CHAPTER OUTLINE

1.1 WHAT IS ECONOMICS?

1.2 THE COMPLEXITY OF MODERN ECONOMIES

1.3 IS THERE AN ALTERNATIVE TO THE MARKET ECONOMY?

LEARNING OBJECTIVES (LO)

After studying this chapter you will be able to

1. explain the importance of scarcity, choice, and opportunity cost, and how all three concepts are illustrated by the production possibilities boundary.

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 that trade is greatly facilitated by money.

4. identify the economy’s decision makers and see how their actions create a circular flow of income and expenditure.

5. see that 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. Some are mostly environmental, social, or political, but with many issues there is also 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.
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Productivity Growth Productivity growth lies at the heart of the long-term increase in Canadians’ 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 in universities and governments 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 as a result. Second, since our publicly funded health-care system tends to spend much more on seniors than it does on Canadians under the age of 55, there will be a significant increase in public health-care spending as a share of the total size of the economy. This will put new and difficult demands on governments’ fiscal positions, and force them either to increase tax rates or reduce spending in order to balance their budgets. This same demographic problem is being encountered in most developed countries.

Climate Change Climate change is a global phenomenon that will have 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. Particularly troubling is that much of the burden of climate change appears to be falling on developing countries that are least able to bear the burden. 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. It also presents a challenge for global diplomacy, aimed at getting all countries—rich and poor—involved in a collective effort of reducing their emissions.

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. Many elements came together to cause these events, including new mortgage practices, innovative financial instruments, expansionary monetary policy, regulation in the financial sector, and many others. The crisis led most of the world’s major governments to intervene considerably in their economies—by providing assistance to their financial institutions, by directly expanding expenditures on goods and
services, and by providing liquidity to their financial markets. By 2010 most of these economies had emerged from recession and were on their way to healthy economic recoveries. However, it was then clear that governments needed to play a role in redesigning their financial systems 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. These increases in government spending, however, took place when the recession was causing a decline in government tax revenues. As a result, governments’ budget deficits increased for several years, and government debt in most countries increased significantly between 2008 and 2012. Even by 2010 it had become 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. The European “sovereign debt crisis” is 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 overall benefits for Canada, but it also 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 leads to overall increases in domestic living standards, as Canadians now have access to cheaper goods. However, it may also lead to a decline in some middle-level jobs in Canada that get replaced slowly with jobs in expanding sectors.

These six 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.
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1.1 What Is Economics?

These issues 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 goods 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 products such as better food, clothing, housing, education, holidays, health care, and entertainment, 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., haircuts and education).

People use goods and services to satisfy many of their wants. The act of making them is called production, and the act of using them to satisfy wants is called consumption. Goods are valued for the services they provide. For example, a car helps to satisfy its owner’s desires for transportation, mobility, and possibly status.

Scarcity and Choice

For almost all of the world’s 7 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 advanced industrialized nations rich enough that scarcity is nearly banished? 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 $75,000 per year, the average after-tax income for a Canadian family in 2013 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. Since David is both hungry and thirsty, he 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 choices are illustrated in Figure 1-1, which graphs the combinations of beers and slices of pizza that David considers buying. 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—4 slices of pizza and 3 beers—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
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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 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 that 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 $30,000, 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 $130,000!

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

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 using resources for a certain purpose is the benefit given up by not using them in the best alternative way. 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.

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 military goods (such as ships, tanks, and guns) and civilian goods (such as food, clothing, and housing).

If resources are fully and efficiently employed, it is not possible to have more of both. However, as the government cuts defence expenditures, resources needed to produce civilian goods will be freed up. The opportunity cost of increased civilian goods is therefore
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.

The shape of the production possibilities boundary in Figure 1-2 implies that an increasing amount of civilian production must be given up to achieve equal successive increases in military production. 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.
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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 military goods, and then consider gradually shifting more and more resources toward the production of civilian goods. We might begin by shifting nutrient-rich land that is particularly well suited to growing wheat. This land may not be very useful for making military equipment, but it is very useful for making certain civilian goods (like bread). This shift of resources will therefore lead to a small reduction in military output but a substantial increase in civilian output. Thus, the opportunity cost of producing a few more units of civilian goods, which is equal to the forgone military output, is small. But as we shift more and more resources toward the production of civilian 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 military output, like aerospace engineers or the minerals needed to make gunpowder. As we produce more and more civilian goods (by devoting more and more resources to producing them), the amount of military output that must be forgone to produce one extra unit of civilian 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, however, 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. Nor is the essence of the decisions in modern, complex economies different from those in current-day developing economies, where many people struggle for their daily survival. 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.

1. 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?

Furthermore, because resources are scarce, it is desirable that they be used efficiently. Hence, it matters which of the available methods of production is used to produce each of the goods. What determines which methods of production get used and which ones do not? Any economy must have some mechanism by which these decisions about resource allocation are made.
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? Could they achieve this if they tried?

2. 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?

3. Why Are Resources Sometimes Idle? Sometimes large numbers of workers who would like to have jobs are unable to find employers to hire them. At the same time, the managers and owners of offices and factories could operate at a higher level of activity—that is, they could 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 there anything governments can do to reduce such idleness?

4. 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 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? Are there some undesirable side effects of growth? Can governments do anything to influence economic growth?

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, interest rates, the price level, and the rate of economic growth.

The design and effectiveness of government policy is relevant to discussing all four 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). In such situations, government policy could be used to alter the allocation of the economy’s resources in such a way as to make society as a whole better off.

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? And if we could, what kind of government policies could be used to improve the distribution? 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 economic 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 planned spending significantly in an attempt to dampen the decline in aggregate output and rise in unemployment that was then occurring. Other countries did the same. Some critics argued that such “fiscal stimulus” packages could not increase overall output and income, since the increase in government spending would simply displace private spending. Others argued that recessions are caused largely by a reduction in private spending, and that an increase in government spending can be an effective temporary replacement to help sustain the level of economic activity. Such debates lie at the heart of macroeconomic policy, and we have much to say about them in this book.

### 1.2 The Complexity of Modern Economies

If you want a litre of milk, you go to your local grocery store and buy it. When the grocer needs more milk, he orders it from the wholesaler, who in turn gets it from the dairy, which in turn gets it from the dairy farmer. The dairy farmer buys cattle feed and electric milking machines, and he gets power to run all his equipment by putting a plug into a wall outlet where the electricity is supplied as he needs it. The milking machines are made from parts manufactured in several different places in Canada, the United States, and overseas. The parts themselves are made from materials mined and smelted in a dozen or more countries.

As it is with the milk you drink, so it is with everything else that you buy. When you go to the appropriate store, what you want is normally on the shelf. Those who make these products find that all the required components and materials are available when they need them—even though these things typically come from many different parts of the world and are made by many people who have no direct dealings with one another.

Your own transactions are only a small part of the remarkably complex set of transactions that takes place every day in a modern economy. Shipments arrive daily at our ports, railway terminals, and airports. These shipments include raw materials, such as iron ore, logs, and oil; parts, such as automobile engines, transistors, and circuit
boards; tools, such as screwdrivers, lathes, and digging equipment; perishables, such as fresh flowers, coffee beans, and fruit; and all kinds of manufactured goods, such as washing machines, computers, and cell phones. Railways and trucking lines move these goods among thousands of different destinations within Canada. Some go directly to consumers. Others are used by local firms to manufacture their products—some of which will be sold domestically and others exported to other countries.

The Nature of Market Economies

An economy is a system in which scarce resources—such as labour, land, and capital—are allocated among competing uses. Decisions must be made about which goods are produced and which are not; who works where and at what wage; and who consumes which goods at what times. Although each of these individual decisions may seem simple, the entire combination is remarkably complex, especially in modern societies.

Self-Organizing

Early in the development of modern economics, thoughtful observers wondered how such a complex set of dealings gets organized. Who coordinates the whole set of efforts? Who makes sure that all the activities fit together, providing jobs to produce the things that people want and delivering those things to where they are wanted? The answer is, surprisingly, no one!

A great insight of early economists was that an economy based on free-market transactions is self-organizing.

A market economy is self-organizing in the sense that when individual consumers and producers act independently to pursue their own self-interests, responding to prices determined in open markets, the collective outcome is coordinated—there is a “spontaneous economic order.” In that order, literally thousands of millions of transactions and activities fit together to produce the things that people want within the constraints set by the resources that are available to the nation.

The great Scottish economist and political philosopher Adam Smith (1723–1790),\(^1\) who was the first to develop this insight fully, put it this way:

> It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages.

Smith is not saying that benevolence is unimportant. Indeed, he praises it in many other passages of his book. He is saying, however, that the massive number of economic interactions that characterize

\(^1\) Throughout this book, we encounter many great economists from the past whose ideas shaped the discipline of economics. At the back of the book you will find a timeline that begins in the 1600s. It contains brief discussions of many of these thinkers and places them in their historical context.
a modern economy cannot all be motivated by benevolence. Although benevolence does motivate some of our actions, often the very dramatic ones, the vast majority of our everyday actions are motivated by self-interest. Self-interest, not benevolence, is therefore the foundation of economic order.

**Efficiency** Another great insight, which was hinted at by Smith and fully developed over the next century and a half, was that this spontaneously generated economic order is relatively *efficient*. Loosely speaking, efficiency means that the resources available to the nation are organized so as to produce the various goods and services that people want to purchase and to produce them with the least possible amount of resources.

An economy organized by free markets behaves almost as if it were guided by “an invisible hand,” in Smith’s now-famous words. This does not literally mean that a supernatural presence runs a market economy. Instead it refers to the relatively efficient order that emerges spontaneously out of the many independent decisions made by those who produce, sell, and buy goods and services. The key to explaining this market behaviour is that these decision makers all respond to the same set of prices, which are determined in markets that respond to overall conditions of national scarcity or plenty. Much of this book is devoted to a detailed elaboration of how this market order is generated and how efficiently that job is done.

That free markets usually generate relatively efficient outcomes does not mean that they are *always* efficient or that everyone views the outcomes as desirable or even *fair*. Free markets sometimes fail to produce efficient outcomes, and these failures often provide a motivation for government intervention. In addition, many market outcomes may be efficient but perceived by many to be quite unfair. For example, we will see that an efficient labour market may nonetheless lead to large differentials in wages, with some individuals receiving low incomes while others receive enormous incomes. So, while a central aspect of economics is the study of how markets allocate resources efficiently, much emphasis is also placed on what happens when markets fail in various ways.

**Incentives and Self-Interest** Lying at the heart of modern economies are *incentives* and *self-interest*. Individuals generally pursue their own self-interest, buying and selling what seems best for them and their families. They purchase products that they want rather than those they dislike, and they buy them when it makes sense given their time and financial constraints. Similarly, they sell products, including their own labour services, in an attempt to improve their own economic situation. When making such decisions about what to buy or sell and at what prices, people respond to incentives. Sellers usually want to sell more when prices are high because by doing so they have command over more resources that can be used to purchase the things they want. Similarly, buyers usually want to buy more when prices are low because by doing so they are better able to use their scarce resources to acquire the many things they desire.

With self-interested buyers and sellers responding to incentives when determining what they want to buy and sell, the overall market prices and quantities are determined by their collective interactions. Changes in their preferences or productive abilities lead to changes in their desired transactions and thus to fluctuations in market prices and quantities.

The millions of market transactions occurring on a daily basis in a modern economy are governed by a set of institutions largely created by government. Most often these institutions are so much a part of the fabric of our society that we barely notice their existence, but their importance should not be ignored. The most important of these institutions are private property, the freedom to enter into contracts, and the
rule of law. The natures of private property and contractual obligations are defined by laws passed by legislatures and enforced by the police and the courts.

The Decision Makers and Their Choices

Three broad groups of decision makers operate in any economy. The first group is consumers. Sometimes we think of consumers as being individuals and sometimes we think in terms of families or households. Consumers purchase various kinds of goods and services with their income; they usually earn their income by selling their labour services to their employers. Sometimes their income is earned by renting out the land or buildings or machines that they own.

The second group of decision makers is producers. Producers may be firms that are interested in earning profits or they may be non-profit or charitable organizations. In any case, producers hire workers, purchase or rent various kinds of material inputs and supplies, and then produce and sell their products. In the cases of charitable organizations, their products are often distributed for free.

The third group of decision makers is government. In Canada, this group includes the federal, provincial, territorial, and municipal governments. Like producers, governments hire workers, purchase or rent material and supplies, and produce goods and services. Unlike most producers, however, governments usually provide their goods and services at no direct cost to the final user; their operations are financed not by revenue from the sale of their products but instead by the taxes they collect from individual consumers and producers. In addition to producing and providing many goods and services, governments create and enforce laws, and design and implement regulations that must be followed by consumers and producers.

How Are Decisions Made? How do consumers, producers, and governments make decisions? Thinking about how governments make decisions is not straightforward. Indeed, it is not uncommon to hear Canadians say something like “How could the government possibly do something so stupid?” As we will see in later chapters, however, there is usually a sensible explanation for why a government makes the decisions that it does, though it is often not clear until you think carefully about what the government’s objectives really are. We will examine government policies in detail at many points throughout this book.

For now, let’s focus on how consumers and producers make their decisions. Economists usually assume that consumers’ and producers’ decisions are both “maximizing” and “marginal.” What does this mean?

Maximizing Decisions. The important assumption that economists usually make about how these two groups make their decisions is that everyone tries to do as well as possible for himself or herself. In the jargon of economics, people are assumed to be maximizers. When individuals decide how many factor services to sell to producers and how many products to buy from them, they are assumed to make choices designed to maximize their well-being, or utility. When producers decide how many factor services to buy from individuals and how many goods to produce and sell to them, they are assumed to make choices designed to maximize their profits. We explore the details of utility and profit maximization in later chapters.

Marginal Decisions. Firms and consumers who are trying to maximize usually need to weigh the costs and benefits of their decisions at the margin. For example, when you consider buying an additional pair of shoes, you know the marginal cost of the shoes—that is,
how much you must pay to get them—and you need to compare that cost to the **marginal benefit** that you will receive—the extra satisfaction you get from having those shoes. If you are trying to maximize your utility, you will buy the new pair of shoes only if you think that the benefit to you in terms of extra utility exceeds the marginal cost.

Similarly, a producer attempting to maximize its profits and considering whether to hire an extra worker must determine the **marginal cost** of the worker—the extra wages and benefits that must be paid—and compare it to the **marginal benefit** of the worker—the increase in sales revenues the extra worker will generate. A producer interested in maximizing its profit will hire the extra worker only if the benefit in terms of extra revenue exceeds the cost in terms of extra wages.

In order to achieve their objectives, maximizing consumers and producers make marginal decisions; they decide whether they will be made better off by buying or selling a little more or a little less of any given product.

Voting in an election is an example in which decisions are not made on a marginal basis. When you vote in a Canadian federal election, you have only one vote and you must support one party over the others. When you do, you vote for everything that party stands for, even though you may prefer to pick and choose elements from each party’s political platform. You cannot say “I vote for the Liberals on issue A and for the Conservatives on issue B.” You must make a total, rather than a marginal, decision.

The **Flow of Income and Expenditure**

Figure 1-4 shows the basic decision makers and the flows of income and expenditure that they set up. Individuals own factors of production. They sell the services of these factors to producers and receive payments in return. These are their incomes. Producers use the factor services that they buy to make goods and services. They sell these to individuals, receiving payments in return. These are the incomes of producers. These basic flows of income and expenditure pass through markets. Individuals sell the services of the factor that they own in what are collectively called **factor markets**. When you get a part-time job during university, you are participating in the factor market. Producers sell their outputs of goods and services in what are collectively called **goods markets**. When you purchase a haircut, an airplane ticket, or a new pair of shoes, for example, you are participating in the goods market.

The prices that are determined in these markets determine the incomes that are earned. People who get high prices for their factor services earn high incomes; those who get low prices earn low incomes. The **distribution of income** refers to how the nation’s total income is distributed among its citizens. This is largely determined by the price that each type of factor service receives in factor markets.
CHAPTER 1: ECONOMIC ISSUES AND CONCEPTS

Production and Trade

Individual producers decide which goods to produce and how to produce them. Production is a very complex process in any modern economy. For example, a typical car manufacturer assembles a product out of thousands of individual parts. It makes some of these parts itself. Most are subcontracted to parts manufacturers, and many of the major parts manufacturers subcontract some of their work to smaller firms. The same is true for producing consumer electronics, clothing, home appliances, furniture, fashion accessories, cleaning products, restaurant meals, and most other products you can imagine purchasing. Such complex production displays two characteristics noted long ago by Adam Smith—specialization and the division of labour.

Specialization

In ancient hunter–gatherer societies and in modern subsistence economies, most people make most of the things they need for themselves. However, from the time that people first engaged in settled agriculture and some of them began to live in towns, people have specialized in doing particular jobs. Artisan, soldier, priest, and government official were some of the earliest specialized occupations. Economists call this allocation of different jobs to different people the specialization of labour. There are two fundamental reasons why specialization is extraordinarily efficient compared with universal self-sufficiency.

First, individual abilities differ, and specialization allows individuals to do what they can do relatively well while leaving everything else to be done by others. Even when people's abilities are unaffected by the act of specializing, the economy's total production is greater when people specialize than when they all try to be self-sufficient. This is true for individuals, but it is also true for entire countries, and it is one of the most fundamental principles in economics: the principle of comparative advantage. A much fuller discussion of comparative advantage is found in Chapter 33, where we discuss the gains from international trade.

The second reason why specialization is more efficient than self-sufficiency concerns changes in people's abilities that occur because they specialize. A person who concentrates on one activity becomes better at it than could a jack-of-all-trades. This is called learning by doing, and it was a factor much stressed by early economists; research shows that it is important in many modern industries.

The Division of Labour

Throughout most of history each artisan who specialized in making some product made the whole of that product. But over the last several hundred years, many technical advances have made it efficient to organize production methods into large-scale firms organized around what is called the division of labour. This term refers to specialization within the production process of a particular product.

Mass Production. In a mass-production factory, work is divided into highly specialized tasks by using specialized machinery. Each individual repeatedly does one or a few small tasks that represent only a small fraction of those necessary to produce any one product.

Flexible Manufacturing. Two recent changes have significantly altered the degree of specialization found in many modern production processes. First, individual artisans have recently reappeared in some lines of production. They are responding to a revival in the demand for individually crafted, rather than mass-produced, products. Second, many manufacturing operations are being reorganized along new lines called flexible manufacturing, which was pioneered by Japanese car manufacturers in the mid-1950s. It has led back to a more craft-based form of organization within the factory. In this technique, employees work as a team; each employee is able to do every team member's job rather than only one very specialized task at one point on the assembly line. However,
even these workers are practising the division of labour—but the division is not as fine as it is in mass production.

**Money and Trade** People who specialize in doing only one thing must satisfy most of their wants by consuming things made by other people. In early societies the exchange of goods and services took place by simple mutual agreement among neighbours. In the course of time, however, trading became centred on particular gathering places called markets. For example, the French markets or trade fairs of Champagne were known throughout Europe as early as the eleventh century. Even now, many small towns in Canada have regular market days. Today, however, the term “market” has a much broader meaning, referring to any institutions that allow buyers and sellers to transact with each other, which could be by meeting physically or by trading over the Internet. Also, we use the term “market economy” to refer to a society in which people specialize in productive activities and meet most of their material wants through voluntary market transactions with other people.

**Specialization must be accompanied by trade. People who produce only one thing must trade most of it to obtain all the other things they want.**

Early trading was by means of barter, the trading of goods directly for other goods. But barter is costly in terms of time spent searching out satisfactory exchanges. If a farmer has wheat but wants a hammer, he must find someone who has a hammer and wants wheat. A successful barter transaction thus requires what is called a *double coincidence of wants*.

Money eliminates the cumbersome system of barter by separating the transactions involved in the exchange of products. If a farmer has wheat and wants a hammer, she merely has to find someone who wants wheat. The farmer takes money in exchange. Then she finds a person who wants to sell a hammer and gives up the money for the hammer.

**Money greatly facilitates trade, which itself facilitates specialization.**

**Globalization** Market economies constantly change, largely as a result of the development of new technologies and the new patterns of production and trade that result. Many of the recent changes are referred to as *globalization*, a term often used loosely to mean the increased importance of international trade. International trade is, however, a very old phenomenon. The usual pattern over most of the last 200 years was manufactured goods being sent from Europe and North America to the rest of the world, with raw materials and primary products being sent in return. What is new in the last few decades is the globalization of manufacturing. Assembly of a product may take place in the most industrialized countries, but the hundreds of component parts are manufactured in dozens of different countries and delivered to the assembly plant “just in time” for assembly.

Two major causes of globalization are the rapid reduction in transportation costs and the revolution in information technology that have occurred in the past 50 years. The cost of moving products around the world fell greatly over the last half of the twentieth century because of containerization and the increasing size of ships. Our ability to transmit
and analyze data increased even more dramatically, while the costs of doing so decreased equally dramatically. For example, today $1000 buys an ultra-slim tablet or laptop computer that has the same computing power as a “mainframe” computer that in 1970 cost $10 million and filled a large room. This revolution in information and communication technology has made it possible to coordinate economic transactions around the world in ways that were difficult and costly 50 years ago and quite impossible 100 years ago.

Globalization is as important for consumers as it is for producers. For example, as some tastes become universal to young people, spread by ever-increasing access to foreign television stations and global social networks, we can see the same clothes and hear the same music in virtually all big cities. McDonald’s restaurants are as visible in Moscow or Beijing as in London, New York, Vancouver, or Montreal. Many other brands are also known around the world, such as Louis Vuitton, Hilfiger, Gucci, Rolex, Nike, Coca-Cola, Kellogg’s, Heinz, Nestlé, Molson, Toyota, Rolls-Royce, Sony, and Mitsubishi.

Through the ongoing process of globalization, national economies are ever more linked to the global economy, in which an increasing share of jobs and incomes is created.

Globalization comes with challenges, however. As Canadian firms relocate production facilities to countries where costs are lower, domestic workers are laid off and must search for new jobs, perhaps needing retraining in the process. The location of production facilities in countries with lower environmental or human-rights records raises difficult questions about the standards that should be followed by Canadian-owned firms in foreign lands. And firms often use the threat of relocation in an attempt to extract financial assistance from governments, placing those governments in difficult positions. These concerns have led in recent years to “anti-globalization protests” that have raised awareness of some of the costs associated with the process of globalization. We have more to say about these issues in Chapters 33 and 34.

1.3 Is There an Alternative to the Market Economy?

In this chapter we have discussed the elements of an economy based on free-market transactions—what we call a market economy. Are there any alternatives to this type of economy? The answer is no in one sense and yes in another. We answer no because the modern economy has no practical alternative to reliance on market determination for many of its transactions. We answer yes because not all transactions take place in free markets even in the most market-oriented society. To go further we need to identify various types of economic systems.
Types of Economic Systems

It is helpful to distinguish three pure types of economies, called traditional, command, and free-market economies. These economies differ in the way in which economic decisions are coordinated. But no actual economy fits neatly into one of these three categories—all real economies contain some elements of each type.

**Traditional Economies** A traditional economy is one in which behaviour is based primarily on tradition, custom, and habit. Young men follow their fathers’ occupations. Women do what their mothers did. There is little change in the pattern of goods produced from year to year, other than those imposed by the vagaries of nature. The techniques of production also follow traditional patterns, except when the effects of an occasional new invention are felt. Finally, production is allocated among the members according to long-established traditions.

Such a system works best in an unchanging environment. Under such static conditions, a system that does not continually require people to make choices can prove effective in meeting economic and social needs.

Traditional systems were common in earlier times. The feudal system, under which most people in medieval Europe lived, was a largely traditional society. Peasants, artisans, and most others living in villages inherited their positions in that society. They also usually inherited their specific jobs, which they handled in traditional ways.

Some elements of traditional economies persist today. In some cases, the traditional behaviour is natural and probably desirable, as when a child with considerable expertise takes over a successful family business. In other situations, the traditional behaviour is the result of a resistance to change and fear of less familiar and more risky career paths. In these cases, the traditions may clash with the change that is a hallmark of a modern and dynamic economy.

**Command Economies** In command economies, economic behaviour is determined by some central authority, usually the government, which makes most of the necessary decisions on what to produce, how to produce it, and who gets to consume which products and in what quantities. Such economies are characterized by the centralization of decision making. Because centralized decision makers usually create elaborate and complex plans for the behaviour that they want to impose, the terms command economy and centrally planned economy are usually used synonymously.

The sheer quantity of data required for the central planning of an entire modern economy is enormous, and the task of analyzing it to produce a fully integrated plan can hardly be exaggerated. Moreover, the plan must be continually modified to take account not only of current data but also of future trends in labour supplies, technological developments, and people’s tastes for various goods and services. This is a notoriously difficult exercise, not least because of the unavailability of all essential, accurate, and up-to-date information.

Thirty years ago, more than one-third of the world’s population lived in countries that relied heavily on central planning. Today, after the fall of the Berlin Wall and the collapse of the Soviet Union, the number of such countries is small. Even in countries in which central planning is the proclaimed system, as in Cuba, increasing amounts of market determination are gradually being permitted.

**Free-Market Economies** In the third type of economic system, the decisions about resource allocation are made without any central direction. Instead, they result from innumerable independent decisions made by individual producers and consumers. Such a system is known as a free-market economy or, more simply, a market economy. In such an economy, decisions relating to the basic economic issues are decentralized.
Despite the absence of a central plan, these many decentralized decisions are nonetheless coordinated. The main coordinating device is the set of market-determined prices—which is why free-market systems are often called price systems.

In a pure market economy, all these decisions are made by buyers and sellers acting through unhindered markets. The government provides the background of defining property rights and protecting citizens against foreign and domestic enemies but, beyond that, markets determine all resource allocation and income distribution.

**Mixed Economies** Economies that are fully traditional or fully centrally planned or wholly free-market are pure types that are useful for studying basic principles. When we look in detail at any actual economy, however, we discover that its economic behaviour is the result of some mixture of central control and market determination, with a certain amount of traditional behaviour as well.

In practice, every economy is a mixed economy in the sense that it combines significant elements of all three systems in determining economic behaviour.

Furthermore, within any economy, the degree of the mix varies from sector to sector. For example, in some planned economies, the command principle was used more often to determine behaviour in heavy-goods industries, such as steel, than in agriculture. Farmers were often given substantial freedom to produce and sell what they wanted in response to varying market prices.

When economists speak of a particular economy as being centrally planned, we mean only that the degree of the mix is weighted heavily toward the command principle. When we speak of one as being a market economy, we mean only that the degree of the mix is weighted heavily toward decentralized decision making.

Although no country offers an example of either system working alone, some economies, such as those of Canada, the United States, France, and Hong Kong, rely much more heavily on market decisions than others, such as the economies of China, North Korea, and Cuba. Yet even in Canada, the command principle has some sway. Crown corporations, legislated minimum wages, rules and regulations for environmental protection, quotas on some agricultural outputs, and restrictions on the import of some items are just a few examples.

**The Great Debate**

As we saw earlier, in 1776 Adam Smith was one of the first people to analyze the operation of markets, and he stressed the relative efficiency of free-market economies. A century later, another great economist and political philosopher, Karl Marx (1818–1883), argued that although free-market economies would indeed be successful in producing high levels of output, they could not be relied on to ensure that this output would be fairly distributed among citizens. He argued the benefits of a centrally planned system in which the government could ensure a more equitable distribution of output.

Beginning with the Soviet Union in the early 1920s, many nations adopted systems in which conscious government central planning
replaced the operation of the free market. For almost a century, a great debate then raged on the relative merits of command economies versus market economies. Along with the Soviet Union, the countries of Eastern Europe and China were command economies for much of the twentieth century. Canada, the United States, and most of the countries of Western Europe were, and still are, primarily market economies. The apparent successes of the Soviet Union and China in the 1950s and 1960s, including the ability to mobilize considerable resources into heavy industries, suggested to many observers that the command principle was at least as good for organizing economic behaviour as the market principle. Over the long run, however, planned economies proved to be a failure of such disastrous proportions that they seriously depressed the living standards of their citizens.

During the last decade of the twentieth century, most of the world’s centrally planned economies began the difficult transition back toward freer markets. These transitions occurred at different paces in different countries, but in most cases the initial few years were characterized by significant declines in output and employment. Twenty years later, however, most of the “transition” economies are experiencing growth rates above the ones they had in their final years as centrally planned economies. Living standards are on the rise. Lessons from History 1-1 discusses in more detail why the centrally planned economies failed. This failure suggests the superiority of decentralized markets over centrally

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**LESSONS FROM HISTORY 1-1**

**The Failure of Central Planning**

*The fall of the Berlin Wall in November 1989 was the beginning of the end of the Soviet system of central planning.*

The Bolshevik Revolution in 1917 in Russia brought the world its first example of a large-scale communist society. With the rise to power of Joseph Stalin and the creation of the Soviet Union in 1922, communism and central economic planning began their spread throughout Eastern and Central Europe. This spread of central planning was accelerated by the Soviet Union’s role following the Second World War in “liberating” several countries from Nazi domination, thus creating the group of countries that became known as the Eastern Bloc or the Soviet Bloc.

Despite the successful geographic spread of communism, the Soviet system of central economic planning had many difficulties. By 1989, communism had collapsed throughout Central and Eastern Europe, and the economic systems of formerly communist countries began the difficult transition from centrally planned to market economies. Although political issues played an enormous role in these events, the economic changes generally confirmed the superiority of a market-oriented price system over central planning as a method of organizing economic activity. The failure of central planning had many causes, but four were particularly significant.

**Failure of Coordination**

In the centrally planned economies, a body of planners attempted to coordinate all the economic decisions about production, investment, trade, and consumption that were likely to be made by producers and consumers throughout the country. Without the use of prices to signal relative scarcity and abundance, central planning generally proved impossible to do with any reasonable degree of success. Bottlenecks in production, shortages of some goods, and gluts of others plagued the Soviet economy for decades.
planned ones as mechanisms for allocating an economy’s scarce resources. Put another way, it demonstrates the superiority of mixed economies with substantial elements of market determination over fully planned command economies. However, it does not demonstrate, as some observers have asserted, the superiority of completely free-market economies over mixed economies.

There is no guarantee that completely free markets will, on their own, handle such urgent matters as controlling pollution, providing public goods (like national defence), or preventing financial crises, such as occurred in 2008–2009 in most of the developed countries. Indeed, as we will see in later chapters, much economic theory is devoted to explaining why free markets often fail to do these things. Mixed economies, with significant elements of government intervention, are needed to do these jobs.

Furthermore, acceptance of the free market over central planning does not provide an excuse to ignore a country’s pressing social issues. Acceptance of the benefits of the free market still leaves plenty of scope to debate the most appropriate levels and types of government policies directed at achieving specific social goals. It follows that there is still considerable room for disagreement about the degree of the mix of market and government determination in any modern mixed economy—room enough to accommodate such divergent views as could be expressed by conservative, liberal, and modern social democratic parties.

### Failure of Quality Control

Central planners could monitor the number of units produced by any factory, reward plants that exceeded their production targets, and punish those that fell short. Factory managers operating under these conditions would meet their quotas by whatever means were available, and once the goods passed out of their factory, what happened to them was someone else’s headache.

In market economies, poor quality is punished by low sales, and retailers soon give a signal to factory managers by shifting their purchases to other suppliers. The incentives that obviously flow from such private-sector purchasing discretion were generally absent from centrally planned economies, where purchases and sales were organized by the body of planners, and prices and profits were not used to signal customer satisfaction or dissatisfaction.

### Misplaced Incentives

In market economies, relative wages and salaries provide incentives for labour to move from place to place, and the possibility of losing one’s job provides an incentive to work diligently. This is a harsh mechanism that punishes job losers with loss of income (although social programs provide floors to the amount of economic punishment that can be suffered). In centrally planned economies, workers usually had complete job security. Industrial unemployment was rare, and even when it did occur, new jobs were usually found for all who lost theirs. Although the high level of security was attractive to many people, it proved impossible to provide sufficient incentives for reasonably hard and efficient work under such conditions.

### Environmental Degradation

Fulfilling production plans became the all-embracing goal in centrally planned economies, to the exclusion of most other considerations, including the environment. As a result, environmental degradation occurred in the Soviet Union and the countries of Eastern Europe on a scale unknown in advanced Western nations. A particularly disturbing example (only one of many) occurred in Central Asia, where high quotas for cotton output led to indiscriminate use of pesticides and irrigation. Birth defects became very common, and the vast Aral Sea was more than three-quarters drained, causing major environmental effects.

This failure to protect the environment stemmed from the pressure to fulfill production plans and the absence of a “political marketplace” where citizens could express their preferences for the environment. Imperfect though the system may be in democratic market economies—and in some particular cases it has been quite poor—their record of environmental protection has been vastly better than that of the centrally planned economies.
So, the first answer to the question about the existence of an alternative to the market economy is no: There is no practical alternative to a mixed system with major reliance on markets but some government presence in most aspects of the economy. The second answer is yes: Within the framework of a mixed economy there are substantial alternatives among many different and complex mixes of free-market and government determination of economic life.

**Government in the Modern Mixed Economy**

Market economies in today’s advanced industrial countries are based primarily on voluntary transactions between individual buyers and sellers. Private individuals have the right to buy and sell what they want, to accept or refuse work that is offered to them, and to move where they want when they want.

Key institutions are private property and freedom of contract, both of which must be maintained by active government policies. The government creates laws of ownership and contract and then provides the institutions, such as police and courts, to enforce these laws.

In modern mixed economies, governments go well beyond these important basic functions. They intervene in market transactions to correct what economists call *market failures*. These are well-defined situations in which free markets do not work well. Some products, called *public goods*, are usually not provided at all by markets because their use cannot usually be restricted to those who pay for them. Defence and police protection are examples of public goods. In other cases, private producers or consumers impose costs called *externalities* on those who have no say in the transaction. This is the case when factories pollute the air and rivers. The public is harmed but plays no part in the transaction. In yet other cases, financial institutions, such as banks, mortgage companies, and investment houses, may indulge in risky activities that threaten the health of the entire economic system. These market failures explain why governments sometimes intervene to alter the allocation of resources.

Also, important issues of *equity* arise from letting free markets determine people’s incomes. Some people lose their jobs because firms are reorganizing to become more efficient in the face of new technologies. Others keep their jobs, but the market places so little value on their services that they face economic deprivation. The old and the chronically ill may suffer if their past circumstances did not allow them to save enough to support themselves. For many reasons of this sort, almost everyone accepts some government intervention to redistribute income. Care must be taken, however, not to kill the goose that lays the golden egg. By taking too much from higher-income people, we risk eliminating their incentives to work hard and produce income, some of which is to be redistributed to those in need.

These are some of the reasons that all modern economies are mixed economies. Throughout most of the twentieth century in advanced industrial societies, the mix had been shifting toward more and more government participation in decisions about the allocation of resources and the distribution of income. Starting in the early 1980s, a worldwide movement began to reduce the degree of government participation in economies. With the onset of the global financial crisis of 2008–2009, however, there has been some movement back toward a greater involvement of government in the economy. These shifts in the market/government mix, and the reasons for them, are some of the major issues that will be studied in this book.
1.3  Is There an Alternative to the Market Economy?

• We can distinguish three pure types of economies: traditional, command, and free-market. In practice, all economies are mixed economies in that their economic behaviour responds to mixes of tradition, government command, and price incentives.

• In the late 1980s, events in Eastern Europe and the Soviet Union led to the general acceptance that the system of fully centrally planned economies had failed to produce minimally acceptable living standards for its citizens. All these countries are now moving toward greater market determination and less state command in their economies.

• Governments play an important role in modern mixed economies. They create and enforce important background institutions such as private property and freedom of contract. They intervene to correct market failures. They also redistribute income in the interests of equity.

KEY CONCEPTS

Resources
Scarcity and the need for choice
Choice and opportunity cost
Production possibilities boundary
The self-organizing economy

Incentives and self-interest
Specialization
The division of labour
Trade and money
Globalization

Traditional economies
Command economies
Free-market economies
Mixed economies
STUDY EXERCISES

Make the grade with MyEconLab: Study Exercises marked in red can be found on MyEconLab. You can practise them as often as you want, and most feature step-by-step guided instructions to help you find the right answer.

1. Fill in the blanks to make the following statements correct.
   a. The three general categories of any economy’s resources are ________, ________, and ________. Economists refer to these resources as the ________ of production.
   b. When we use any resource, the benefit given up by not using it in its best alternative way is known as the ________ of that resource.
   c. The concepts of scarcity, choice, and opportunity cost can be illustrated by a curve known as the ________.
   d. When looking at a production possibilities boundary, any point that is outside the boundary demonstrates ________. The ________ slope of the production possibilities boundary demonstrates ________.
   e. A straight-line production possibilities boundary (PPB) indicates that the opportunity cost of each good is ________, no matter how much of that good is produced. A PPB that is concave to the origin indicates that a(n) ________ amount of one good must be given up to produce more of the other good.
   f. Consider an economy producing two goods, A and B, with a PPB that is concave to the origin. As the economy produces more of good A and less of good B, its opportunity cost of producing A ________.

2. Explain the three economic concepts illustrated by the production possibilities boundary.

3. Consider an economy that produces only food and clothing. Its production possibilities boundary is shown below.

   a. If the economy is at point A, how many tonnes of clothing and how many tonnes of food are being produced? At point B? At point C?
   b. What do we know about the use of resources when the economy is at point A? At point B? At point C?
   c. If the economy is at point B, what is the opportunity cost of producing one more tonne of food? What is the opportunity cost of producing one more tonne of clothing?
   d. What do we know about the use of resources at point D? How would it be possible for the economy to produce at point D?

4. Choiceland has 250 workers and produces only two goods, X and Y. Labour is the only factor of production, but some workers are better suited to producing X than Y (and vice versa). The table below shows the maximum levels of output of each good possible from various levels of labour input.

<table>
<thead>
<tr>
<th>Number of Workers Producing X</th>
<th>Annual Production of X</th>
<th>Number of Workers Producing Y</th>
<th>Annual Production of Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>250</td>
<td>1300</td>
</tr>
<tr>
<td>50</td>
<td>20</td>
<td>200</td>
<td>1200</td>
</tr>
<tr>
<td>100</td>
<td>45</td>
<td>150</td>
<td>900</td>
</tr>
<tr>
<td>150</td>
<td>60</td>
<td>100</td>
<td>600</td>
</tr>
<tr>
<td>200</td>
<td>70</td>
<td>50</td>
<td>350</td>
</tr>
<tr>
<td>250</td>
<td>75</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

   a. Draw the production possibilities boundary for Choiceland on a scale diagram, with the production of X on the horizontal axis and the production of Y on the vertical axis.
   b. Compute the opportunity cost of producing an extra 15 units of X if the economy is initially producing 45 units of X and 900 units of Y. How does this compare to the opportunity cost if the economy were initially producing 60 units of X and 600 units of Y?
   c. If the economy is producing 40 units of X and 600 units of Y, what is the opportunity cost of producing an extra 20 units of X?
   d. Suppose now that the technology associated with producing good Y improves, so that the maximum
level of $Y$ that can be produced from any given level of labour input increases by 10 percent. Explain (or show in a diagram) what happens to the production possibilities curve.

5. Explain why a technological improvement in the production of one good means that a country can now produce more of other goods than it did previously. Hint: Draw a country’s production possibilities boundary to help answer this question.

6. Consider your decision whether to go skiing for the weekend. Suppose transportation, lift tickets, and accommodation for the weekend cost $300. Suppose also that restaurant food for the weekend will cost $75. Finally, suppose you have a weekend job that you will have to miss if you go skiing, which pays you $120 (after tax) for the one weekend day that you work. What is the opportunity cost of going skiing? Do you need any other information before computing the opportunity cost?

7. Suppose you and a friend are stranded on an island and must gather firewood and catch fish to survive. Through experience, you know that if each of you spends an entire day on either activity, the result is given in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Fish</th>
<th>Firewood (bundles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>You</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Your friend</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

You and your friend decide that you should each specialize so that one person catches fish while the other gathers firewood. But who should do which task?

a. What is the opportunity cost for you to gather an additional bundle of firewood? What is your friend’s opportunity cost of gathering an extra bundle of firewood?

b. Assuming that you and your friend specialize, what allocation of tasks maximizes total output for your one day of joint effort?

c. Suppose you both decide to work for two days according to the allocation in part (b). What is the total amount of output? What would it have been had you chosen the reverse allocation of tasks?

8. In this chapter we used a simple idea of a production possibilities boundary to illustrate the concepts of scarcity, choice, and opportunity cost. We assumed there were only two goods—call them $X$ and $Y$. But we all know that any economy produces many more than just two goods. Explain why the insights illustrated in Figure 1-2 on page 8 are more general, and why the assumption of only two goods is a useful one.

9. What is the difference between microeconomics and macroeconomics?

10. For each of the following situations, explain how a change in the stated “price” is likely to affect your incentives regarding the stated decision.

   a. the price of ski-lift tickets; your decision to purchase a ski-lift ticket
   b. the hourly wage for your weekend job; the decision to not work and go skiing on the weekend instead
   c. the value of a speeding ticket; your decision to speed on the highway
   d. the weight of your course grade attached to an assignment; your decision to work hard on that assignment
   e. the level of tuition fees at your college or university; your decision to attend that college or university

11. State and explain two reasons why the specialization of labour is more efficient than universal self-sufficiency.

12. Consider the market for doctors’ services. In what way has this market taken advantage of the specialization of labour?

13. List the four main types of economic systems and their main attributes.

14. As we said in the text, the average family income in Canada is about $75,000 per year. Imagine a hypothetical world in which all Canadian families had this income.

   a. In such a world, would poverty exist in Canada?
   b. In such a world, would scarcity exist in Canada?
   c. Explain the difference between poverty and scarcity.

15. Comment on the following statement: “One of the mysteries of semantics is why the government-managed economies ever came to be called planned and the market economies unplanned. It is the former that are in chronic chaos, in which buyers stand in line hoping to buy some toilet paper or soap. It is the latter that are in reasonable equilibrium—where if you want a bar of soap or a steak or a shirt or a car, you can go to the store and find that the item is magically there for you to buy. It is the liberal economies that reflect a highly sophisticated planning system, and the government-managed economies that are primitive and unplanned.”
This appendix is a refresher on the basic graphing techniques you saw in high school mathematics. Economists use graphs to illustrate theories and show data, and you will see many graphs throughout this course. Here, we review the most basic concepts for those who need review.

Displaying Points on a Graph

**Coordinate Space** A graph begins with two number lines, one horizontal and one vertical. We call the horizontal number line the \( x \) axis because we often label the variable displayed along this axis \( x \). We call the vertical number line the \( y \) axis because we often label the variable displayed along this axis \( y \). In Figure 1 the \( x \) axis displays the number line horizontally from \(-5\) to \(5\) with intervals of \(1\). The \( y \) axis displays the number line vertically from \(-3\) to \(3\), also with intervals of \(1\). We have now created a two-dimensional space that is called a coordinate space.

Now look at point A in the figure. Point A represents two numbers: \(3\) on the horizontal, or \(x\), axis and \(2\) on the vertical, or \(y\), axis. We write point A as \((3, 2)\) and we call the \(3\) and the \(2\) the coordinates of point A. The usual practice in graphing is to list the \(x\)-axis coordinate first and the \(y\)-axis coordinate second. In the same way, we can read point B\((2, -2)\), point C\((-1, -2)\), and point D\((-4, 3)\).

Any point on a graph is simply a visual representation of two numbers. For example, point A represents the numbers 3 and 2. For the graph to be meaningful to us, however, the numbers must tell us something. Let’s take an example from economics and plot a graph with the information from the table in Figure 2 that shows how much Katie saves at various levels of income (both measured in dollars). Each point on the graph now represents a particular level of income and the associated level of saving, or an income-saving combination. For example, point C shows that at an income of \$30 000, Katie saves \$5000. It is also easy to see when looking at this graph that when Katie’s level of income goes up, her level of saving goes up.

Notice that each increment indicated on the \(x\) axis is \(10 000\) and the increment on the \(y\) axis is only \(5 000\). We adjust the scales on the axes to fit the information we want to graph. In Figure 1 we called each interval 1 on both axes, and in Figure 2 we called each interval on the \(x\) axis \(10 000\) and each interval on the \(y\) axis \(5 000\). Imagine trying to graph Canadian national income, which is in the range of \$1.7 trillion, on a graph using intervals of \$1 or even \$10 000. The resulting graph would have to be enormous, and would not be helpful in displaying the information. Therefore, we choose the scales on each axis to best display the specific data we are considering.

**Variables** Our graph in Figure 2 now visually represents the relationship between the two variables, income and saving. **Variable** is the word we use to describe the items on the axes to which we are giving numeric values; in this case, income and saving. The **independent** variable, in this case income, is represented on the
horizontal axis (the $x$ axis) and the dependent variable, in this case saving, is represented on the vertical axis (the $y$ axis). (Though this is the usual way to draw a graph, you will later see that economists are sometimes accused of doing it backward—see footnote 3 on page 71 in Chapter 3.)

**Linear Curves**

When two variables move, either in the same or in opposite directions, we can plot the data points on a graph and join their points to form a curve. If joining the points gives us a straight line we call it a linear curve and we say that $x$ and $y$ have a linear relationship. A relationship in which the two variables move in the same direction is called a positive, or direct, relationship—when one variable goes up, the other goes up. A relationship in which the two variables move in opposite directions is called a negative, or inverse, relationship—when one variable goes up, the other goes down.

**A Positive Relationship** Figure 3 shows two variables, the number of pizza toppings and the total price of a pizza. A cheese pizza has zero toppings and costs $5; each additional topping costs $1.50. The two variables, number of toppings and price of pizza, move in the same direction—as the number of toppings (the $x$ variable) goes up, the price of the pizza (the $y$ variable) goes up—so this is a positive or direct relationship. Joining the points gives us an upward-sloping straight line, so we call this a positive, linear relationship.

**A Negative Relationship** Figure 4 shows two variables, the price of tickets for a university basketball game and the number of people who choose to purchase tickets and attend the game. (In Chapter 3 we describe such a relationship as a demand curve for basketball tickets.) The two variables move in opposite directions—this is a negative, or inverse, relationship. Joining the points gives us a downward-sloping straight line, so we call this a negative linear relationship.
**Slopes of Linear Curves** The slope of a line tells us how much the y variable changes whenever the x variable changes. For example, the slope of the straight line in Figure 3 tells us how much the price of pizza changes (the change on the y axis) when the number of toppings changes (the change on the x axis). The slope is defined as the change in the value on the vertical axis divided by the change in the value on the horizontal axis. It is commonly referred to as the “rise over the run.” We can write a description of slope in a few ways:

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in value on vertical axis}}{\text{change in value on horizontal axis}} = \frac{\Delta y}{\Delta x}$$

The last term uses the Greek letter delta, $\Delta$, which means “the change in.” For Figure 3, the slope of the curve is $1.50$ per topping, indicating that each extra topping increases the price of the pizza by $1.50$.

Figure 5 shows the calculation of slopes for two linear curves. (Work through each of these calculations and then draw various linear curves of your own and practise calculating their slopes. Try using different units and intervals on the axes and see if this affects the slope.) Notice that the upward-sloping curve has a positive slope and the downward-sloping curve has a negative slope. Also notice that the steeper the line, upward- or downward-sloping, the higher the absolute number value of the slope.

**A linear curve has the same slope over the entire length of the curve.**

**Infinite and Zero Slopes** Figure 6 shows two extreme cases that we see often in economics. For the horizontal line, we calculate the slope as $\text{rise}/\text{run} = \Delta y/\Delta x = 0/\infty$. We say that the run, or $\Delta x$, is $\infty$ because the linear curve extends to infinity. Zero divided by infinity is zero. Remember that the flatter is the curve, the smaller is the slope. Here is the extreme case of a flat curve; the slope is zero. For the vertical line, we calculate the slope as $\text{rise}/\text{run} = \Delta y/\Delta x = \infty/0$. Infinity divided by zero is infinity. Remember that the
steeper is the curve, the higher is the slope. This is the extreme case of a steep curve; the slope is infinite. Understanding the concept of the slope of a line is crucial when studying economics. Economists are interested in how much one variable changes in response to a change in another variable, and it is the slope of the curve that tells them this.

**Equation of a Linear Curve** A linear curve is a visual representation of the linear relationship between two variables. The same relationship can also be described in an equation. The general equation for a linear curve is

\[ y = a + bx, \]

where \( y \) is the dependent variable and \( x \) is the independent variable. The letter \( a \) represents the \( y \) intercept, or the point at which the line intersects the \( y \) axis. The letter \( b \) represents the slope of the line.

In Figure 7 we plot the linear curve, \( A \), given by the relationship between the \( x \) and \( y \) variables in Table A of Figure 7. The equation for this linear curve is

\[ y = 2 + 0.5x \]

Prove this to yourself by calculating \( y \) for any value of \( x \). For example, when \( x = 3 \), \( y = 2 + 0.5(3) = 3.5 \). When \( x = 7 \), \( y = 2 + 0.5(7) = 5.5 \). The \( y \) intercept of this line is 2, and thus the line intersects the \( y \) axis at 2.

The slope of the line is 0.5. Verify this by calculating \( \Delta y/\Delta x \) between any two points on the line. Between points \( C \) and \( D \), for example, the \( \Delta y \) (or the rise) is 1 and the \( \Delta x \) (or the run) is 2. So the slope of the linear curve is \( \Delta y/\Delta x = 1/2 = 0.5 \).

The equation for a downward-sloping linear curve works the same way. In Figure 7 we plot the linear curve, \( B \), given by the relationship between the \( x \) and \( y \) variables in Table B of Figure 7. The equation for this linear curve is \( y = 8 - 4x \). Once again, prove this to yourself by calculating \( y \) for various levels of \( x \). The \( y \) intercept for this line is 8 and the slope is –4. Notice, of course, that the slope of the downward-sloping linear curve is negative.

**Non-Linear Curves**

All the curves we have looked at so far have been straight lines—they have been linear curves. (So they haven’t really been “curves” at all!) However, not all relations between two economic variables can be graphed as a straight line. More often, the relation is non-linear. In a non-linear relationship between \( x \) and \( y \), each unit change in \( x \) does not always bring about the same change in the \( y \) variable. Figure 8 shows four curves, two with positive slopes and two with negative slopes.
Curves A and B both show positive relationships between \( x \) and \( y \)—the slopes are both positive. As \( x \) increases, so does \( y \). Curve A, however, becomes flatter as \( x \) increases, and curve B becomes steeper as \( x \) increases. Similarly, curves C and D both show negative relationships between \( x \) and \( y \)—both slopes are negative because in each case, as \( x \) increases, \( y \) decreases. Curve C becomes flatter as \( x \) increases and curve D becomes steeper as \( x \) increases.

**Slopes of Non-Linear Curves** Examine curves A, B, C, and D in Figure 8 to see how \( y \) changes in response to a one-unit change in \( x \), at various levels of \( x \). You will see that for curves A and C, the change in \( y \) becomes smaller as we move along the \( x \) axis. We can describe the slopes of curves A and C as starting out steep and becoming flatter as \( x \) increases. For curves B and D, however, the change in \( y \) becomes larger as we move along the \( x \) axis. We can describe the slopes of curves B and D as starting out flat and becoming steeper as \( x \) increases. The slopes of these non-linear curves are changing as we move along the curve. How do we measure the slope of a curve when the slope is different at each point along the curve?

Remember that we measured the slope of a straight line by choosing two points on the line and dividing the change in \( y \) by the change in \( x \). Doing the same thing to measure the slope of a non-linear curve, however, would give us the slope of the line connecting the two specific points that we chose on the curve but would not give us the slope of the curve itself.

Since the slope of the curve is continuously changing, we must measure the slope at specific points along the curve. To do so, we simply draw a straight line tangent to the curve at the point at which we want to measure the slope. A line is tangent to a curve if it touches but does not intersect the curve at that point. The slope of this tangent line then tells us the slope of the curve at the point of tangency. Figure 9 shows the calculation of the slope at three points along a downward-sloping curve like our curve C in Figure 8.

Consider the slope of the curve at point A. The tangent to the curve at point A has a \( y \) intercept at 50 and an \( x \) intercept at 10. Thus the slope of the tangent line is \( \Delta y / \Delta x = -50 / 10 = -5 \). Thus the slope of the curve at point A is \(-5\). Now consider the slope of the curve at point C. The tangent line to point C has an \( x \) intercept of 50 and a \( y \) intercept of 10. The slope of the tangent line is \( \Delta y / \Delta x = -10 / 50 = -0.2 \). Therefore the slope of the curve at point C is \(-0.2\). Thus, although the slope of the curve is always negative, its slope falls (in absolute value) from 5 at point A to 0.2 at point C.
We leave it to you to draw more non-linear curves (like curves A, B, and D in Figure 8) and compute the slopes at various points along each curve. For each computation, simply draw a straight line tangent to the curve, and then compute the slope of the tangent line. This will give you the slope of the non-linear curve at the point of tangency.

A Final Word

Graphing can be intimidating, but a little practice goes a long way. By working your way carefully through the various parts of this section, plus the graphing questions in the Study Exercises at the end of Chapter 2, you will soon be comfortable with the basics of graphing.