

FIFTEENTH CANADIAN EDITION

RAGAN

MACROECONOMICS



Economists on record . . .

On the economic problem . . .

The peculiar character of the problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess. The economic problem of society is thus not merely a problem of how to allocate “given” resources—if “given” is taken to mean given to a single mind which deliberately solves the problem. . . . It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of the utilization of knowledge not given to anyone in its totality.

Friedrich Hayek , 1974 Nobel Laureate

“The Use of Knowledge in Society,” *American Economic Review*, September 1945

On “balance” in economics . . .

There is a long-standing tension in economics between belief in the advantages of the market mechanism and awareness of its imperfections. . . . There is a large element of Rohrschach test in the way each of us responds to this tension. Some of us see Smithian virtues as a needle in a haystack, as an island of measure zero in a sea of imperfections. Others see all the potential sources of market failure as so many fleas on the thick hide of an ox, requiring only an occasional flick of the tail to be brushed away. A hopeless eclectic without any strength of character, like me, has a terrible time of it. . . . I need only listen to Milton Friedman talk for a minute and my mind floods with thoughts of increasing returns to scale, oligopolistic interdependence, consumer ignorance, environmental pollution, intergenerational inequity, and on and on. There is almost no cure for it, except to listen for a minute to John Kenneth Galbraith, in which case all I can think of are the discipline of competition, the large number of substitutes for any commodity, the stupidities of regulation, the Pareto optimality of Walrasian competition, the importance of decentralizing decision making to where the knowledge is, and on and on. Sometimes I think it is only my weakness of character that keeps me from making obvious errors.

Robert Solow , 1987 Nobel Laureate

“On Theories of Unemployment,” *American Economic Review*, March 1980

On choosing between theories . . .

. . . any theory has implications . . . and it is true that most of us would not value the theory if we did not think these implications corresponded to happenings in the real economic system. But a theory is not like an airline or bus timetable. We are not interested simply in the accuracy of its predictions. A theory also serves as a base for thinking. It helps us to understand what is going on by enabling us to organise our thoughts. Faced with a choice between a theory which predicts well but gives us little insight into how the system works and one which gives us this insight but predicts badly, I would choose the latter, and I am inclined to think that most economists would do the same.

. . . Testable predictions are not all that matters. And realism in our assumptions is needed if our theories are ever to help us understand why the system works in the way it does. Realism in assumptions forces us to analyse the world that exists, not some imaginary world that does not. It is, of course, true that our assumptions should not be completely realistic. There are factors we leave out because we do not know how to handle them. There are others we exclude because we do not feel the benefits of a more complete theory would be worth the costs involved in including them. . . . There are good reasons why the assumptions of our theories should not be completely realistic, but this does not mean that we should lose touch with reality.

Ronald Coase , 1991 Nobel Laureate

“How Should Economists Choose?,” in *Essays on Economics and Economists* (Chicago: The University of Chicago Press, 1994)

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CHRISTOPHER T.S. RAGAN

McGILL UNIVERSITY

PEARSON

Toronto

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To the Instructor



Economics is a living discipline, changing and evolving in response to developments in the world economy and in response to the research of many thousands of economists throughout the world. Through fifteen editions, *Macroeconomics* has evolved with the discipline. Our purpose in this edition, as in the previous fourteen, is to provide students with an introduction to the major issues facing the world's economies, to the methods that economists use to study those issues, and to the policy problems that those issues create. Our treatment is everywhere guided by three important principles:

1. Economics is *scientific*, in the sense that it progresses through the systematic confrontation of theory by evidence. Neither theory nor data alone can tell us much about the world, but combined they tell us a great deal.
2. Economics is *useful*, and it should be seen by students to be so. An understanding of economic theory combined with knowledge about the economy produces many important insights about economic policy. Although we stress these insights, we are also careful to point out cases in which too little is known to support strong statements about public policy. Appreciating what is not known is as important as learning what is known.
3. We strive always to be *honest* with our readers. Although we know that economics is not always easy, we do not approve of glossing over difficult bits of analysis without letting readers see what is happening and what has been assumed. We take whatever space is needed to explain why economists draw their conclusions, rather than just asserting the conclusions. We also take pains to avoid simplifying matters so much that students would have to unlearn what they have been taught if they continue their study beyond the introductory course. In short, we have tried to follow Albert Einstein's advice:

Everything should be made as simple as possible, but not simpler.

CURRENT ECONOMIC ISSUES

In writing the fifteenth edition of *Macroeconomics*, we have tried to reflect the major economic issues that we face in the early twenty-first century.

Living Standards and Economic Growth

One of the most fundamental economic issues is the determination of overall living standards. Adam Smith wondered why some countries become wealthy while others remain poor. Though we have learned much about this topic in the past 240 years since Adam Smith's landmark work, economists recognize that there is still much we do not know.

Technological change plays a central role in our discussion of long-run economic growth in Chapter 25. We explore not only the traditional channels of saving, investment, and population growth, but also the more recent economic theories that emphasize the importance of increasing returns and endogenous growth.

We are convinced that no other introductory economics textbook places as much emphasis on technological change and economic growth as we do in this book. Given the importance of continuing growth in living standards and understanding where that growth comes from, we believe this emphasis is appropriate. We hope you agree.

Financial Crisis, Recession, and Recovery

The collapse of U.S. housing prices in 2007 led to a global financial crisis the likes of which had not been witnessed in a century, and perhaps longer. A deep recession, experienced in many countries, followed quickly on its heels. These dramatic events reawakened many people to two essential facts about economics. First, modern economies *can and do* go into recession. This essential fact had perhaps been forgotten by many who had become complacent after more than two decades of economic prosperity. Second, financial markets are crucial to the operation of modern economies. Like an electricity system, the details of financial markets are a mystery to most people, and the system itself is often ignored when it is functioning properly. But when financial markets cease to work smoothly and interest rates rise while credit flows decline, we are all reminded of their importance. In this sense, the financial crisis of 2007–2008 was like a global power failure for the world economy.

The financial crisis had important macro consequences. It affected the Canadian banking system, as discussed in Chapter 26, and led to some aggressive actions by the Bank of Canada, as discussed in Chapter 28. Moreover, as the global financial crisis led to a deep recession worldwide, Canadian fiscal policy was forced to respond, as we review in Chapters 24 and 31. Finally, as has happened several times throughout history, the

recession raised the threat of protectionist policies, as we examine in Chapter 33.

Globalization

Enormous changes have occurred throughout the world over the last few decades. Flows of trade and investment between countries have risen so dramatically that it is now common to speak of the “globalization” of the world economy. Today it is no longer possible to study any economy without taking into account developments in the rest of the world.

Throughout its history, Canada has been a trading nation, and our policies relating to international trade have often been at the centre of political debates. International trade shows up in many parts of this textbook, but it is the exclusive focus of two chapters. Chapter 32 discusses the theory of the gains from trade; Chapter 33 explores trade policy, with an emphasis on NAFTA and the WTO.

With globalization and the international trade of goods and assets come fluctuations in exchange rates. In recent years there have been substantial changes in the Canada–U.S. exchange rate—a 15-percent depreciation followed the Asian economic crisis in 1997–1998 and also the 2014–2015 period, which saw a major decline in the world price of oil. An even greater appreciation occurred in the 2002–2008 period. Such volatility in exchange rates complicates the conduct of economic policy. In Chapters 28 and 29 we explore how the exchange rate fits into the design and operation of Canada’s monetary policy. In Chapter 35 we examine the debate between fixed and flexible exchange rates.

The forces of globalization are with us to stay. In this fifteenth edition of *Macroeconomics*, we have done our best to ensure that students are made aware of the world outside Canada and how events elsewhere in the world affect the Canadian economy.

The Role of Government

Between 1980 and 2008, the political winds shifted in Canada, the United States, and many other countries. Political parties that previously advocated a greater role for government in the economy argued the benefits of limited government. But the political winds shifted again with the arrival of the financial crisis and global recession in 2008, which led governments the world over to take some unprecedented actions. Many soon argued that we were observing the “end of laissez-faire” and witnessing the return of “big government.” But was that really true?

Has the *fundamental* role of government changed significantly over the past 35 years? In order to understand the role of government in the economy, students must understand the benefits of free markets as well as the situations that cause markets to fail. They must also understand that

governments often intervene in the economy for reasons related more to equity than to efficiency.

In this fifteenth edition of *Macroeconomics*, we continue to incorporate the discussion of government policy as often as possible. Here are but a few of the many examples that we explore:

- fiscal policy (in Chapters 22 and 24)
- policies related to the economy’s long-run growth rate (in Chapter 25)
- monetary policy (in Chapters 27, 28, and 29)
- policies that affect the economy’s long-run unemployment rate (in Chapter 30)
- the importance of debt and deficits (in Chapter 31)
- trade policies (in Chapter 33)
- policies related to the exchange rate (in Chapter 34)

THE BOOK

Economic growth, financial crisis and recession, globalization, and the role of government are pressing issues of the day. Much of our study of economic principles and the Canadian economy has been shaped by these issues. In addition to specific coverage of growth and internationally oriented topics, growth and globalization appear naturally throughout the book in the treatment of many topics once thought to be entirely “domestic.”

Most chapters of *Macroeconomics* contain some discussion of economic policy. We have two main goals in mind when we present these discussions:

1. We aim to give students practice in using economic theory, because applying theory is both a wonderfully effective teaching method and a reliable test of students’ grasp of theory.
2. We want to introduce students to the major policy issues of the day and to let them discover that few policy debates are as “black and white” as they often appear in the press.

Both goals reflect our view that students should see economics as useful in helping us to understand and deal with the world around us.

Structure and Coverage

Our treatment of macroeconomics is divided into six parts. We make a clear distinction between the economy in the short run and the economy in the long run, and we get quickly to the material on long-run economic growth. Students are confronted with issues of long-run economic growth *before* they are introduced to issues of money and banking. Given the importance of economic growth in driving overall living standards, we believe that this is an appropriate ordering of the material, but

for those who prefer to discuss money before thinking about economic growth, the order can be easily switched without any loss of continuity.

The first macro chapter, Chapter 19, introduces readers to the central macro variables, what they mean, and why they are important. The discussion of national income accounting in Chapter 20 provides a thorough treatment of the distinction between real and nominal GDP, the GDP deflator, and a discussion of what measures of national income *do not measure* and whether these omissions really matter.

Part 8 develops the core short-run model of the macro economy, beginning with the fixed-price (Keynesian Cross) model in Chapters 21 and 22 and then moving on to the *AD/AS* model in Chapter 23. Chapter 21 uses a closed economy model with no government to explain the process of national-income determination and the nature of the multiplier. Chapter 22 extends the setting to include international trade and government spending and taxation. Chapter 23 rounds out our discussion of the short run with the *AD/AS* framework, discussing the importance of both aggregate demand and aggregate supply shocks. We place the Keynesian Cross before the *AD/AS* model to show that there is no mystery about where the *AD* curve comes from and why it is downward sloping; the *AD* curve is derived directly from the Keynesian Cross model. In contrast, books that begin their analysis with the *AD/AS* model are inevitably less clear about where the model comes from. We lament the growing tendency to omit the Keynesian Cross from introductory macroeconomics textbooks; we believe the model has much to offer students in terms of economic insights.

Part 9 begins in Chapter 24 by showing how the short-run model evolves toward the long run through the adjustment of factor prices—what we often call the Phillips curve. We introduce potential output as an “anchor” to which real GDP returns following *AD* or *AS* shocks. This chapter also addresses issues in fiscal policy, including the important distinction between automatic stabilizers and discretionary fiscal stabilization policy. Our treatment of long-run growth in Chapter 25, which we regard as one of the most important issues facing Canada and the world today, goes well beyond the treatment in most introductory texts.

Part 10 focuses on the role of money and financial systems. Chapter 26 discusses the nature of money, various components of the money supply, the commercial banking system, and the Bank of Canada. In Chapter 27 we offer a detailed discussion of the link between the money market and other economic variables such as interest rates, the exchange rate, national income, and the price level. In Chapter 28 we discuss the Bank of Canada’s monetary policy, including a detailed discussion of inflation targeting. The chapter ends with a review of Canadian monetary policy over the past 30 years.

Part 11 deals with some of today’s most pressing macroeconomic policy issues. It contains separate chapters on inflation, unemployment, and government budget deficits. Chapter 29 on inflation examines the central role of expectations in determining inflation and the importance of credibility on the part of the central bank. Chapter 30 on unemployment examines the determinants of frictional and structural unemployment and discusses likely reasons for increases in the NAIRU over the past few decades. Chapter 31 on budget deficits stresses the importance of a country’s debt-to-GDP ratio and also the effect of budget deficits on long-term economic growth.

Virtually every macroeconomic chapter contains at least some discussion of international issues. However, the final part of *Macroeconomics* focuses primarily on international economics. Chapter 32 gives the basic treatment of international trade, developing both the traditional theory of static comparative advantage and newer theories based on imperfect competition and dynamic comparative advantage. Chapter 33 discusses both the positive and normative aspects of trade policy, as well as the WTO and NAFTA. Chapter 34 introduces the balance of payments and examines exchange-rate determination. Here we also discuss three important policy issues: the desirability of current-account deficits or surpluses, whether there is a “right” value for the Canadian exchange rate, and the costs and benefits of Canada’s adopting a fixed exchange rate.

We hope you find this menu both attractive and challenging; we hope students find the material stimulating and enlightening. Many of the messages of economics are complex—if economic understanding were only a matter of common sense and simple observation, there would be no need for professional economists and no need for textbooks like this one. To understand economics, one must work hard. Working at this book should help readers gain a better understanding of the world around them and of the policy problems faced by all levels of government. Furthermore, in today’s globalized world, the return to education is large. We like to think that we have contributed in some small part to the understanding that increased investment in human capital by the next generation is necessary to restore incomes to the rapid growth paths that so benefited our parents and our peers. Perhaps we may even contribute to some income-enhancing accumulation of human capital by some of our readers.

SUBSTANTIVE CHANGES TO THIS EDITION

We have revised and updated the entire text with guidance from feedback from both users and nonusers of the previous editions of this book. For this edition, we

have aimed to reduce the book's length by about 10 per cent, and this required streamlining many discussions and deleting some boxes. As always, we have strived very hard to improve the teachability and readability of the book. We have focused the discussions so that each major point is emphasized as clearly as possible, without distracting the reader with nonessential points. As in recent editions, we have kept all core material in the main part of the text. Three types of boxes (Applying Economic Concepts, Lessons from History, and Extensions in Theory) are used to show examples or extensions that can be skipped without fear of missing an essential concept. But we think it would be a shame to skip too many of them, as there are many interesting examples and policy discussions in these boxes.

What follows is a brief listing of the main changes that we have made to the textbook.

Microeconomics Introduction

In Chapter 1 we have added income inequality to the initial list of motivating topics, deleted the box on the failure of central planning, and have deleted the appendix on graphing (given that this topic is well-covered in Chapter 2). In Chapter 3 on demand and supply, we have provided a fuller discussion of weather shocks, and have added a numerical example of a demand-and-supply model. We have deleted the box on weather events as well as the box on the algebra of market equilibrium.

Macroeconomics

Part 7: An Introduction to Macroeconomics

At the beginning of Chapter 19 we have removed the discussion of the two approaches to macro and moved that material into the Instructor's Manual. In Chapter 20 we have removed the discussion of GNP, focussing only on GDP, its measurement, meaning, and omissions.

Part 8: The Economy in the Short Run

There are no major changes in Chapters 21 and 22. These two chapters still lay out the basic demand-determined macro model—first in a closed economy with no government and then in the expanded and more realistic version (with government and foreign trade). In Chapter 23 we have deleted the box on the Keynesian AS curve, but have incorporated some of this material into the body of the text.

Part 9: The Economy in the Long Run

In Chapter 24 we have re-designed the opening section of the chapter, which explains the three macroeconomic states, and have shortened our discussion toward the end of the chapter regarding the effects of fiscal policy on potential output. We have deleted the

former Chapter 25, but moved the box on real-world examples of productivity growth to the newly renumbered Chapter 25, which examines long-run growth.

Part 10: Money, Banking, and Monetary Policy

The two opening chapters on money and banking and the money market are still largely unchanged. In Chapter 28, which examines Canadian monetary policy in considerable detail, we have extended the final section to discuss the slow economic recovery since 2011, and the challenges faced by the Bank's new governor.

Part 11: Macroeconomic Problems and Policies

In Chapter 29 on inflation, we have removed the box on expectations formation, but say more about it in the main part of the text. We have also deleted the box on the NAIRU as a razor's edge. In Chapter 30, we have clarified the discussion about the two competing sets of theories regarding fluctuations in unemployment. In Chapter 31 on deficits and debt, we have clarified the discussion of the primary budget deficit, and now use numerical examples to demonstrate the concept. We have also entirely reworked our discussion of structural and cyclical budget deficits, and how these relate to the stance of fiscal policy.

Part 12: Canada in the Global Economy

In Chapter 32 on the gains from trade, we have clarified our discussion of scale economies and intra-industry trade. In Chapter 33 we have vastly streamlined the discussion of the WTO (and GATT) and we have deleted the box on the transformation of Canadian trade. In Chapter 34 we have clarified the connection between the official financing account and the central bank's intervention in the foreign-exchange market. We have also shortened the algebraic derivation of the current account, and moved this material into a footnote. We have updated the discussion of the shock-absorbing properties of the exchange rate using the most recent decline in the world price of oil as an example.

If you are moved to write to us (and we hope that you will be!), please do. You can send any comments or questions regarding the text (or any of the supplementary material, such as the *Instructor's Manual*, the *TestGen*, or the web-based MyEconLab to:

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To the Student



Welcome to what is most likely your first book about economics! You are about to encounter what is for most people a new way of thinking, which often causes people to see things differently than they did before. But learning a new way of thinking is not always easy, and you should expect some hard work ahead. We do our best to be as clear and logical as possible and to illustrate our arguments whenever possible with current and interesting examples.

You must develop your own technique for studying, but the following suggestions may prove helpful. Begin by carefully considering the Learning Objectives at the beginning of a chapter. Read the chapter itself relatively quickly in order to get the general idea of the argument. At this first reading, you may want to skip the boxes and any footnotes. Then, after reading the Summary and the Key Concepts (at the end of each chapter), reread the chapter more slowly, making sure that you understand each step of the argument.


With respect to the figures and tables, be sure you understand how the conclusions that are stated in boldface at the beginning of each caption have been reached. You should be prepared to spend time on difficult sections; occasionally, you may spend an hour on only a few pages. Paper and pencil are indispensable equipment in your reading. It is best to follow a difficult argument by building your own diagram while the argument unfolds rather than by relying on the finished diagram as it appears in the book.

The end-of-chapter Study Exercises require you to practise using some of the concepts that you learned in the chapter. These will be excellent preparation for your exams. To provide you with immediate feedback,

we have posted Solutions to Selected Study Exercises on MyEconLab (www.myeconlab.com). We strongly advise that you should seek to understand economics, not to memorize it.

The red numbers in square brackets in the text refer to a series of mathematical notes that are found starting on page M-1 at the end of the book. For those of you who like mathematics or prefer mathematical argument to verbal or geometric exposition, these may prove useful. Others may disregard them.

In this edition of the book, we have incorporated many elements to help you review material and prepare for examinations. A brief description of all the features in this book is given in the separate section that follows.

We encourage you to make use of MyEconLab that accompanies this book (www.myeconlab.com) at the outset of your studies. MyEconLab contains a wealth of valuable resources to help you. MyEconLab provides Solutions to Selected Study Exercises. It also includes many additional practice questions, some of which are modelled on Study Exercises in the book. You can also find animations of some of the key figures in the text, marked with the symbol  below the figure number, as well as an electronic version of the textbook. For more details about MyEconLab, please see the description on the inside front cover of your text.

Over the years, the book has benefited greatly from comments and suggestions we have received from students. Please feel free to send your comments to christopher.ragan@mcgill.ca. Good luck, and we hope you enjoy your course in economics!

Features of This Edition



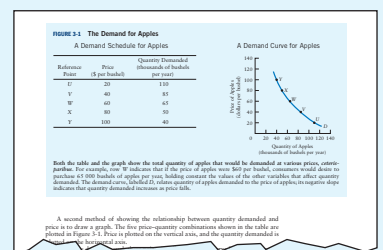
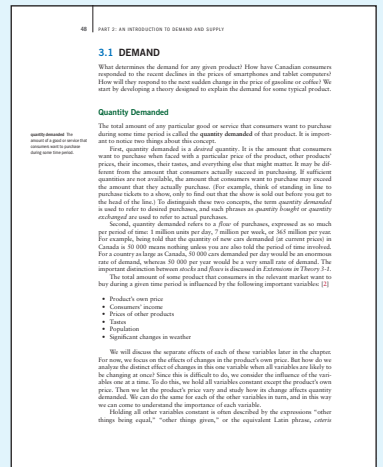
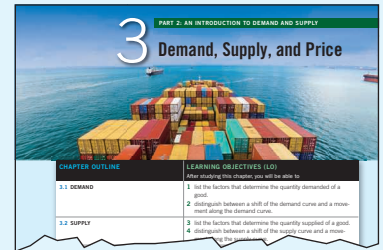
We have made a careful effort with this edition to incorporate features that will facilitate the teaching and learning of economics.

- A set of **Learning Objectives** at the beginning of each chapter, correlated to the **Chapter Outline**, clarifies the skills and knowledge to be learned in each chapter. These same learning objectives are used in the chapter summaries, as well as in the *Study Guide*.

- **Major ideas** are highlighted with a yellow background in the text.
- **Key terms** are boldfaced where they are defined in the body of the text, and they are restated with their definitions in the margins. In the index at the back of the book, each key term and the page reference to its definition are boldfaced.

- The colour scheme for figures consistently uses the same colour for each type of curve. For example, all demand curves are blue and all supply curves are red.
- A caption for each figure and table summarizes the underlying economic reasoning. Each caption begins with a boldfaced statement of the relevant economic conclusion.

- **Applying Economic Concepts** boxes demonstrate economics in action, providing examples of how theoretical material relates to issues of current interest.
- **Extensions in Theory** boxes provide a deeper treatment of a theoretical topic that is discussed in the text.
- **Lessons from History** boxes contain discussions of a particular policy debate or empirical finding that takes place in a historical context.
- **Photographs with short captions** are interspersed throughout the chapters to illustrate some of the arguments.



demanded of carrots as they substitute toward the consumption of other vegetables, in this case the relative price of carrots has increased. For the relative price of carrots to fall, other vegetables are rising at the same rate, the relative price of carrots is constant. In this case we expect no substitution in the price of carrots and other vegetables.

In microeconomics, whenever we refer to a change in the price of one product, we mean a change in that product's relative price; that is, a change in the price of that product relative to the prices of all other goods.

SUMMARY

3.1 DEMAND 103.2

- The amount of a product that consumers want to purchase is called **quantity demanded** and is a flow measured as much per period of time. It is determined by tastes, income, the product's own price, the prices of other products, and population.
- The relationship between quantity demanded and price is represented graphically by a **demand curve** that shows how much will be demanded at each market price. Quantity demanded is assumed to increase as the price of the product falls, other things held constant. Thus, demand curves are negatively sloped.

3.2 SUPPLY 103.4

- The amount of a good that producers wish to sell is called **quantity supplied** by a flow measured as much per period of time. It depends on the producer's own price, the cost of raw materials, the number of suppliers, technological costs or subsidies, the state of technology, and prices of other products.

- A **shift** in a demand curve represents a change in the quantity demanded at each price and is referred to as a **change in demand**.
- The increase in demand means the demand curve shifts to the right; a decrease in demand means the demand curve shifts to the left.
- It is important to make the distinction between a **movement** along a demand curve (caused by a change in the product's price) and a **shift** of a demand curve (caused by a change in any of the other determinants of demand).

103.4

- The relationship between quantity supplied and price is represented graphically by a **supply curve** that shows how much will be supplied at each market price. Quantity supplied is assumed to increase as the price of the product increases, other things held constant. Thus, supply curves are positively sloped.

Price rises when there is a rise in demand and falls when it is scarce supply. Thus, the actual market price will be moved toward the equilibrium price. When it is reached, there will be neither excess demand nor excess supply, and the price will be stable until either the supply curve or the demand curve shifts.

ply toward equilibrium quantity but raises equilibrium price.

The relative price of a product is the price in terms of money, its relative price is the price in terms of other products.

KEY CONCEPTS

Back and flow variables	Change in quantity demanded versus change in demand	Equilibrium, equilibrium price, and downward-sloping demand
Goods purchase or "what being being bought"	Quantity supplied	Comparative statics
Quantity demanded	Supply schedule and supply curve	Relative and absolute prices
Demand schedule and demand curve	Change in quantity supplied versus change in supply	

STUDY EXERCISES

MyEconLab Make the grade with MyEconLab! Study Exercises marked in **•** can be found on MyEconLab. You can practice them as often as you want, and most feature step-by-step guided instruction to help you find the right answer.

• Fill in the blanks to complete the sentences about a supply-and-demand model. The applied in the following.

- Consider the market for oranges in Florida. In one year, the price of oranges in this market decreases. The supply curve will shift to the _____, indicating a(n) _____.
- Consider the market for oranges in Florida. In one year, the price of oranges in this market decreases. The supply curve will shift to the _____, indicating a(n) _____.
- Consider the market for oranges in Florida. In one year, the price of oranges in this market decreases. The supply curve will shift to the _____, indicating a(n) _____.
- Consider the market for oranges in Florida. In one year, the price of oranges in this market decreases. The supply curve will shift to the _____, indicating a(n) _____.

Mathematical Notes

- Because one cannot divide by zero, the ratio $\Delta Y/\Delta X$ cannot be calculated when $\Delta X = 0$. However, as ΔX approaches zero, the ratio $\Delta Y/\Delta X$ becomes infinite.
- Therefore, we say that the slope of a vertical line is "infinite" or "not defined."
- Many variables affect the quantity demanded. Using functional notation, the argument of the demand function of the text can be anticipated. Let Q^D represent the quantity of a commodity demanded and

$$Q^D = D(T, T, N, N, P, P, P, P),$$

represent, respectively, tastes, average household income, population, income distribution, the commodity's own price, and the price of the other commodity.

The demand function is

$$Q^D = D(T, T, N, N, P, P, P, P), \quad j = 1, 2, \dots, n$$

The demand schedule or curve is given by

$$Q^D = D(P_j) | (T, N, P)$$

where the notation means that the variables to the right of the vertical line are held constant.

The function is usually described as the demand function with respect to price, all other variables being held constant. This function often written concisely as $Q^D = D(P_j)$, shifts in response to changes in the variables. Consider average income; if, as is usually hypothetical, $dQ^D/dI > 0$, then increases in average income shift $Q^D = D(P_j)$ rightward and decreases in average income shift $Q^D = D(P_j)$ leftward. Changes in other variables likewise shift the function in the direction implied by the relationship of that variable to the quantity demanded.

- Quantity demanded is a simple and straightforward but frequently misunderstood concept in everyday use, but it has a clear mathematical meaning. It refers to the dependent variable in the demand function from note 2.

$$Q^D = D(T, T, N, N, P, P, P, P)$$

If there are n specific values whenever a specific value is assigned to each of the independent variables. The value of Q^D changes whenever the value of any independent variable is changed. Q^D could change, for example, as a result of a change in any one price, in average income, in the distribution of income, in tastes, or in population. It could also change as a result of the net effect of changes in all of the independent variables occurring at once.

Some textbooks reserve the term **change in quantity demanded** for a movement along a demand curve that is a change in Q^D as a result of a change in P_j . They then use other words for a change in Q^D caused by a change in the other variables in the demand function. This usage is potentially confusing because it gives the single variable P_j more than one name.

The usage, which corresponds to that in most advanced treatments, avoids this confusion. We call Q^D **quantity demanded** and refer to any change in Q^D as a **change in quantity demanded**. In this usage it is correct to say that a movement along a demand curve is a change in quantity demanded, but it is incorrect to say that a change in quantity demanded can occur only because of a movement along a demand curve (because Q^D can change for other reasons, for example, a **concern** *paribus* change in average household income).

- Similar to the way we treated quantity demanded in note 1, let Q^S represent the quantity of a commodity supplied and

$$Q^S = S(C, X, P, P),$$

represent, respectively, producers' goals, technology, the product's price, and the price of the other input.

The supply function is

$$Q^S = S(C, X, P, P), \quad j = 1, 2, \dots, m$$

• **Chapter Summaries** are organized using the same numbered heading as found in the body of the chapter. The relevant Learning Objective (LO) numbers are given in red next to each heading in the summary.

- **Key Concepts** are listed near the end of each chapter.
- A set of **Study Exercises** is provided for each chapter. These often quantitative exercises require the student to analyze problems by means of computations, graphs, or explanations.

• A set of **Mathematical Notes** is presented in a separate section near the end of the book. Because mathematical notation and derivations are not necessary to understand the principles of economics but are more helpful in advanced work, this seems to be a sensible arrangement. References in the text to these mathematical notes are given by means of red numbers in square brackets.

Timeline of Great Economists

A horizontal timeline from 1660 to 1730. Key events are marked with vertical lines and text boxes:

- 1660:** Four great games (poker, billiard, tennis, and football) are invented in England.
- 1670:** Haldane's Bar (Company) is founded with monopoly over all iron-holding iron in Haldane Bay.
- 1687:** Isaac Newton publishes *Principia Mathematica*.
- 1690:** Paper money is first used in America.
- 1696:** The Bank of England is created to help the government pay off its debts.
- 1713:** J.S. Bach completes the *Breve* Cantatas.
- 1730:** Four great games (poker, billiard, tennis, and football) are invented in England.

- A **Timeline of Great Economists**, extending from the mid-seventeenth century to the late twentieth century, is presented near the end of the book. Along this timeline we have placed brief descriptions of the life and works of some great economists, most of whom the reader will encounter in the textbook. The timeline also includes some major world events in order to give readers an appreciation of when these economists did their work.
- **Economists on Record**, on the inside of the back cover, provides some classic quotations that are relevant to the study and practice of economics.
- For convenience, a list of the **Common Abbreviations Used in the Text** is given inside the front cover.

Supplements



MYECONLAB

The Ragan MyEconLab has been designed and refined with a single purpose in mind: to create those moments of understanding that transform the difficult into the clear and obvious. With homework, quiz, test, activity, and tutorial options, instructors can manage all their assessment needs in one program.

- All of the end-of-chapter study exercises are assignable and automatically graded in MyEconLab.
- The Gradebook records each student's performance and time spent on the Tests and Study Plan and generates reports by student or by chapter.
- The Gradebook records each student's performance and time spent on the Tests and Study Plan and generates reports by student or by chapter.
- Test Bank questions are also assignable for test, quiz, or homework and auto-graded in the MyEconLab.

MyEconLab also includes the following features.

Adaptive Learning

MyEconLab's Study Plan is now powered by a sophisticated adaptive learning engine that tailors learning material to meet the unique needs of each student. MyEconLab's new Adaptive Learning Study Plan monitors students' performance on homework, quizzes, and tests and continuously makes recommendations based on that performance.

If a student is struggling with a concept such as supply and demand, or having trouble calculating a price elasticity of demand, the Study Plan provides customized remediation activities—a pathway based on personal proficiencies, the number of attempts, back on track. Students will also receive recommendations for additional practice in the form of rich multimedia learning aids such as videos, an interactive eText, Help Me Solve This tutorials, and graphing tools.

The Study Plan can extrapolate a student's future trouble spots and provide learning material and practice to avoid pitfalls. In addition, students who are showing a high degree of success with the assessment material are offered a chance to work on future topics based on the professor's course coverage preferences. This personalized and adaptive feedback and support ensure that your students are

optimizing their current and future course work and mastering the concepts, rather than just memorizing and at guessing answers.

You can learn more about adaptive learning at <http://www.myeconlab.com/product-info/adaptive>.

Economics in the News

Economics in the News is a turnkey solution to bringing current news into the classroom. Updated weekly during the academic year, two relevant articles (one micro, one macro) are uploaded with questions that may be assigned for homework or for classroom discussion.

Digital Interactives

Digital Interactives immerse students in a fundamental economic principle, helping them to learn actively. They can be presented in class as a visually stimulating, highly engaging lecture tool, and can also be assigned with assessment questions for grading. Digital Interactives are designed for use in traditional, online, and hybrid courses, and many incorporate real-time, as well as data display and analysis tools. To learn more, and for a complete list of digital interactives, visit www.myeconlab.com.

Learning Catalytics

Learning Catalytics is a bring-your-own-device classroom engagement tool instructors can use to ask students questions utilizing 18 different question types, allowing students to participate in real time during lectures. With Learning Catalytics you can:

- Engage students in real time, using open-ended tasks to probe student understanding.
- Promote student participation using any modern Web-enabled device they already have—laptop, smartphone, or tablet.
- Address misconceptions before students leave the classroom.
- Understand immediately where students are and adjust your lecture accordingly.
- Improve your students' critical thinking skills.
- Engage with and record the participation of every student in your classroom.

Learning catalytics gives you the flexibility to create your own questions to fit your course exactly or to choose from a searchable question library Pearson has created.

For more information, visit learningcatalytics.com.

Dynamic Study Modules

Dynamic Study Modules, which focus on key topic areas and are available from within MyEconLab, are an additional way for students to obtain tailored help. These modules work by continuously assessing student performance and activity on discrete topics and provide personalized content in real time to reinforce concepts that target each student's particular strengths and weaknesses.

Each Dynamic Study Module, accessed by computer, smartphone, or tablet, promotes fast learning and long-term retention. Because MyEconLab and Dynamic Study Modules help students stay on track and achieve a higher level of subject-matter mastery, more class time is available for interaction, discussion, collaboration, and exploring applications to current news and events.

Instructors can register, create, and access all of their MyEconLab courses at www.myeconlab.com.

Pearson eText

Pearson eText gives students access to the text whenever and wherever they have online access to the Internet. eText pages look exactly like the printed text, offering powerful new functionality for students and instructors. Users can create notes, highlight text in different colours, create bookmarks, zoom, click hyperlinked words and phrases to view definitions, and view in single-page or two-page view.

INSTRUCTOR'S RESOURCES

These instructor supplements are available for download from a password-protected section of Pearson Canada's online catalogue (www.pearsoncanada.ca/highered). Navigate to your book's catalogue page to view a list of those supplements that are available. Speak to your local Pearson sales representative for details and access.

Instructor's Manual

- An **Instructor's Manual** (in both Word and PDF format) written by Christopher Ragan. It includes full solutions to all the Study Exercises.

Computerized Test Bank

- **Computerized Test Bank.** Pearson's computerized test banks allow instructors to filter and select questions to create quizzes, tests or homework. Instructors can revise questions or add their own, and may be able to choose print or online options. These questions are also available in Microsoft Word format.

PowerPoint Slides

- **PowerPoint® Slides**, covering the key concepts of each chapter, that can be adapted for lecture presentations.

Image Library

- An **Image Library**, consisting of all the figures and tables from the textbook in gif format. These files can easily be imported into PowerPoint slides for class presentation.

Additional Topics

- **Additional Topics**, written by Christopher Ragan, offering optional topics on a wide variety of economic subjects. A list of these topics is included in the text; students can access them on MyEconLab (www.myeconlab.com).

TECHNOLOGY SPECIALISTS

Learning Solutions Managers. Pearson's Learning Solutions Managers work with faculty and campus course designers to ensure that Pearson technology products, assessment tools, and online course materials are tailored to meet your specific needs. This highly qualified team is dedicated to helping schools take full advantage of a wide range of educational resources, by assisting in the integration of a variety of instructional materials and media formats. Your local Pearson Canada sales representative can provide you with more details on this service program.

Acknowledgements

It would be impossible to acknowledge here by name all the teachers, colleagues, and students who contributed to the development and improvement of this book over its previous fourteen editions. Hundreds of users have written to us with specific suggestions, and much of the credit for the improvement of the book over the years belongs to them. We can no longer list them individually but we thank them all sincerely.

For the development of this fifteenth edition, we are grateful to the many people who offered informal suggestions. We would also like to thank the following instructors who provided us with formal reviews of the textbook. Their observations and recommendations were extremely helpful.

- Medoune Seck, CEGEP John Abbott College
- Paul T. Dickinson, McGill University
- Mark Raymond, Saint Mary's University
- Cheryl Jenkins, John Abbott College
- Kevin Richter, Douglas College
- Fulton Tom, Langara College
- Mayssun El-Attar Vilalta, McGill University

We would like to express our thanks to the many people at Pearson Canada involved in the development and production of this textbook. We would especially like to thank three individuals with whom we worked closely. Megan Farrell (Acquisitions Editor); Keriann McGoogan (Senior Developmental Editor); Loula March (Marketing Manager) all showed their professionalism, dedication, and enthusiasm in guiding this book through the publication and marketing processes. We would also like to thank the many sales representatives who work to bring this

book to professors across the country. These individuals have been a pleasure to work with each step along the way, and we are deeply grateful for their presence and their participation and delighted to consider them friends as well as professional colleagues.

Our thanks also to the many people at Pearson with whom we work less closely but who nonetheless toil behind the scenes to produce this book, including Andrea Falkenberg, Vastavikta Sharma and Anthony Leung.

Thanks also to Cat Haggert for copyediting, Jeannie Gilmore for the technical review, and to Joel Gladstone for proofreading, all of whom provided an invaluable service with their attention to detail.

In short, we realize that there is a great deal more involved in producing a book than *just* the writing. Without the efforts of all of these dedicated professionals, this textbook simply would not exist. Our sincere thanks to all of you.

Thanks also to Simon Altman for his detailed and diligent work in assembling the necessary data for updating this fifteenth edition.

Finally, Ingrid Kristjanson is deeply involved in each revision of this textbook. Without her participation, the quality and efficiency of this project would suffer greatly. In addition, for the past four editions she has played a leading role in the improvement, rewriting, and expansion of the electronic Testbank. With her involvement, the lengthy revision of the textbook and its supplements continues to be an enriching and pleasant experience.

Christopher Ragan

About the Author



Chris Ragan received his B.A. in economics from the University of Victoria, his M.A. from Queen's University, and his Ph.D. from the Massachusetts Institute of Technology in Cambridge, Massachusetts

in 1990. He then joined the Department of Economics at McGill University in Montreal, where he has taught graduate courses in macroeconomics and international finance and undergraduate courses in macroeconomic theory and policy, current economic issues, and financial crises. Over the years he has taught principles of economics (micro and macro) to thousands of students at McGill and maintains a reputation on campus as being “super-excited” about economics. In 2007, Chris Ragan was awarded the Noel Fieldhouse Teaching Award from McGill for teaching excellence.

Professor Ragan's research focuses mainly on the design and implementation of macroeconomic policy in Canada. He has been privileged to serve the federal government in Ottawa as Special Advisor to the Governor of the Bank of Canada and as the Clifford Clark Visiting Economist at the Department of Finance. He currently serves as the chair of Canada's Ecofiscal Commission, a five-year project of independent economists and advisors to promote the greater use of pollution pricing in the Canadian economy.

Chris Ragan used the third edition of this textbook as an undergraduate student in 1981 and joined Richard Lipsey as a co-author in 1997 for the book's ninth edition. For several editions, Lipsey and Ragan worked diligently to maintain the book's reputation as the clearest and most comprehensive introductory economics textbook in Canada. Although Professor Ragan is now the sole listed author, this fifteenth edition of *Economics* still owes much to the dedication of previous authors, including Richard Lipsey, Douglas Purvis, and Gordon Sparks.

1

PART 1: WHAT IS ECONOMICS?

Economic Issues and Concepts



CHAPTER OUTLINE	LEARNING OBJECTIVES (LO)
	After studying this chapter you will be able to
1.1 WHAT IS ECONOMICS?	1 explain the importance of scarcity, choice, and opportunity cost, and how each is illustrated by the production possibilities boundary.
1.2 THE COMPLEXITY OF MODERN ECONOMIES	2 view the market economy as self-organizing in the sense that order emerges from a large number of decentralized decisions. 3 explain how specialization gives rise to the need for trade, and how trade is facilitated by money. 4 identify the economy's decision makers and see how their actions create a circular flow of income and expenditure.
1.3 IS THERE AN ALTERNATIVE TO THE MARKET ECONOMY?	5 describe how all actual economies are mixed economies, having elements of free markets, tradition, and government intervention.

MANY of the challenges we face in Canada and around the world are primarily economic. Others that appear to be mainly environmental, social, or political usually have a significant economic dimension. Wars and civil unrest throughout history have often had economic roots, with antagonists competing for control over vital resources; global climate change is a phenomenon that engages the attention of the scientific and environmental communities, but the economic implications of both the problem and its solutions will be tremendous; population aging in

Canada and other developed countries will have consequences for the structure of our societies, but it will also have significant economic effects; and the existence of poverty, whether in Canada or in the much poorer nations of the world, most certainly has economic causes and consequences. We begin by discussing several issues that are currently of pressing concern, both inside and outside of Canada. Then, we'll move on to acquiring the knowledge and tools we need to better understand these and many other issues.

Productivity Growth Productivity growth lies at the heart of the long-term increase in average living standards. Productivity is a measure of how much output (or income) is produced by one hour of work effort, and it has been rising gradually over the past century. In recent years, however, productivity growth has been slowing in Canada, and economists have been examining the cause of the slowdown and also examining what policies, if any, might reverse this trend. If your living standards are to improve over your lifetime as much as your grandparents' did over theirs, Canada's rate of productivity growth will need to increase significantly.

Population Aging The average age of the Canadian population is steadily rising, due both to a long-term decline in fertility and to an increase in average life-expectancy. This population aging has several effects. First, since people eventually retire as they approach their "golden years," there will be a decline in the growth rate of Canada's labour force. As a result, some firms and industries will find it more difficult to find workers, and wages are likely to rise. Second, since our publicly funded health-care system tends to spend much more on seniors than it does on younger Canadians, there will be a significant increase in public health-care spending that will put difficult demands on governments' fiscal positions. This same demographic problem is being encountered in most developed countries.

Climate Change Climate change is a global phenomenon that has important implications for most nations on Earth. The long-term increase in the emission of greenhouse gases—caused largely from the burning of fossil fuels such as oil, coal, and natural gas—has led to an accumulation of these gases in the atmosphere and is contributing to a long-term increase in Earth's average temperature. The rise in temperature is leading to the melting of polar ice caps, a slow increase in sea level, a creeping expansion of the world's great deserts, and reductions in agricultural productivity. Global climate change presents a challenge for the design of better economic policy, aimed at reducing greenhouse-gas emissions without unduly slowing the growth of material living standards.

Global Financial Stability The collapse of the U.S. housing market in 2007–2008 led to the failure of several major financial institutions and caused a global financial crisis. The largest and most synchronized worldwide recession in over 70 years followed in its wake. The crisis led most of the world's major governments to intervene considerably in their economies—by providing assistance to their financial institutions and by directly expanding expenditures on goods and services. By 2014 most of these economies had emerged from recession but were nonetheless still experiencing slow economic recoveries. Most governments were also actively redesigning their financial regulations to reduce the likelihood that similar events would occur in the future. The quest for "financial stability" has become a policy imperative in many countries.

Rising Government Debt The aggressive government response to the global financial crisis led to massive new public spending in an effort to dampen the effects of the recession. Governments' budget deficits increased for several years, and thus government debt in most countries increased significantly between 2008 and 2015. Early in this period it became clear that government debt in some European countries (especially Greece, Portugal, Ireland, Italy, and Spain) was so high that bondholders were no longer prepared to purchase new government bonds or renew their existing holdings of bonds. The resulting upward spike in interest rates made it almost impossible for these

countries to carry out their regular business without special financial assistance from other governments or from the International Monetary Fund. The political tensions created among European governments threatened to spell the end of Europe's common currency, the euro. These issues are still largely unresolved.

Globalization Canada is a small nation that relies significantly on trade with the rest of the world for its prosperity. We sell our lumber and oil and beef to the world, as we do our engineering and legal and financial services. As consumers we buy a wide variety of products from the rest of the world, including coffee, leather shoes, and fine wine; our firms also buy many inputs from abroad, including machine tools, software, and some specialized raw materials. In short, international trade and the ongoing process of globalization are crucial to Canada's economic prosperity. Yet globalization also presents some challenges. A decision to reduce tariffs on imported goods generates temporary costs for those Canadians who are displaced from their previously protected occupations. And greater competition for Canadian firms from those in developing countries may lead to a decline in some middle-level Canadian jobs.

Growing Income Inequality In Canada and most other developed countries, the past three decades have seen a rise in income inequality. Particularly dramatic has been the increase in the share of national income going to the richest one percent of individuals, all while the incomes of those in the "middle classes" have grown very slowly. The causes of this rising inequality are hotly debated among economists, but most agree that the nature and pace of technological change and the growing ability of firms to locate their production facilities in lower-wage developing countries are contributing factors. There is also considerable debate regarding what government actions could be taken to slow or reverse the increase in income inequality, and whether the benefits of those actions in terms of reduced inequality would be justified by the associated costs.

These seven issues are only a small sample of the many economic issues that confront Canada and other countries. To understand any of them it is necessary to have a basic understanding of economics—how markets work, how prices are determined, in what sense markets sometimes fail to work well, and how government policy can be used to improve outcomes. These are the main topics of this book. There is a lot to learn, and not many weeks in your college or university course. So, let's get started at the very beginning.

1.1 WHAT IS ECONOMICS?

The issues described in the introduction would not matter much if we lived in an economy of such plenty that there was always enough to fully satisfy everyone's wants. If we could always get all the things we wanted, it wouldn't be so important to be more productive in our work. Rapid growth in health-care spending would not be such a problem if governments had no limits on what they could spend, or if there were not problems associated with high levels of government debt. And there would be no need to trade with other countries if Canada could easily and cheaply produce coffee, clothing, electronic components, and all those other things that we currently import from foreign lands. But such an economy with unlimited products is impossible. Why?

The short answer is because we live in a world of *scarcity*. Compared with the desires of individuals for things such as better food, clothing, housing, education, clean

water and health care, the existing supplies of resources are clearly inadequate. They are sufficient to produce only a small fraction of the goods and services that we desire. This scarcity gives rise to the basic economic problem of choice. If we cannot have everything we want, we must choose what we will and will not have.

One definition of *economics* comes from the great economist Alfred Marshall (1842–1924), who we will encounter at several points in this book: “Economics is a study of mankind in the ordinary business of life.” A more informative definition is:

Economics is the study of the use of scarce resources to satisfy unlimited human wants.

Scarcity is inevitable and is central to economic problems. What are society’s resources? Why is scarcity inevitable? What are the consequences of scarcity?

Resources

A society’s resources are often divided into the three broad categories of land, labour, and capital. *Land* includes all natural endowments, such as arable land, forests, lakes, crude oil, and minerals. *Labour* includes all mental and physical human resources, including entrepreneurial capacity and management skills. *Capital* includes all manufactured aids to production, such as tools, machinery, and buildings. Economists call such resources **factors of production** because they are used to produce the things that people desire. We divide what is produced into goods and services. **Goods** are tangible (e.g., cars and shoes), and **services** are intangible (e.g., legal advice and education). People use goods and services to satisfy their wants. The act of making them is called **production**, and the act of using them is called **consumption**.

factors of production Resources used to produce goods and services; frequently divided into the basic categories of land, labour, and capital.

goods Tangible products, such as cars or shoes.

services Intangible products, such as legal services and education.

production The act of making goods or services.

consumption The act of using goods or services to satisfy wants.

Scarcity and Choice

For almost all of the world’s 7.3 billion people, scarcity is real and ever-present. As we said earlier, relative to our desires, existing resources are inadequate; there are enough to produce only a fraction of the goods and services that we want.

But aren’t the developed nations rich enough that scarcity is no longer a problem? After all, they are “affluent” societies. Whatever affluence may mean, however, it does not mean the end of the problem of scarcity. Canadian families that earn \$80 000 per year, approximately the average after-tax income for a Canadian family in 2016 but a princely amount by *world* standards, have no trouble spending it on things that seem useful to them, and they would certainly have no trouble convincing you that their resources are scarce relative to their desires.

Because resources are scarce, all societies face the problem of deciding what to produce and how much each person will consume. Societies differ in who makes the choices and how they are made, but the need to choose is common to all. Just as scarcity implies the need for choice, so choice implies the existence of cost. A decision to have more of one thing requires a decision to have less of something else. The less of “something else” can be thought of as the cost of having more of that “one thing.”

Scarcity implies that choices must be made, and making choices implies the existence of costs.

Opportunity Cost To see how choice implies cost, we look first at a trivial example and then at one that affects all of us; both examples involve precisely the same fundamental principles.

Consider the choice David faces when he goes out for pizza and beer with his friends. Suppose that he has only \$16 for the night and that each beer costs \$4 and each slice of pizza costs \$2. David would like to have 4 slices of pizza and 3 beers, but this would cost \$20 and is therefore unattainable given David's scarce resources of \$16. There are several combinations, however, that are attainable: 8 slices of pizza and 0 beers; 6 slices of pizza and 1 beer; 4 slices of pizza and 2 beers; 2 slices of pizza and 3 beers; and 0 slices of pizza and 4 beers.

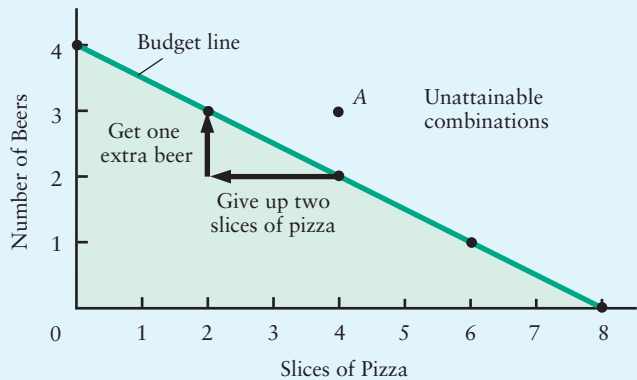
David's possible choices are illustrated in Figure 1-1. The numbers of slices of pizza are shown on the horizontal axis; the numbers of beers are shown on the vertical axis. The downward-sloping line connects the five possible combinations of beer and pizza that use up all of David's resources—\$16. This is David's *budget line*. Notice that point A shows a combination that lies outside the line because its total cost is more than \$16; Point A is *unattainable* to David. If David could buy fractions of a beer and of a slice of pizza, *all* points that lie on or inside the line would be *attainable* combinations.

In this setting David can ask himself, "What is the cost of one beer?" One answer is that the cost is \$4. An equivalent answer, assuming that he wanted to spend all of this \$16 on these two items, is that the cost of one beer is the two slices of pizza he must give up to get it. In fact, we say in this case that two slices of pizza is the *opportunity cost* of one beer, since they are the opportunity David must give up to get one extra beer.

Every time a choice is made, opportunity costs are incurred.

As simple as it may seem, the idea of opportunity cost is one of the central insights of economics. Here is a precise definition: The **opportunity cost** of choosing any one alternative is the value of the next best alternative that is given up. That is, it is the cost measured in terms of other goods and services that could have been obtained instead. If, for example, resources that could have produced 20 km of road are best used instead to produce one hospital, the opportunity cost of a hospital is 20 km of road; looked at the other way round, the opportunity cost of 20 km of road is one hospital.

FIGURE 1-1 Choosing Between Pizza and Beer



Scarce resources force a choice among competing alternatives. Given a total of \$16 to spend on \$2 slices of pizza and \$4 beers, some choices are unattainable, such as point A. The five points on the green line show *all* combinations that are attainable by spending the \$16. If it were possible to buy parts of a beer and parts of a slice of pizza, then all combinations on the line and in the green area would be attainable. If the entire \$16 is to be spent, the choice between more pizza and more beer involves an opportunity cost. The *slope* of the green line reflects opportunity costs. The opportunity cost of one extra slice of pizza is half of a beer; the opportunity cost of one extra beer is two slices of pizza.

opportunity cost The value of the next best alternative that is forgone when one alternative is chosen.

APPLYING ECONOMIC CONCEPTS 1-1



The Opportunity Cost of Your University Degree

The opportunity cost of choosing one thing is what must be given up as the best alternative. Computing the opportunity cost of a college or university education is a good example to illustrate which factors are included in the computation of opportunity cost. You may also be surprised to learn how expensive your university degree really is!*

Suppose that a bachelor's degree requires four years of study and that each year you spend \$6500 for tuition fees—approximately the average at Canadian universities in 2016—and a further \$1500 per year for books and materials. Does this mean that the cost of a university education is only \$32 000? Unfortunately not; the true cost of a university degree to a student is much higher.

The key point is that the opportunity cost of a university education does not include just the out-of-pocket expenses on tuition and books. You must also take into consideration *what you are forced to give up* by choosing to attend university. Of course, if you were not studying you could have done any one of a number of things, but the relevant one is *the one you would have chosen instead*—your best alternative to attending university.

Suppose your best alternative to attending university was to get a job. In this case, the opportunity cost of your university degree must include the earnings that you would have received had you taken that job. Suppose your (after-tax) annual earnings would have been \$25 000 per year, for a total of \$100 000 if you had stayed at that job for four years. To the direct expenses of \$32 000, we must therefore add \$100 000 for the earnings that

you gave up by not taking a job. This brings the true cost of your university degree—the opportunity cost—up to \$132 000!

Notice that the cost of food, lodging, clothing, and other living expenses did not enter the calculation of the opportunity cost in this example. The living expenses must be incurred in either case—whether you attend university or get a job.

If the opportunity cost of a degree is so high, why do students choose to go to university? Maybe students simply enjoy learning and are prepared to incur the high cost to be in the university environment. Or maybe they believe that a university degree will significantly increase their future earning potential. In Chapter 14 we will see that this is true. In this case, they are giving up four years of earnings at one salary so that they can invest in building their skills in the hope of enjoying many more years in the future at a considerably higher salary.

Whatever the reason for attending college or university, the recognition that a post-secondary degree is very expensive should convince students to make the best use of their time while they are there. Read on!

* This box considers only the cost *to the student* of a university degree. For reasons that will be discussed in detail in Part Six of this book, provincial governments heavily subsidize post-secondary education in Canada. Because of this subsidy, the cost *to society* of a university degree is generally much higher than the cost to an individual student.

See *Applying Economic Concepts 1-1* for an example of opportunity cost that should seem quite familiar to you: the opportunity cost of getting a university degree.

Production Possibilities Boundary Although David's choice between pizza and beer may seem to be a trivial consumption decision, the nature of the decision is the same whatever the choice being made. Consider, for example, the choice that any country must face between producing goods for final consumption (such as food and clothing) and goods for investment purposes used to increase future production (such as machines and factories).

If resources are fully and efficiently employed it is not possible to have more of *both* consumption and investment goods. As the country devotes more resources to producing consumption goods it must take resources away from producing investment goods. The opportunity cost of the extra consumption goods is the value of the investment goods forgone.

The choice is illustrated in Figure 1-2. Because resources are scarce, some combinations—those that would require more than the total available supply of resources for their production—cannot be attained. The negatively sloped curve on the graph divides the combinations that can be attained from those that cannot. Points above and to the right of this curve cannot be attained because there are not enough resources, points below and to the left of the curve can be attained without using all of the available resources, and points on the curve can just be attained if all the available resources are used efficiently. The curve is called the **production possibilities boundary**. (Sometimes “boundary” is replaced with “curve” or “frontier.”) It has a negative slope because when all resources are being used efficiently, producing more of one good requires producing less of others.

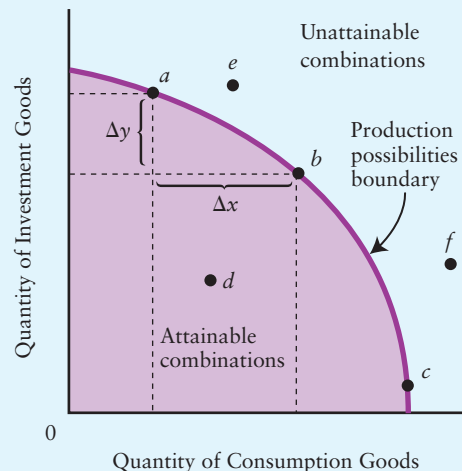
A production possibilities boundary illustrates three concepts: scarcity, choice, and opportunity cost. Scarcity is indicated by the unattainable combinations outside the boundary; choice, by the need to choose among the alternative attainable points along the boundary; and opportunity cost, by the negative slope of the boundary.

production possibilities boundary A curve showing which alternative combinations of output can be attained if all available resources are used efficiently; it is the boundary between attainable and unattainable output combinations.

The shape of the production possibilities boundary in Figure 1-2 implies that an increasing amount of consumption goods must be given up to achieve equal successive increases in the production of investment goods. This shape, referred to as *concave* to the origin, indicates that the opportunity cost of either good increases as we increase the amount of it that is produced. A straight-line boundary, as in Figure 1-1, indicates that the opportunity cost of one good stays constant, no matter how much of it is produced.

The concave shape in Figure 1-2 is the way economists usually draw a country’s production possibilities boundary. The shape occurs because each factor of production is not equally useful in producing all goods. To see why differences among factors of production are so important, suppose we begin at point *c* in Figure 1-2, where most resources are devoted to the production of consumption goods, and then consider gradually shifting more and more resources toward the production of investment goods. We might begin by shifting the use of iron ore and other raw materials. These resources may not be very well suited to producing consumption goods (like food) but may be essential for producing tools, machinery, and factories. This shift of resources will therefore lead to a small reduction in the output of consumption goods but a substantial increase in the output of investment goods. Thus, the opportunity cost of producing more units of investment goods, which is equal to the forgone consumption goods, is

FIGURE 1-2 A Production Possibilities Boundary



The negatively sloped boundary shows the combinations that are attainable when all resources are used efficiently. The production possibilities boundary separates the attainable combinations of goods, such as *a*, *b*, *c*, and *d*, from unattainable combinations, such as *e* and *f*. Points *a*, *b*, and *c* represent full and efficient use of society’s resources. Point *d* represents either inefficient use of resources or failure to use all the available resources. If production changes from point *a* to point *b*, an opportunity cost is involved. The opportunity cost of producing Δx more consumption goods is the necessary reduction in the production of investment goods equal to Δy .

small. But as we shift more and more resources toward the production of investment goods, and therefore move along the production possibilities boundary toward point *a*, we must shift more and more resources that are actually quite well suited to the production of consumption goods, like arable agricultural land. As we produce more and more investment goods (by devoting more and more resources to producing them), the amount of consumption goods that must be forgone to produce one *extra* unit of investment goods rises. That is, the opportunity cost of producing one good rises as more of that good is produced.

Four Key Economic Problems

Modern economies involve millions of complex production and consumption activities. Despite this complexity, the basic decisions that must be made are not very different from those that were made in ancient and primitive economies in which people worked with few tools and bartered with their neighbours. In all cases, scarcity, opportunity cost, and the need for choice play crucial roles. Whatever the economic system, whether modern or ancient or complex or primitive, there are four key economic problems.

What Is Produced and How? This question concerns the *allocation* of scarce resources among alternative uses. This **resource allocation** determines the quantities of various goods that are produced. Choosing to produce a particular combination of goods means choosing a particular allocation of resources among the industries or regions producing the goods. What determines which goods are produced and which ones are not?

Is there some combination of the production of goods that is “better” than others? If so, should governments try to alter the pattern of production in this direction?

What Is Consumed and by Whom? Economists seek to understand what determines the distribution of a nation’s total output among its people. Who gets a lot, who gets a little, and why? Should governments care about this *distribution* of consumption and, if so, what tools do they have to alter it?

If production takes place on the production possibilities boundary, then how about consumption? Will the economy consume exactly the same goods that it produces? Or will the country’s ability to trade with other countries permit the economy to consume a different combination of goods?

Why Are Resources Sometimes Idle? Sometimes large numbers of workers are unemployed. At the same time, the managers and owners of offices and factories could choose to produce more goods and services. For some reason, however, these resources—land, labour, and factories—lie idle. Thus, in terms of Figure 1-2, the economy sometimes operates inside its production possibilities boundary.

Why are resources sometimes idle? Should governments worry about such idle resources, or is there some reason to believe that such occasional idleness is necessary for a well-functioning economy?

Is Productive Capacity Growing? The capacity to produce goods and services grows rapidly in some countries, grows slowly in others, and actually declines in others. Growth in productive capacity can be represented by an outward shift of the production possibilities boundary, as shown in Figure 1-3. If an economy’s capacity to

resource allocation The allocation of an economy’s scarce resources among alternative uses.

produce goods and services is growing, some combinations that are unattainable today will become attainable in the future. What are the determinants of such growth and can governments do anything to influence them?

Economics and Government Policy

Questions relating to what is produced and how, and what is consumed and by whom, fall within the realm of microeconomics. **Microeconomics** is the study of the causes and consequences of the allocation of resources as it is affected by the workings of the price system and government policies that seek to influence it. Questions relating to the idleness of resources and the growth of the economy's productive capacity fall within the realm of macroeconomics. **Macroeconomics** is the study of the determination of economic aggregates, such as total output, total employment, and the rate of economic growth.

The design and effectiveness of government policy matters for each of our four key economic problems. When asking what combination of goods and services is produced in the economy, and whether some combinations might be better than others, government policy enters the discussion. In later chapters we will examine situations called *market failures*, which arise when free markets lead to too much of some goods being produced (like pollution) and too little of others (like national parks). Government policy could be used to alter the allocation of the economy's resources to correct these market failures.

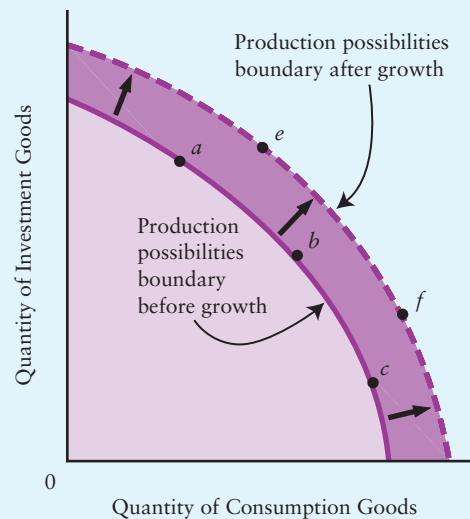
When asking who gets to consume the economy's output, it is natural to discuss the *fairness* regarding the distribution of consumption across individuals. Do free markets lead to fair outcomes? Can we even decide objectively what is fair and what is unfair? We will see throughout this book that many government policies are designed with fairness in mind. We will also encounter an ongoing debate about how much the government should try to improve the fairness of market outcomes. Some argue that it is reasonable to do so; others argue that attempts to improve fairness often lead to reductions in market efficiency that impose large costs on society.

Government policy is also part of the discussion of why a nation's resources are sometimes idle and what can be done to reduce such idleness. For example, when the Canadian economy entered a major global recession in 2009, the federal and provincial governments increased their spending significantly in an attempt to dampen the decline in aggregate output that was then occurring. Some critics argue that such "fiscal stimulus" packages cannot increase overall output, since the increase

microeconomics The study of the causes and consequences of the allocation of resources as it is affected by the workings of the price system.

macroeconomics The study of the determination of economic aggregates such as total output, employment, and growth.

FIGURE 1-3 The Effect of Economic Growth on the Production Possibilities Boundary



Economic growth shifts the boundary outward and makes it possible to produce more of all products. Before growth in productive capacity, points *a*, *b*, and *c* were on the production possibilities boundary and points *e* and *f* were unattainable. After growth, points *e* and *f* and many other previously unattainable combinations are attainable.