, economics consists of two main branches: macroeconomics and microeconomics. The old saying 'can't see the wood for the trees' can be used as the basis for understanding the difference between macroeconomics and microeconomics.
Microeconomics

Examining individual trees, leaves and pieces of bark, rather than surveying the wood (or forest), illustrates microeconomics. Microeconomics is the branch of economics that studies decision-making by a single individual, household, firm or industry. The focus is on the behaviour of small economic units, such as the economic decisions of particular groups of consumers or businesses. An example would be to use microeconomic analysis to study economic units involved in the market for eggs. Will suppliers decide to supply more, less or the same amount of eggs to the market in response to price changes? Will individual consumers of these eggs decide to buy more, less or the same amount at a new price?

Macroeconomics

Macroeconomics surveys the wood (or forest). It is the branch (pun intended) of economics that studies decision-making for the economy as a whole. Macroeconomics applies an overview perspective to an economy by examining economy-wide variables, such as inflation, unemployment, the money supply and the flows of exports, imports and international financial capital. Macroeconomic decision-making considers such ‘big picture’ policies as the effect of balancing the federal budget on unemployment, the effect of changing the money supply on prices and the effect of strong economic growth on the value of the currency.

We have described macroeconomics and microeconomics as two separate branches, but they are related. Because the overall economy is the sum or aggregation of its parts, micro changes affect the macro economy, and macro changes produce micro changes.

You make the call

Can the free market eliminate scarcity?

Cuba is one of the few remaining communist command economies. If you visit Cuba you will observe that at ‘official’ prices there is a constant shortage of consumer goods in government stores. People explain that in Cuba scarcity is caused by the low prices combined with the low production quotas set by the government. Many Cuban citizens say that the condition of scarcity will be eliminated if the government will allow free markets to operate as they do in capitalist economies. Would the free market eliminate scarcity?
The methodology of economics

Economists use the same scientific method used by other disciplines such as criminology, biology, chemistry and physics. The scientific method is a step-by-step procedure for solving problems by developing a theory, gathering data and testing whether the data are consistent with the theory. Exhibit 1.2 summarises the model-building process.

Exhibit 1.2 The steps in the model-building process

Identify the problem

Develop a model based on simplified assumptions

Collect data and test the model

The first step in developing a model is to identify the problem. The second step is to select the critical variables necessary to formulate a model that explains the problem under study. Eliminating other variables that complicate the analysis requires simplifying assumptions. In the third step, the researcher collects data and tests the model. If the evidence supports the model, the model is accepted. If not, the model is rejected.

Identifying the problem

The first step in applying the scientific method is to define the problem. Suppose an economist wishes to investigate the microeconomic question of why motorists have cut back on petrol consumption in a given year from, say, 5 billion litres per month in February to 4.5 billion litres per month in March.

Developing a model

The second step in our hypothetical example towards finding an explanation is for the economist to build a model. A model is a simplified description of reality used to understand and predict the relationship between variables. A model is built on the foundation of an underlying...
theory. It looks at the factors, often called *variables*, that explain an event. However, a model emphasises only those variables that are most important to explaining an event. In this respect, models are similar to their underlying theories which, according to Albert Einstein, 'should be as simple as possible, but not any simpler'. The purpose of a model is to construct an abstraction from real-world complexities and make events understandable. A map of France's capital, Paris, for example, is far from a precise duplication of a real trip to this beautiful city. But a map of the city does help a visitor understand the best way to see the sights by leaving out the clutter of details.

A model requires simplified assumptions in order to be useful. Someone must decide, for example, whether a map will include only symbols for the major highways or the details of every minor road. In our petrol consumption example, several variables might be related to the quantity of petrol consumed, including consumer incomes, the price of goods other than petrol, the price of petrol, the fuel economy of cars, and weather conditions. Because we wish to focus only on the main or critical variables, the economist must be a Sherlock Holmes and use a keen sense of observation to form a model. Using his or her expertise, the economist must select the relevant variables that are related to petrol consumption and reject variables that have only slight or no relationship to petrol consumption. In this simple case, the economist removes the cloud of complexity by formulating the hypothesis that increases in the price of petrol cause the quantity of petrol consumed to decrease during the time period.

**Testing the model**

An economic model can be formulated using verbal arguments, numerical tables, graphs or mathematical equations. You will soon discover that a major part of this book is devoted to building and using economic models. The purpose of an economic model is to enable us to *forecast* or *predict* the results of various changes in key variables. An economic model is useful only if it yields accurate predictions. When the evidence is consistent with the prediction that a change in $A$ causes outcome $B$, all other factors remaining constant, there is confidence in the model's validity. This confidence in the model is maintained indefinitely unless there is some evidence that the model has lost its predictive power. So, if repeated tests indicate that the evidence is inconsistent with the prediction that a change in $A$ causes outcome $B$, the researcher rejects the model.

Returning to our petrol consumption problem, the economist gathers data to test the hypothesis that if the price of petrol rises, then petrol purchases fall — all other relevant factors held constant. Suppose the investigation reveals that there was a sharp rise in the price of petrol in March of the given year. The data are therefore consistent with the
This map of Paris is a model because it is an abstraction from the actual beauty of the city. A key assumption is that one can rationally interpret this model.
hypothesis that the quantity of petrol consumed per month falls when its price rises, assuming no other relevant factors change. Thus, the model is valid if, for example, consumer incomes or population do not change at the same time petrol prices rise.

Hazards of the economic way of thinking

Models help us understand and predict the impact of changes in economic variables. A model is an important tool in the economist's toolkit, but it must be handled with care. The economic way of thinking seeks to avoid reasoning mistakes. Two of the most common pitfalls to clear thinking are (1) failing to understand the ceteris paribus assumption and (2) confusing association and causation.

The ceteris paribus assumption

As you work through a model, try to think of a host of relevant variables assumed to be 'standing still', or 'held constant'. Ceteris paribus is a Latin phrase that means that while certain variables change, 'all other things remain unchanged'. As in the petrol example discussed earlier, a key simplifying assumption of the model is that changes in consumer incomes and certain other variables do not occur and complicate the analysis. The ceteris paribus assumption holds everything else constant and therefore allows us to concentrate on the study of the relationship between two key variables: changes in the price of petrol and the quantity of petrol purchased per month.

Now suppose an economist wishes to explain the model for the price and quantity purchased of Coca-Cola. Assume the theory is 'If the price increases, then the quantity of Coca-Cola purchased decreases, ceteris paribus'. A pitfall in reasoning might occur if you observed that the price of Coca-Cola increased one summer and some people actually bought more and not less. Based on this real-world observation, you declare that the model does not work. Think again! The economist responds that the model is valid based on the assumption of ceteris paribus and that your observation gives us no reason to reject the model. The reason the model appeared flawed is that another factor, a sharp rise in the temperature, caused people to buy more Coca-Cola in spite of its higher price. If the temperature and all other factors are held constant as the price of Coca-Cola rises, then people will indeed buy less Coca-Cola, as the model predicts.
CONCLUSION A model cannot be tested legitimately unless its ceteris paribus assumption is satisfied.

Association versus causation

Another of the most common errors in reasoning is confusing association (or correlation) and causation between variables. Stated differently, you err when you read more into a relationship between variables than is actually there. A model is valid only when there is a genuine cause-and-effect relationship. It is not valid when it relies on an association between variables. That is, where a change in the value of one variable does not cause any subsequent change that occurs in the other. Suppose that the hole in the ozone layer increases in size during three different months, and Indonesia's exports to Australia increase during each of these months. The change in the ozone layer is associated with the increase in exports, but this does not mean the ozone layer change caused the event. Even though there is a statistical relationship between two variables in a number of observations, economists would not be concerned if further increases in the size of the hole in the ozone layer were associated with a fall in Indonesian exports to Australia. The reason is that there is no true economic relationship between the ozone layer and Indonesian exports. A more likely explanation for the increase in Indonesian exports to Australia would be that currency movements have reduced the cost to Australians of buying these exports.

Can simple models explain stock market movements?

Almost every day, in the business pages of the newspapers, there is an explanation of the causes of the overall movement up or down of the stock market on the previous day. Financial journalists, who are sometimes trained economists, variously attribute these ups and downs to government and company announcements, changes in overseas markets, changes in the value of the Australian dollar or the prevailing mood of investors. It does not usually take long, however, for a flaw in the journalists' arguments to become apparent. All of a sudden, the reaction of the market to a given event turns out to be the opposite of what the journalists have been suggesting. Why is it that the journalists' explanations for stock market movements are often found to be incorrect?
CONCLUSION The fact that one event follows another does not necessarily mean that the first event caused the second event.

Throughout this book, you will study economic theories and models that include variables linked by stable cause-and-effect relationships. These include the microeconomic theory that a change in the price of a good causes a change in the quantity purchased; and the macroeconomic model that estimates changes in the interest rate caused by changes in the money supply. The ‘You make the call’ on page 11 discusses an everyday example of the pitfalls of developing simple models to explain highly complex phenomena.

international focus

Mops and brooms, the Boston Snow Index, the Super Bowl and other economic indicators

Economic forecasting is a huge growth industry. In recent years there has been an enormous increase in the number of forecasts of future values of key economic indicators such as economic growth, inflation and the value of the currency. Many of these forecasts come from government departments and agencies such as Treasury and the Reserve Bank in Australia or the Commerce Department and the Federal Reserve Board in the United States. Many more are produced by banks, stockbrokers and universities. As the following story reveals, however, in the United States these prestigious organisations are not without armchair competition.

The chief executive of Standex International Corporation, Daniel E. Hogan, reports that his company can predict economic downturns and recoveries from sales reports of its National Metal Industries subsidiary in Springfield, Massachusetts. National makes metal parts for about 300 US manufacturers of mops and brooms. A drop in National’s sales always precedes a proportional fall in consumer spending. The company’s sales always pick up slightly before consumer spending does.

The Boston Snow Index (BSI) is the brainchild of one of the vice presidents of a New York securities firm. It predicts that next year will see a rising economy if there is snow on the ground in Boston on Christmas Day. The BSI has predicted correctly about 73 per cent of the time over the past 30 years. However, its creator, Mr David L. Upshaw, does not take it too seriously and views it as a spoof of other forecasters’ methods.
Why do economists disagree?

Why might one economist say a clean environment is the most important goal for society, and another economist say economic growth should be our goal? If economists share the economic way of thinking and carefully avoid reasoning pitfalls, then why do they disagree? Why are economists known for giving advice by saying, ‘On the one hand, if you do this, then A results, and, on the other hand, doing this causes result B’? In fact, President Harry Truman once jokingly exclaimed, ‘Find me an economist with one hand’.

Greeting card sales are another tried and true indicator, according to a vice president of American Greetings. Before a recession sets in, there is an increase in the sale of higher-priced greeting cards. It seems that people substitute the cards for gifts, and since there is no gift, the card must be fancier.

Then there are some other less well-known indicators. For example, one economist says that the surliness of waiters is a countercyclical indicator. If they are nice, expect that bad times are coming, but if they are rude, expect an upturn. Waiters, on the other hand, counter that a fall in the average tip usually precedes a downturn in the economy. In football, a Super Bowl win by an NFC team has been associated with the stock market the following December being up from the year before. A win by an old American Football Leage team has been associated with a dip in the stock market.

Finally, Anthony Chan, chief economist for Bank One Investment Advisers, studied marriage trends over a 34-year period. He discovered that when the number of marriages increases, the economy rises significantly and a slowdown in marriages is followed by a decline in the economy. Chan explains that there is usually about a one-year lag between a change in the marriage rate and the economy.

analyse the issue
Which of the above indicators are examples of causation? Explain.

George Bernard Shaw offered another famous line in the same vein: 'If you took all the economists in the world and laid them end to end, they would never reach a conclusion'. These famous quotes imply that economists should agree, but ignore the fact that physicists, doctors, business executives, lawyers and other professionals often disagree.

It may appear that economists disagree more than other professions partly because it is more interesting to report disagreements than agreements. Actually, economists agree on a wide range of issues. Many economists, for example, agree on the benefits of free trade among nations, the elimination of farm subsidies and government-imposed rent ceilings, government deficit spending to recover from recession and many other issues. When disagreements do exist, the reason can often be explained by the difference between positive economics and normative economics.

**Positive economics**

Positive economics deals with facts and therefore addresses 'what is' or 'verifiable' questions. Positive economics is an analysis limited to statements that are verifiable. Positive statements can be proved either true or false. Often a positive statement is expressed 'If A, then B'. For example, it might be stated that if the national unemployment rate is 7 per cent, then youth unemployment exceeds 80 per cent. This is a positive 'if-then' prediction, which may or may not be correct. The accuracy of the statement is not the criterion for being a positive statement. The key consideration for a positive statement is whether the statement is testable and not whether it is true or false. Suppose the data show that if the nation's overall unemployment rate is close to 7 per cent, the youth unemployment rate never reaches 80 per cent. Based on these facts, we would conclude that this positive statement is false. (In Australia, when the overall unemployment rate is around 7 per cent, the rate for young people is approximately 20 per cent.)

Now we can explain one reason why economists' forecasts can diverge. The statement 'If event A occurs, then event B follows' can be thought of as a conditional positive statement. For example, two economists may agree that if the federal government cuts spending by 10 per cent this year, prices will fall about 2 per cent next year. However, their predictions about the fall in prices may differ because one economist assumes the government will not cut spending, while the other economist assumes it will cut spending by 10 per cent.
CONCLUSION Forecasts of economists can differ because, using the same methodology, economists can agree that event A causes event B, but disagree over the assumption that event A will occur.

Normative economics

Instead of using objective statements, an argument can be phrased subjectively. **Normative economics** is concerned with ‘what should be’. Normative economics is an analysis based on value judgments. Normative statements express an individual or collective opinion on a subject and cannot be proved by facts to be true or false. Certain words or phrases tell us clearly that we have entered the realm of normative economics. These include the words **good, bad, need, should, and ought to**.

The point here is that people wearing different-coloured glasses see the same facts differently. Each of us has individual subjective preferences that we apply to a particular subject. An economist trained in the United States may argue that Asian nations **should** adopt Western values and institutions. Or one member of parliament argues, ‘We **ought to** see that every teenager who wants a job has one’. Another counters by saying, ‘Keeping inflation under control is more **important** than teenage unemployment’.

CONCLUSION Normative statements involve opinions or points of view that are not scientifically testable.

When considering a debate, make sure you separate the arguments into their positive and normative components. This distinction allows you to determine if you are choosing a course of action related to factual evidence or to opinion. The material presented in this textbook, like most of economics, takes pains to stay within the boundaries of positive economic analysis. In our everyday lives, however, politicians, business executives, relatives and friends often use normative statements when discussing economic issues. Economists also might associate themselves with a political position and use normative arguments for or against some economic policy. When using value judgments, an economist's normative judgments might have no greater validity than those of others. As is the case with all human beings, their own personal values or preconceptions can influence an economist's thinking about many things ranging from deficit spending to whether petrol taxes should be reduced.
Would raising the minimum wage help low income workers?

In Australia, regulation of the conditions of employment of workers is overseen by the Industrial Relations Commission. In 1907, in the famous Harvester case, its predecessor, the Conciliation and Arbitration Commission, determined that Australian workers should be protected by provision of a minimum wage. Today, in spite of this protection, a worker on the minimum wage who works full-time still earns a relatively low annual income. One approach to help low income earners might be to raise the minimum wage.

The dilemma for policy makers is that a higher minimum-wage may be awarded at the expense of jobs for unskilled workers. Opponents forecast that the increased labour cost from an increase in the minimum-wage would jeopardise hundreds of thousands of unskilled jobs. For example, employers may opt to purchase more capital and use less of the more expensive labour. Some politicians claim that raising the minimum wage is a way to help low income earners without cost to taxpayers. Others believe the cost is hidden in inflation and lost employment opportunities for unskilled workers, many of whom are young.

Another problem with raising the minimum wage is that studies show that the minimum wage is a blunt weapon for redistributing wealth. Only a small percentage of

Key concepts

- Scarcity
- Resources
- Land
- Labour
- Entrepreneurship
- Capital
- Economics
- Macroeconomics
- Microeconomics
- Model
- Ceteris paribus
- Positive economics
- Normative economics
minimum-wage earners are full-time workers. For example, many minimum-wage workers are students living at home or workers whose spouse earns a much higher income. To help only poor families, some economists argue that the government should target only those who need it, rather than using the 'shotgun' approach of raising the minimum wage.

Supporters are not convinced by the case against raising the minimum wage. They say it is outrageous that a worker can work full-time and still earn a very low annual income. Moreover, these people believe that opponents exaggerate the dangers to the economy from a higher minimum wage. Economist Lester Thurow of Massachusetts Institute of Technology, for example, argues that a high minimum wage will force employers to upgrade the skills and productivity of workers. Increasing the minimum wage may therefore be a win-win proposition, rather than a win-lose proposition. Professor Thurow is supported by the research of David Card and Alan B. Krueger. These economists studied data on increases in the minimum wage in the United States. Their evidence shows that modest increases in the minimum wage have resulted in little or no loss of jobs.\(^1\) Note that we will return to this issue in Chapter 4 as an application of supply and demand analysis, and in Chapter 10 where labour markets are discussed.

Using the information you have just read, answer the following questions:

1. Identify two positive and two normative statements given concerning raising the minimum wage. List other minimum-wage arguments not discussed above, and classify them as either positive or normative economics.
2. Give a positive and a normative argument for why a business leader would oppose raising the minimum wage. Give a positive and a normative argument for why a union leader would favour raising the minimum wage.
3. Explain your position on this issue. Identify positive and normative reasons for your decision. Are there alternative ways to aid low income earners?


Summary

- Scarcity is the fundamental economic problem that human wants exceed the availability of time, goods, services and resources. Individuals and society therefore can never have everything they desire.
- Resources are factors of production classified as land, labour and capital. Entrepreneurship is a special type of labour. An entrepreneur combines resources to produce products.
**Economics** is the study of how individuals and society choose to allocate scarce resources in order to satisfy unlimited wants. Faced with unlimited wants and scarce resources, we must make choices among alternatives.

**Macroeconomics** applies an economy-wide perspective that focuses on such issues as inflation, unemployment, the growth rate of the economy and international trade.

**Microeconomics** examines individual decision-making units within an economy. Microeconomics studies such topics as a consumer’s response to changes in the price of coffee and the reasons for changes in the market price of personal computers.

**Models** are simplified descriptions of reality used to understand and predict economic events. An economic model can be stated verbally or in a table, graph or equation. If the evidence is not consistent with the model, the model is rejected.

**Ceteris paribus** means that all other factors that might affect a particular relationship remain unchanged. If this assumption is violated, a model cannot be tested. Another reasoning pitfall is to think that association means causation.

Use of **positive** versus **normative** economic analysis is a major reason for disagreement among economists. **Positive economics** uses testable statements. Often a positive argument is expressed as an ‘if-then’ statement. **Normative economics** is based on value judgments or opinions and uses words such as good, bad, ought to and ought not to.

### Study questions and problems

1. Explain why nations with high living standards and nations with low living standards face the problem of scarcity. If you won $1 million in a lottery, would you escape the scarcity problem?

2. Why isn’t money considered capital in economics?

3. Computer software programs are an example of
   a. capital.
   b. labour.
   c. a natural resource.
   d. none of the above.

4. Explain the difference between macroeconomics and microeconomics. Give examples of the areas of concern to each branch of economics.

5. Which of the following are microeconomic issues? Which are macroeconomic issues?
   a. How will an increase in the price of Coca-Cola affect the quantity of Pepsi-Cola sold?
   b. What will cause the rate of inflation in the nation to fall?
   c. How does a quota on textile imports affect the textile industry?
   d. Does a large federal budget deficit reduce the rate of unemployment in the economy?

6. A model is defined as
   a. value judgment of the relationship between variables.
   b. presentation of all relevant aspects of real-world events.
c simplified description of reality used to understand the way variables are related. d data set adjusted for irrational actions of people.

7 Explain the importance of an economic model being an abstraction from the real world.

8 Explain the importance of the ceteris paribus assumption for an economic model.

9 Not long after the completion of the Petronas Towers in Kuala Lumpur, the Malaysian economy experienced a recession. Is there causation in this situation, or are we observing an association between events?

10 Which of the following statements about Australian federal politics is an example of a proposition from normative economics?
   a If the Labor Party is in power, individual taxpayers will pay more tax than if the Coalition is in office.
   b The average rate of inflation has been higher during periods when the Labor Party has been in power.
   c The Coalition's economic policies are better for the economy.
   d Labor policies will result in a more equal distribution of income.

11 ‘The government should collect higher taxes from the rich and use the additional revenues to provide greater benefits to the poor’. This statement is an illustration of a testable statement. b basic principle of economics. c statement of positive economics. d statement of normative economics.

12 Analyse the positive versus normative arguments in the following case. Which are the positive statements used and which are normative?

Should airbags be compulsory in all new motor cars?

Airbag advocates say airbags will save lives and the government should make them compulsory in all cars. Airbags are estimated to add up to $1000 to the cost of a car, compared to about $160 for a set of seatbelts. Opponents argue that, because airbags are electronic devices, they are subject to failures and have caused injury or death. Opponents therefore believe the government should leave the decision of whether to spend an extra $1000 or so for an airbag to the consumer. The say the role of the government should be limited to providing information on the risks of having or not having an airbag.

Online exercises

Exercise 1

Does the Internet raise or lower the cost of purchasing goods such as antiques and collectables from other countries? As you ponder this question, visit an online auction site such as eBay (http://www.ebay.com). Which costs has the Internet reduced and which costs might it raise? Remember that we are considering all costs, not just monetary costs.

Exercise 2

Visit World Factbook (http://www.odci.gov/cia/publications/factbook/index.html) and follow these steps:

1 Select Countries and then Australia.

2 Note the land area and population size of Australia.

3 Compute the land area per person by dividing the land area of Australia by its population size.

4 Select Japan. Repeat steps 2 and 3 for Japan.

5 How does the scarcity of land influence land-use choices? Would you find as many golf courses per capita in Japan as in Australia? Explain.

Exercise 3

Visit Job Openings for Economists (http://www.eco.uta.edu/jobs) and select the most recent issue. Browse through the academic, foreign and non-academic job openings for economists. Study the job descriptions and earnings for economists. Can you explain why there are differences in salaries for different jobs where the qualifications and experience required are similar?
Exercise 4
Visit the official website of the Prime Minister of New Zealand (http://www.prime.minister.govt.nz). Click on Speeches & releases. Choose a topic you think pertains to economics. Does the subject matter pertain to macroeconomics or microeconomics? Is the analysis primarily normative or positive?

Answers to ‘You make the call’

Can the free market eliminate scarcity?
Scarcity is the condition in which human wants are forever greater than the resources available to satisfy those wants. Using markets free from government interference will not solve the scarcity problem. Scarcity exists at any price for a good or service. This means scarcity occurs at any price regardless of whether the price is determined in a capitalist, free market economy or in a government-controlled command economy. If you said free markets cannot eliminate scarcity, YOU ARE CORRECT.

Can simple models explain stock market movements?
The journalists’ explanations of the relationship between public events and stock market movements are rarely based on fact because determination of the precise causes of stock movements would require surveys of the thousands of investors who trade daily on the stock market. What these financial journalists are doing is simply noting the association between certain public events and movements in the market, and then attributing a causal role to the events they have noted. In some instances the link will be a causal one but in others there will only be an association between the variables. Furthermore, even in cases where there is a causal link, other factors which would normally remain constant may change, with the result that the causal link is no longer apparent. If you said that the poor predictive power of simple models linking stock market movements to certain public events results from the confusion of association with causation, YOU ARE CORRECT.

Multiple-choice questions
1 Scarcity exists
   a when people consume beyond their needs.
   b only in rich nations.
   c in all countries of the world.
   d only in poor nations.

2 Which of the following would eliminate scarcity as an economic problem?
   a moderation of people’s competitive instincts.
   b discovery of sufficiently large new energy reserves.
   c resumption of steady productivity growth.
   d none of the above because scarcity cannot be eliminated.

3 Which of the following is not a factor of production?
   a land
   b labour
   c a financial asset
   d capital

4 Economics is the study of
   a how to make money.
   b how to operate a business.
   c people making choices because of the problem of scarcity.
   d the government decision-making process.

5 Microeconomics approaches the study of economics from the viewpoint of
   a individual or specific markets.
   b the operation of the Reserve Bank of Australia.
   c economy-wide effects.
   d the national economy.

6 A review of the performance of the Korean economy during the 1990s is primarily the concern of
   a macroeconomics.
   b microeconomics.
   c both macroeconomics and microeconomics.
   d neither macroeconomics nor microeconomics.
7 An economic model indicates that a rise in petrol prices will cause petrol purchases to fall, ceteris paribus. The phrase ‘ceteris paribus’ means that
   a. other relevant factors like consumer incomes must be held constant.
   b. the petrol prices must first be adjusted for inflation.
   c. the theory is widely accepted, but cannot be accurately tested.
   d. consumers’ need for petrol remains the same regardless of price.

8 An economist notices that eclipses of the moon have preceded recessions, and concludes that these eclipses cause recessions. The economist has
   a. confused association and causation.
   b. misunderstood the ceteris paribus assumption.
   c. used normative economics to answer a positive question.
   d. built an untestable model.

9 Which of the following is a statement of positive economics?
   a. The income tax system collects a lower percentage of the incomes of the poor.
   b. Governments should attempt to reduce unemployment.
   c. Tax rates ought to be raised to finance health care.
   d. All of the above are primarily statements of positive economics.

10 Which of the following is a statement of positive economics?
   a. An unemployment rate greater than 8 per cent is good because prices will fall.
   b. An unemployment rate of 7 per cent is a serious problem.
   c. If the overall unemployment rate is 7 per cent, youth unemployment rates will average 20 per cent.
   d. Unemployment is a more severe problem than inflation.

11 Which of the following is a statement of normative economics?
   a. The minimum wage is good because it raises wages for low income earners.
   b. The minimum wage is supported by unions.
   c. The minimum wage reduces jobs for less skilled workers.
   d. The minimum wage encourages firms to substitute capital for labour.

12 Select one of the alternatives below to complete the following sentence in such a way that it becomes a normative statement: If the minimum wage is raised rapidly, then
   a. inflation increases.
   b. workers will gain their rightful share of total income.
   c. profits will fall.
   d. unemployment will rise.
Applying graphs to economics

Economists are famous for their use of graphs. The reason is 'A picture is worth a thousand words'. Graphs are used throughout this text to present economic models. By drawing a line, you can use a two-dimensional illustration to analyse the effects of a change in one variable on another. You could describe the same information using other devices, such as verbal statements, tables or equations. But the graph provides one of the simplest ways to present and understand relationships between economic variables.

Don't worry if graphs are unfamiliar to you. This appendix explains all the basic graphical language you will need for the economic analysis in this text.

A direct relationship

Basic economic analysis typically concerns the relationship between two variables, both having positive values. Hence, we can confine our graphs to the upper right-hand (north-east) quadrant of the coordinate number system. In Exhibit A1.1, notice that the scales on the horizontal axis (x-axis) and the vertical axis (y-axis) do not necessarily measure the same variables.

The horizontal axis in Exhibit A1.1 measures annual income, and the vertical axis shows the amount spent per year on a personal computer (PC). The intersection of the horizontal and the vertical axes is the origin and the point where both income and expenditure are zero. In Exhibit A1.1, each point is a coordinate that matches the dollar value of income and the corresponding expenditure on a PC. For example, point A on the graph shows that people with an annual income of $10 000 spent $1000 per year on a PC. Other incomes are associated with different expenditure levels. For example, at $30 000 per year (point C), $3000 will be the annual amount spent on a PC.

The straight line in Exhibit A1.1 allows us to determine the direction of change in PC expenditure as annual income changes. This relationship is
A direct relationship between variables

Positive because PC expenditure, measured along the vertical axis, and annual income, measured along the horizontal axis, move in the same direction. PC expenditure increases as annual income increases. As income declines, so does the amount spent on a personal computer. Thus, the straight line representing the relationship between income and PC expenditure is a direct relationship. A direct relationship is a positive association between two variables. When one variable increases, the other variable increases, and when one variable decreases, the other variable decreases. In short, both variables change in the same direction.

Finally, a two-variable graph, like any model, isolates the relationship between two variables and holds all other variables constant under the ceteris paribus assumption. In Exhibit A1.1, for example, other possible causal factors such as the prices of PCs and the education level of the individual are held constant by assumption. In Chapter 3, you will learn how to deal with changes in these variables as well.
An inverse relationship

Now consider the relationship between the price of compact discs and the quantity consumers will buy per year, shown in Exhibit A1.2. These data indicate a negative relationship between the price variable and the quantity variable. When the price is low, consumers purchase a greater quantity of compact discs than when the price is high.

In Exhibit A1.2, there is an inverse relationship between the price per compact disc and the quantity consumers buy. An inverse relationship is a negative association between two variables. When one variable increases,
the other variable decreases, and when one variable decreases, the other variable increases. Stated simply, both variables move in opposite directions. Again we are dealing with only two variables, holding constant all other causal factors such as consumer income and sellers' expenditures on advertising compact discs.

The line drawn in Exhibit A1.2 is an inverse relationship. By long-established tradition, economists put price on the vertical axis and quantity on the horizontal axis. In Chapter 3, we will study in more detail the relationship between price and quantity called the law of demand.

In addition to the slope, you must interpret the intercept at point A in the exhibit. The intercept in this case means that at a price of $50 no consumer is willing to buy a single compact disc.

The slope of a straight line

Plotting numbers gives a clear visual expression of the relationship between two variables, but it is also important to know how much one variable changes as another variable changes. To find out, we calculate the slope. The slope is the ratio of the change in the variable on the vertical axis (the rise or fall) to the change in the variable on the horizontal axis (the run). Algebraically, if $Y$ is the vertical axis and $X$ is on the horizontal axis, the slope is expressed as follows (the delta symbol, $\Delta$, means 'change in'):

$$ \text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta Y}{\Delta X} $$

Consider the slope between points $B$ and $C$ in Exhibit A1.1. The change in expenditure on a PC, $Y$, is equal to +1 (from $2000$ up to $3000$ per year) and the change in annual income, $X$, is equal to +10 (from $20000$ up to $30000$ per year). The slope is therefore $+1/ +10$. The sign is positive because computer expenditure is directly or positively related to annual income. The steeper the line, the greater the slope because the ratio of $\Delta Y$ to $\Delta X$ rises. Conversely, the flatter the line, the smaller the slope. Exhibit A1.1 also illustrates that the slope of a straight line is constant. That is, the slope between any two points along the line, such as between points $A$ and $D$, is equal to $+3/ +30 = 1/10$.

What does the slope of $1/10$ mean? It means that a $1000$ increase (decrease) in PC expenditure each year occurs for each $10000$ increase (decrease) in annual income. The line plotted in Exhibit A1.1 has a positive slope, and we describe the line as 'upward-sloping'.
On the other hand, the line in Exhibit A1.2 has a negative slope. The change in $Y$ between points $C$ and $D$ is equal to $-10$ (from $30$ down to $20$), and the change in $X$ is equal to $25$ (from $50$ million up to $75$ million compact discs purchased per year). The slope is therefore $-10/25 = -1/2.5$, and this line is described as 'downward-sloping'.

What does this slope of $-1/2.5$ mean? It means that raising (lowering) the price per compact disc by $1$ decreases (increases) the quantity of compact discs purchased by $2.5$ million per year.

Suppose we calculate the slope between any two points – say, points $B$ and $C$ in Exhibit A1.3. In this case, there is no change in $Y$ (expenditure for toothpaste) as $X$ (annual income) increases. Consumers spend $20$ per year on toothpaste regardless of annual income. It follows that $\Delta Y = 0$ for any $\Delta X$, so the slope is equal to $0$. When the relationship between two variables is indicated by a horizontal line (or a vertical line) there is an independent relationship. An independent relationship is a zero association between two variables. When one variable changes, the other variable remains unchanged.

### Table: Expenditure for toothpaste at different annual incomes

<table>
<thead>
<tr>
<th>Point</th>
<th>Toothpaste expenditure (dollars per year)</th>
<th>Annual income (thousands of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A$</td>
<td>$20$</td>
<td>$10$</td>
</tr>
<tr>
<td>$B$</td>
<td>$20$</td>
<td>$20$</td>
</tr>
<tr>
<td>$C$</td>
<td>$20$</td>
<td>$30$</td>
</tr>
<tr>
<td>$D$</td>
<td>$20$</td>
<td>$40$</td>
</tr>
</tbody>
</table>

The horizontal line with a zero slope shows that the expenditure per year for toothpaste is unrelated to annual income. As annual income increases along the horizontal axis, the amount spent each year for toothpaste remains unchanged at $20$ units. If annual income increases $10$ units, the corresponding change in expenditure is zero. The slope $= \Delta Y/\Delta X = 0/10 = 0$. 

**Exhibit A1.3** An independent relationship between variables.
The slope of a curve

So far we have looked at straight-line or linear relationships. Now we examine relationships between two variables which result in a curved-line or non-linear relationship. The slope of a curved line changes from one point to another. Suppose the relationship between the expenditure on a PC per year and annual income is not a straight line, but an upward-sloping curved line, as drawn in Exhibit A1.4. The slope of the curve is positive but it changes as we move along the curve. To calculate the slope of a given point on the curve requires two steps. For example, at point $A$, the first step is to draw a tangent line that just touches the curve at this point without crossing it. The second step is to determine the slope of the tangent line. In Exhibit A1.4, the slope of the tangent line, and therefore the slope of the curve at point $A$, is $+2/30 = 1/15$. What does this slope of $1/15$ mean? It means that at point $A$ there will be a $1000$ increase (decrease) in PC expenditure each year resulting from a $15 000$ increase (decrease) in annual income.

![Graph showing the slope of a curve](image)

The slope of a curve at any given point, such as point $A$, is equal to the slope of the straight line drawn tangent to the curve at that point. The tangent line just touches the curve at point $A$ without crossing it. The slope of the upward-sloping curve at point $A$ is $+2/30 = +1/15 = 1/15$.

**Exhibit A1.4** The slope of an upward-sloping, non-linear curve

Now consider that the relationship between the price per compact disc and the quantity demanded by consumers per year is the downward-sloping, non-linear curve shown in Exhibit A1.5. In this case, the slope of the curve is negative but again it changes as we move along the curve. To calculate the slope at point $A$, draw a line tangent to the curve at point $A$. Thus, the slope of the curve at point $A$ is $-20/50 = -1/2.5$.
A three-variable relationship in one graph

The two-variable relationships drawn so far conform to a two-dimensional flat piece of paper. For example, the vertical axis measures the price per compact disc variable, and the horizontal axis measures the quantity of compact discs purchased variable. All other factors, such as consumer income, that may affect the relationship between the price and quantity variables are held constant by the ceteris paribus assumption. But reality is frequently not so accommodating. Often a model drawn on a two-dimensional piece of graph paper must take into account the impact of changes in a third variable (say consumer income).

The method used to depict a three-variable relationship is shown in Exhibit A1.6. As explained earlier, the cause-and-effect relationship between price and quantity of compact discs determines the downward-sloping curve. A change in the price per compact disc causes a movement downward along either of the two separate curves in Exhibit A1.6. As the price falls, consumers increase the quantity of compact discs demanded.

In this exhibit, the negative slope changes as one moves from point to point along the curve. The slope at any given point, such as point A, can be determined by the slope of the straight line tangent to that point. The slope of the downward-sloping curve at point A is \(\frac{-20}{50} = -1/2.5 = -1/2.5\).

Exhibit A1.5 The slope of a downward-sloping, non-linear curve
The location of each curve on the graph, however, depends on the annual income of consumers. As the annual income variable increases from $30,000 to $60,000 and as consumers choose to purchase more at each possible price, the price-quantity demanded curve shifts rightward. Conversely, as the annual income variable decreases and as consumers choose to buy less at each possible price, the price-quantity demanded curve shifts leftward.

This is an extremely important concept you must understand: throughout this book, you must distinguish between movements along and shifts in a curve. Here is how to tell the difference. A change in one of the variables shown on either of the coordinate axes of the graph causes movement along a curve. On the other hand, a change in a variable not shown on one of the coordinate axes of the graph causes a shift in a curve’s position on the graph.

**CONCLUSION** A shift in a curve occurs only when the ceteris paribus assumption is relaxed and a third variable not on either axis of the graph is allowed to change.

![Graph](image)

Economists use a multi-curve graph to represent a three-variable relationship in a two-dimensional graph. A decrease in the price per compact disc causes a movement downward along each curve. As the annual income of consumers rises, there is a shift rightward in the position of the demand curve.

**Exhibit A1.6 Changes in price, quantity and income in two dimensions**
A helpful study hint using graphs

Don't be the student who tries to memorize the graphs and then wonders why he or she failed economics. Instead of memorizing graphs, you should use them as a valuable aid to learning the economic concepts they illustrate. After studying a chapter, go back to the graphs one by one. Hide the brief description accompanying each graph, and describe to yourself or other students what the graph means. Next, uncover the description and check your interpretation. If you still fail to understand the graph, read the text again and correct the problem before proceeding to the next chapter.

Key concepts

Direct relationship
Inverse relationship

Slope
Independent relationship

Summary

- **Graphs** provide a means of clearly showing economic relationships in two-dimensional space. Economic analysis is often concerned with two variables confined to the upper right-hand (north-east) quadrant of the coordinate number system.
- A **direct relationship** is one in which two variables change in the same direction.

*Direct relationship*
- An inverse relationship is one in which two variables change in opposite directions.

### Inverse relationship

- An independent relationship is one in which two variables are unrelated.

### Independent relationship

- Slope is the ratio of the vertical change (the rise or fall) to the horizontal change (the run). The slope of an upward-sloping line is positive, and the slope of a downward-sloping line is negative.

### Positive slope of an upward-sloping curve
Study questions and problems

1. Without using specific data, draw a graph for the expected relationship between the following variables:
   a. life expectancy and age
   b. annual income and years of education
   c. rainfall and sales of umbrellas
   d. distance from the equator and mean summer temperature

   In each case, state whether the expected relationship is direct or inverse. Explain an additional factor that would be included in the ceteris paribus assumption because it might change and influence your theory.

2. Assume a research firm collects survey sales data that reveal the relationship between the possible selling prices of hamburgers and the quantity of hamburgers consumers would purchase per year at alternative prices. The report states that if the price of a hamburger is $4.00, 20,000 will be bought. However, at a price of $3.00, 40,000 hamburgers will be bought. At $2.00, 60,000 hamburgers will be bought, and at $1.00, 80,000 hamburgers will be purchased.

   Based on these data, describe the relevant relationship between the price of a hamburger and the quantity consumers are willing to purchase, using
   a. a verbal statement.
   b. a numerical table.
   c. a graph.

   Which device do you prefer and why?

Multiple-choice questions

1. Straight line CD in Exhibit A1.7 shows that
   a. increasing the value of X will increase the value of Y.
   b. decreasing the value of X will decrease the value of Y.
   c. there is a direct relationship between X and Y.
   d. all of the above are true.

2. In Exhibit A1.7, the slope of straight line CD is
   a. 3.
   b. 1.
   c. -1.
   d. ½.
3 In Exhibit A1.7, the slope of straight line CD is
   a positive.
   b zero.
   c negative.
   d variable.

4 Straight line AB in Exhibit A1.8 shows that
   a increasing the value of X reduces the
   value of Y.
   b decreasing the value of X increases the
   value of Y.
   c there is an inverse relationship between X
       and Y.
   d all of the above are true.

5 As shown in Exhibit A1.8, the slope of straight
   line AB
   a decreases with increases in X.
   b increases with increases in X.
   c increases with decreases in X.
   d remains constant with changes in X.

6 In Exhibit A1.8, the slope for straight line AB is
   a 3.
   b 1.
   c -1.
   d -5.

7 A shift in a curve represents a change in
   a the variable on the horizontal axis.
   b the variable on the vertical axis.
   c a third variable that is not on either axis.
   d none of the above.