

# 1



## TEN PRINCIPLES OF ECONOMICS

The word *economy* comes from the Greek word for “one who manages a household.” At first, this origin might seem peculiar. But, in fact, households and economies have much in common.

A household faces many decisions. It must decide which members of the household do which tasks and what each member gets in return: Who cooks dinner? Who does the laundry? Who gets the extra dessert at dinner? Who gets to choose what TV show to watch? In short, the household must allocate its scarce resources among its various members, taking into account each member’s abilities, efforts, and desires.

Like a household, a society faces many decisions. A society must decide what jobs will be done and who will do them. It needs some people to grow food, other people to make clothing, and still others to design computer software. Once society has allocated people (as well as land, buildings, and machines) to various jobs,

### IN THIS CHAPTER YOU WILL . . .

*Learn that economics is about the allocation of scarce resources*

*Examine some of the tradeoffs that people face*

*Learn the meaning of opportunity cost*

*See how to use marginal reasoning when making decisions*

*Discuss how incentives affect people’s behavior*

*Consider why trade among people or nations can be good for everyone*

*Discuss why markets are a good, but not perfect, way to allocate resources*

*Learn what determines some trends in the overall economy*

**scarcity**

*the limited nature of society's resources*

**economics**

*the study of how society manages its scarce resources*

it must also allocate the output of goods and services that they produce. It must decide who will eat caviar and who will eat potatoes. It must decide who will drive a Porsche and who will take the bus.

The management of society's resources is important because resources are scarce. **Scarcity** means that society has limited resources and therefore cannot produce all the goods and services people wish to have. Just as a household cannot give every member everything he or she wants, a society cannot give every individual the highest standard of living to which he or she might aspire.

**Economics** is the study of how society manages its scarce resources. In most societies, resources are allocated not by a single central planner but through the combined actions of millions of households and firms. Economists therefore study how people make decisions: how much they work, what they buy, how much they save, and how they invest their savings. Economists also study how people interact with one another. For instance, they examine how the multitude of buyers and sellers of a good together determine the price at which the good is sold and the quantity that is sold. Finally, economists analyze forces and trends that affect the economy as a whole, including the growth in average income, the fraction of the population that cannot find work, and the rate at which prices are rising.

Although the study of economics has many facets, the field is unified by several central ideas. In the rest of this chapter, we look at *Ten Principles of Economics*. These principles recur throughout this book and are introduced here to give you an overview of what economics is all about. You can think of this chapter as a “preview of coming attractions.”



## HOW PEOPLE MAKE DECISIONS

There is no mystery to what an “economy” is. Whether we are talking about the economy of Los Angeles, of the United States, or of the whole world, an economy is just a group of people interacting with one another as they go about their lives. Because the behavior of an economy reflects the behavior of the individuals who make up the economy, we start our study of economics with four principles of individual decisionmaking.

### PRINCIPLE #1: PEOPLE FACE TRADEOFFS

The first lesson about making decisions is summarized in the adage: “There is no such thing as a free lunch.” To get one thing that we like, we usually have to give up another thing that we like. Making decisions requires trading off one goal against another.

Consider a student who must decide how to allocate her most valuable resource—her time. She can spend all of her time studying economics; she can spend all of her time studying psychology; or she can divide her time between the two fields. For every hour she studies one subject, she gives up an hour she could have used studying the other. And for every hour she spends studying, she gives up an hour that she could have spent napping, bike riding, watching TV, or working at her part-time job for some extra spending money.

Or consider parents deciding how to spend their family income. They can buy food, clothing, or a family vacation. Or they can save some of the family income for retirement or the children's college education. When they choose to spend an extra dollar on one of these goods, they have one less dollar to spend on some other good.

When people are grouped into societies, they face different kinds of tradeoffs. The classic tradeoff is between "guns and butter." The more we spend on national defense to protect our shores from foreign aggressors (guns), the less we can spend on consumer goods to raise our standard of living at home (butter). Also important in modern society is the tradeoff between a clean environment and a high level of income. Laws that require firms to reduce pollution raise the cost of producing goods and services. Because of the higher costs, these firms end up earning smaller profits, paying lower wages, charging higher prices, or some combination of these three. Thus, while pollution regulations give us the benefit of a cleaner environment and the improved health that comes with it, they have the cost of reducing the incomes of the firms' owners, workers, and customers.

Another tradeoff society faces is between efficiency and equity. **Efficiency** means that society is getting the most it can from its scarce resources. **Equity** means that the benefits of those resources are distributed fairly among society's members. In other words, efficiency refers to the size of the economic pie, and equity refers to how the pie is divided. Often, when government policies are being designed, these two goals conflict.

Consider, for instance, policies aimed at achieving a more equal distribution of economic well-being. Some of these policies, such as the welfare system or unemployment insurance, try to help those members of society who are most in need. Others, such as the individual income tax, ask the financially successful to contribute more than others to support the government. Although these policies have the benefit of achieving greater equity, they have a cost in terms of reduced efficiency. When the government redistributes income from the rich to the poor, it reduces the reward for working hard; as a result, people work less and produce fewer goods and services. In other words, when the government tries to cut the economic pie into more equal slices, the pie gets smaller.

Recognizing that people face tradeoffs does not by itself tell us what decisions they will or should make. A student should not abandon the study of psychology just because doing so would increase the time available for the study of economics. Society should not stop protecting the environment just because environmental regulations reduce our material standard of living. The poor should not be ignored just because helping them distorts work incentives. Nonetheless, acknowledging life's tradeoffs is important because people are likely to make good decisions only if they understand the options that they have available.

## PRINCIPLE #2: THE COST OF SOMETHING IS WHAT YOU GIVE UP TO GET IT

Because people face tradeoffs, making decisions requires comparing the costs and benefits of alternative courses of action. In many cases, however, the cost of some action is not as obvious as it might first appear.

Consider, for example, the decision whether to go to college. The benefit is intellectual enrichment and a lifetime of better job opportunities. But what is the cost? To answer this question, you might be tempted to add up the money you

### **efficiency**

*the property of society getting the most it can from its scarce resources*

### **equity**

*the property of distributing economic prosperity fairly among the members of society*

spend on tuition, books, room, and board. Yet this total does not truly represent what you give up to spend a year in college.

The first problem with this answer is that it includes some things that are not really costs of going to college. Even if you quit school, you would need a place to sleep and food to eat. Room and board are costs of going to college only to the extent that they are more expensive at college than elsewhere. Indeed, the cost of room and board at your school might be less than the rent and food expenses that you would pay living on your own. In this case, the savings on room and board are a benefit of going to college.

The second problem with this calculation of costs is that it ignores the largest cost of going to college—your time. When you spend a year listening to lectures, reading textbooks, and writing papers, you cannot spend that time working at a job. For most students, the wages given up to attend school are the largest single cost of their education.

The **opportunity cost** of an item is what you give up to get that item. When making any decision, such as whether to attend college, decisionmakers should be aware of the opportunity costs that accompany each possible action. In fact, they usually are. College-age athletes who can earn millions if they drop out of school and play professional sports are well aware that their opportunity cost of college is very high. It is not surprising that they often decide that the benefit is not worth the cost.

### opportunity cost

*whatever must be given up to obtain some item*

## PRINCIPLE #3: RATIONAL PEOPLE THINK AT THE MARGIN

Decisions in life are rarely black and white but usually involve shades of gray. When it's time for dinner, the decision you face is not between fasting or eating like a pig, but whether to take that extra spoonful of mashed potatoes. When exams roll around, your decision is not between blowing them off or studying 24 hours a day, but whether to spend an extra hour reviewing your notes instead of watching TV. Economists use the term **marginal changes** to describe small incremental adjustments to an existing plan of action. Keep in mind that "margin" means "edge," so marginal changes are adjustments around the edges of what you are doing.

### marginal changes

*small incremental adjustments to a plan of action*

In many situations, people make the best decisions by thinking at the margin. Suppose, for instance, that you asked a friend for advice about how many years to stay in school. If he were to compare for you the lifestyle of a person with a Ph.D. to that of a grade school dropout, you might complain that this comparison is not helpful for your decision. You have some education already and most likely are deciding whether to spend an extra year or two in school. To make this decision, you need to know the additional benefits that an extra year in school would offer (higher wages throughout life and the sheer joy of learning) and the additional costs that you would incur (tuition and the forgone wages while you're in school). By comparing these *marginal benefits* and *marginal costs*, you can evaluate whether the extra year is worthwhile.

As another example, consider an airline deciding how much to charge passengers who fly standby. Suppose that flying a 200-seat plane across the country costs the airline \$100,000. In this case, the average cost of each seat is  $\$100,000/200$ , which is \$500. One might be tempted to conclude that the airline should never sell a ticket for less than \$500. In fact, however, the airline can raise its profits by

thinking at the margin. Imagine that a plane is about to take off with ten empty seats, and a standby passenger is waiting at the gate willing to pay \$300 for a seat. Should the airline sell it to him? Of course it should. If the plane has empty seats, the cost of adding one more passenger is minuscule. Although the *average* cost of flying a passenger is \$500, the *marginal* cost is merely the cost of the bag of peanuts and can of soda that the extra passenger will consume. As long as the standby passenger pays more than the marginal cost, selling him a ticket is profitable.

As these examples show, individuals and firms can make better decisions by thinking at the margin. A rational decisionmaker takes an action if and only if the marginal benefit of the action exceeds the marginal cost.

#### PRINCIPLE #4: PEOPLE RESPOND TO INCENTIVES

Because people make decisions by comparing costs and benefits, their behavior may change when the costs or benefits change. That is, people respond to incentives. When the price of an apple rises, for instance, people decide to eat more pears and fewer apples, because the cost of buying an apple is higher. At the same time, apple orchards decide to hire more workers and harvest more apples, because the benefit of selling an apple is also higher. As we will see, the effect of price on the behavior of buyers and sellers in a market—in this case, the market for apples—is crucial for understanding how the economy works.

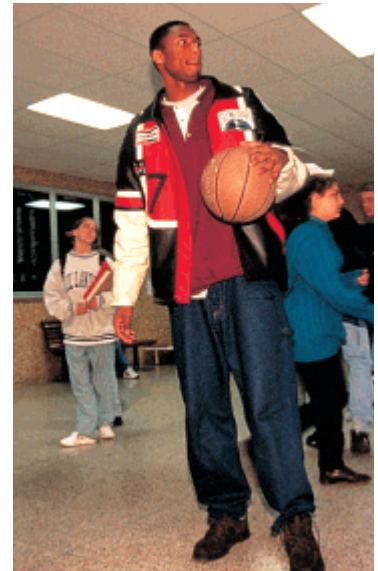
Public policymakers should never forget about incentives, for many policies change the costs or benefits that people face and, therefore, alter behavior. A tax on gasoline, for instance, encourages people to drive smaller, more fuel-efficient cars. It also encourages people to take public transportation rather than drive and to live closer to where they work. If the tax were large enough, people would start driving electric cars.

When policymakers fail to consider how their policies affect incentives, they can end up with results that they did not intend. For example, consider public policy regarding auto safety. Today all cars have seat belts, but that was not true 40 years ago. In the late 1960s, Ralph Nader's book *Unsafe at Any Speed* generated much public concern over auto safety. Congress responded with laws requiring car companies to make various safety features, including seat belts, standard equipment on all new cars.

How does a seat belt law affect auto safety? The direct effect is obvious. With seat belts in all cars, more people wear seat belts, and the probability of surviving a major auto accident rises. In this sense, seat belts save lives.

But that's not the end of the story. To fully understand the effects of this law, we must recognize that people change their behavior in response to the incentives they face. The relevant behavior here is the speed and care with which drivers operate their cars. Driving slowly and carefully is costly because it uses the driver's time and energy. When deciding how safely to drive, rational people compare the marginal benefit from safer driving to the marginal cost. They drive more slowly and carefully when the benefit of increased safety is high. This explains why people drive more slowly and carefully when roads are icy than when roads are clear.

Now consider how a seat belt law alters the cost-benefit calculation of a rational driver. Seat belts make accidents less costly for a driver because they reduce the probability of injury or death. Thus, a seat belt law reduces the benefits to slow and careful driving. People respond to seat belts as they would to an improvement



BASKETBALL STAR KOBE BRYANT UNDERSTANDS OPPORTUNITY COST AND INCENTIVES. DESPITE GOOD HIGH SCHOOL GRADES AND SAT SCORES, HE DECIDED TO SKIP COLLEGE AND GO STRAIGHT TO THE NBA, WHERE HE EARNED ABOUT \$10 MILLION OVER FOUR YEARS.

in road conditions—by faster and less careful driving. The end result of a seat belt law, therefore, is a larger number of accidents.

How does the law affect the number of deaths from driving? Drivers who wear their seat belts are more likely to survive any given accident, but they are also more likely to find themselves in an accident. The net effect is ambiguous. Moreover, the reduction in safe driving has an adverse impact on pedestrians (and on drivers who do not wear their seat belts). They are put in jeopardy by the law because they are more likely to find themselves in an accident but are not protected by a seat belt. Thus, a seat belt law tends to increase the number of pedestrian deaths.

At first, this discussion of incentives and seat belts might seem like idle speculation. Yet, in a 1975 study, economist Sam Peltzman showed that the auto-safety laws have, in fact, had many of these effects. According to Peltzman's evidence, these laws produce both fewer deaths per accident and more accidents. The net result is little change in the number of driver deaths and an increase in the number of pedestrian deaths.

Peltzman's analysis of auto safety is an example of the general principle that people respond to incentives. Many incentives that economists study are more straightforward than those of the auto-safety laws. No one is surprised that people drive smaller cars in Europe, where gasoline taxes are high, than in the United States, where gasoline taxes are low. Yet, as the seat belt example shows, policies can have effects that are not obvious in advance. When analyzing any policy, we must consider not only the direct effects but also the indirect effects that work through incentives. If the policy changes incentives, it will cause people to alter their behavior.

**QUICK QUIZ:** List and briefly explain the four principles of individual decisionmaking.

## HOW PEOPLE INTERACT

The first four principles discussed how individuals make decisions. As we go about our lives, many of our decisions affect not only ourselves but other people as well. The next three principles concern how people interact with one another.

### PRINCIPLE #5: TRADE CAN MAKE EVERYONE BETTER OFF

You have probably heard on the news that the Japanese are our competitors in the world economy. In some ways, this is true, for American and Japanese firms do produce many of the same goods. Ford and Toyota compete for the same customers in the market for automobiles. Compaq and Toshiba compete for the same customers in the market for personal computers.

Yet it is easy to be misled when thinking about competition among countries. Trade between the United States and Japan is not like a sports contest, where one

side wins and the other side loses. In fact, the opposite is true: Trade between two countries can make each country better off.

To see why, consider how trade affects your family. When a member of your family looks for a job, he or she competes against members of other families who are looking for jobs. Families also compete against one another when they go shopping, because each family wants to buy the best goods at the lowest prices. So, in a sense, each family in the economy is competing with all other families.

Despite this competition, your family would not be better off isolating itself from all other families. If it did, your family would need to grow its own food, make its own clothes, and build its own home. Clearly, your family gains much from its ability to trade with others. Trade allows each person to specialize in the activities he or she does best, whether it is farming, sewing, or home building. By trading with others, people can buy a greater variety of goods and services at lower cost.

Countries as well as families benefit from the ability to trade with one another. Trade allows countries to specialize in what they do best and to enjoy a greater variety of goods and services. The Japanese, as well as the French and the Egyptians and the Brazilians, are as much our partners in the world economy as they are our competitors.

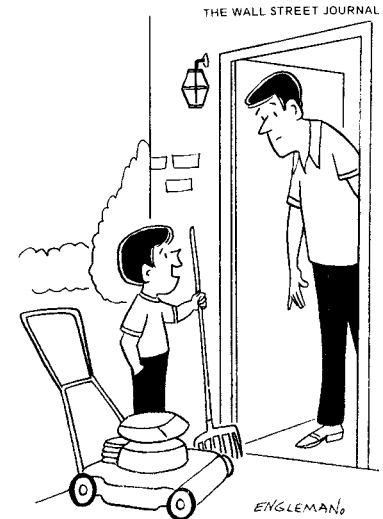
## PRINCIPLE #6: MARKETS ARE USUALLY A GOOD WAY TO ORGANIZE ECONOMIC ACTIVITY

The collapse of communism in the Soviet Union and Eastern Europe may be the most important change in the world during the past half century. Communist countries worked on the premise that central planners in the government were in the best position to guide economic activity. These planners decided what goods and services were produced, how much was produced, and who produced and consumed these goods and services. The theory behind central planning was that only the government could organize economic activity in a way that promoted economic well-being for the country as a whole.

Today, most countries that once had centrally planned economies have abandoned this system and are trying to develop market economies. In a **market economy**, the decisions of a central planner are replaced by the decisions of millions of firms and households. Firms decide whom to hire and what to make. Households decide which firms to work for and what to buy with their incomes. These firms and households interact in the marketplace, where prices and self-interest guide their decisions.

At first glance, the success of market economies is puzzling. After all, in a market economy, no one is looking out for the economic well-being of society as a whole. Free markets contain many buyers and sellers of numerous goods and services, and all of them are interested primarily in their own well-being. Yet, despite decentralized decisionmaking and self-interested decisionmakers, market economies have proven remarkably successful in organizing economic activity in a way that promotes overall economic well-being.

In his 1776 book *An Inquiry into the Nature and Causes of the Wealth of Nations*, economist Adam Smith made the most famous observation in all of economics: Households and firms interacting in markets act as if they are guided by an “invisible hand” that leads them to desirable market outcomes. One of our goals in



“For \$5 a week you can watch baseball without being nagged to cut the grass!”

### market economy

*an economy that allocates resources through the decentralized decisions of many firms and households as they interact in markets for goods and services*

## FYI

*Adam Smith  
and the  
Invisible Hand*



hand of government guiding their actions. This political philosophy provides the intellectual basis for the market economy, and for free society more generally.

Why do decentralized market economies work so well? Is it because people can be counted on to treat one another with love and kindness? Not at all. Here is Adam Smith's description of how people interact in a market economy:

Man has almost constant occasion for the help of his brethren, and it is vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favor, and show them that it is for their own advantage to do for him what he requires of them. . . . It is not from the benevolence of

It may be only a coincidence that Adam Smith's great book, *An Inquiry into the Nature and Causes of the Wealth of Nations*, was published in 1776, the exact year American revolutionaries signed the Declaration of Independence. But the two documents do share a point of view that was prevalent at the time—that individuals are usually best left to their own devices, without the heavy

the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest. . . .

Every individual . . . neither intends to promote the public interest, nor knows how much he is promoting it. . . . He intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.



ADAM SMITH

Smith is saying that participants in the economy are motivated by self-interest and that the “invisible hand” of the marketplace guides this self-interest into promoting general economic well-being.

Many of Smith's insights remain at the center of modern economics. Our analysis in the coming chapters will allow us to express Smith's conclusions more precisely and to analyze fully the strengths and weaknesses of the market's invisible hand.

this book is to understand how this invisible hand works its magic. As you study economics, you will learn that prices are the instrument with which the invisible hand directs economic activity. Prices reflect both the value of a good to society and the cost to society of making the good. Because households and firms look at prices when deciding what to buy and sell, they unknowingly take into account the social benefits and costs of their actions. As a result, prices guide these individual decisionmakers to reach outcomes that, in many cases, maximize the welfare of society as a whole.

There is an important corollary to the skill of the invisible hand in guiding economic activity: When the government prevents prices from adjusting naturally to supply and demand, it impedes the invisible hand's ability to coordinate the millions of households and firms that make up the economy. This corollary explains why taxes adversely affect the allocation of resources: Taxes distort prices and thus the decisions of households and firms. It also explains the even greater harm caused by policies that directly control prices, such as rent control. And it explains the failure of communism. In communist countries, prices were not determined in the marketplace but were dictated by central planners. These planners lacked the information that gets reflected in prices when prices are free to respond to market



forces. Central planners failed because they tried to run the economy with one hand tied behind their backs—the invisible hand of the marketplace.

## PRINCIPLE #7: GOVERNMENTS CAN SOMETIMES IMPROVE MARKET OUTCOMES

Although markets are usually a good way to organize economic activity, this rule has some important exceptions. There are two broad reasons for a government to intervene in the economy: to promote efficiency and to promote equity. That is, most policies aim either to enlarge the economic pie or to change how the pie is divided.

The invisible hand usually leads markets to allocate resources efficiently. Nonetheless, for various reasons, the invisible hand sometimes does not work. Economists use the term **market failure** to refer to a situation in which the market on its own fails to allocate resources efficiently.

One possible cause of market failure is an externality. An **externality** is the impact of one person's actions on the well-being of a bystander. The classic example of an external cost is pollution. If a chemical factory does not bear the entire cost of the smoke it emits, it will likely emit too much. Here, the government can raise economic well-being through environmental regulation. The classic example of an external benefit is the creation of knowledge. When a scientist makes an important discovery, he produces a valuable resource that other people can use. In this case, the government can raise economic well-being by subsidizing basic research, as in fact it does.

Another possible cause of market failure is market power. **Market power** refers to the ability of a single person (or small group of people) to unduly influence market prices. For example, suppose that everyone in town needs water but there is only one well. The owner of the well has market power—in this case a *monopoly*—over the sale of water. The well owner is not subject to the rigorous competition with which the invisible hand normally keeps self-interest in check. You will learn that, in this case, regulating the price that the monopolist charges can potentially enhance economic efficiency.

The invisible hand is even less able to ensure that economic prosperity is distributed fairly. A market economy rewards people according to their ability to produce things that other people are willing to pay for. The world's best basketball player earns more than the world's best chess player simply because people are willing to pay more to watch basketball than chess. The invisible hand does not ensure that everyone has sufficient food, decent clothing, and adequate health care. A goal of many public policies, such as the income tax and the welfare system, is to achieve a more equitable distribution of economic well-being.

To say that the government *can* improve on markets outcomes at times does not mean that it always *will*. Public policy is made not by angels but by a political process that is far from perfect. Sometimes policies are designed simply to reward the politically powerful. Sometimes they are made by well-intentioned leaders who are not fully informed. One goal of the study of economics is to help you judge when a government policy is justifiable to promote efficiency or equity and when it is not.

### market failure

*a situation in which a market left on its own fails to allocate resources efficiently*

### externality

*the impact of one person's actions on the well-being of a bystander*

### market power

*the ability of a single economic actor (or small group of actors) to have a substantial influence on market prices*

**QUICK QUIZ:** List and briefly explain the three principles concerning economic interactions.

## HOW THE ECONOMY AS A WHOLE WORKS

We started by discussing how individuals make decisions and then looked at how people interact with one another. All these decisions and interactions together make up “the economy.” The last three principles concern the workings of the economy as a whole.

### PRINCIPLE #8: A COUNTRY’S STANDARD OF LIVING DEPENDS ON ITS ABILITY TO PRODUCE GOODS AND SERVICES

The differences in living standards around the world are staggering. In 1997 the average American had an income of about \$29,000. In the same year, the average Mexican earned \$8,000, and the average Nigerian earned \$900. Not surprisingly, this large variation in average income is reflected in various measures of the quality of life. Citizens of high-income countries have more TV sets, more cars, better nutrition, better health care, and longer life expectancy than citizens of low-income countries.

Changes in living standards over time are also large. In the United States, incomes have historically grown about 2 percent per year (after adjusting for changes in the cost of living). At this rate, average income doubles every 35 years. Over the past century, average income has risen about eightfold.

What explains these large differences in living standards among countries and over time? The answer is surprisingly simple. Almost all variation in living standards is attributable to differences in countries’ **productivity**—that is, the amount of goods and services produced from each hour of a worker’s time. In nations where workers can produce a large quantity of goods and services per unit of time, most people enjoy a high standard of living; in nations where workers are less productive, most people must endure a more meager existence. Similarly, the growth rate of a nation’s productivity determines the growth rate of its average income.

The fundamental relationship between productivity and living standards is simple, but its implications are far-reaching. If productivity is the primary determinant of living standards, other explanations must be of secondary importance. For example, it might be tempting to credit labor unions or minimum-wage laws for the rise in living standards of American workers over the past century. Yet the real hero of American workers is their rising productivity. As another example, some commentators have claimed that increased competition from Japan and other countries explains the slow growth in U.S. incomes over the past 30 years. Yet the real villain is not competition from abroad but flagging productivity growth in the United States.

The relationship between productivity and living standards also has profound implications for public policy. When thinking about how any policy will affect living standards, the key question is how it will affect our ability to produce goods and services. To boost living standards, policymakers need to raise productivity by ensuring that workers are well educated, have the tools needed to produce goods and services, and have access to the best available technology.

#### **productivity**

*the amount of goods and services produced from each hour of a worker’s time*

In the 1980s and 1990s, for example, much debate in the United States centered on the government's budget deficit—the excess of government spending over government revenue. As we will see, concern over the budget deficit was based largely on its adverse impact on productivity. When the government needs to finance a budget deficit, it does so by borrowing in financial markets, much as a student might borrow to finance a college education or a firm might borrow to finance a new factory. As the government borrows to finance its deficit, therefore, it reduces the quantity of funds available for other borrowers. The budget deficit thereby reduces investment both in human capital (the student's education) and physical capital (the firm's factory). Because lower investment today means lower productivity in the future, government budget deficits are generally thought to depress growth in living standards.

### PRINCIPLE #9: PRICES RISE WHEN THE GOVERNMENT PRINTS TOO MUCH MONEY

In Germany in January 1921, a daily newspaper cost 0.30 marks. Less than two years later, in November 1922, the same newspaper cost 70,000,000 marks. All other prices in the economy rose by similar amounts. This episode is one of history's most spectacular examples of **inflation**, an increase in the overall level of prices in the economy.

Although the United States has never experienced inflation even close to that in Germany in the 1920s, inflation has at times been an economic problem. During the 1970s, for instance, the overall level of prices more than doubled, and President Gerald Ford called inflation "public enemy number one." By contrast, inflation in the 1990s was about 3 percent per year; at this rate it would take more than

#### **inflation**

*an increase in the overall level of prices in the economy*



"Well it may have been 68 cents when you got in line, but it's 74 cents now!"

20 years for prices to double. Because high inflation imposes various costs on society, keeping inflation at a low level is a goal of economic policymakers around the world.

What causes inflation? In almost all cases of large or persistent inflation, the culprit turns out to be the same—growth in the quantity of money. When a government creates large quantities of the nation’s money, the value of the money falls. In Germany in the early 1920s, when prices were on average tripling every month, the quantity of money was also tripling every month. Although less dramatic, the economic history of the United States points to a similar conclusion: The high inflation of the 1970s was associated with rapid growth in the quantity of money, and the low inflation of the 1990s was associated with slow growth in the quantity of money.

### PRINCIPLE #10: SOCIETY FACES A SHORT-RUN TRADEOFF BETWEEN INFLATION AND UNEMPLOYMENT

If inflation is so easy to explain, why do policymakers sometimes have trouble ridding the economy of it? One reason is that reducing inflation is often thought to cause a temporary rise in unemployment. The curve that illustrates this tradeoff between inflation and unemployment is called the **Phillips curve**, after the economist who first examined this relationship.

The Phillips curve remains a controversial topic among economists, but most economists today accept the idea that there is a short-run tradeoff between inflation and unemployment. This simply means that, over a period of a year or two, many economic policies push inflation and unemployment in opposite directions. Policymakers face this tradeoff regardless of whether inflation and unemployment both start out at high levels (as they were in the early 1980s), at low levels (as they were in the late 1990s), or someplace in between.

Why do we face this short-run tradeoff? According to a common explanation, it arises because some prices are slow to adjust. Suppose, for example, that the government reduces the quantity of money in the economy. In the long run, the only result of this policy change will be a fall in the overall level of prices. Yet not all prices will adjust immediately. It may take several years before all firms issue new catalogs, all unions make wage concessions, and all restaurants print new menus. That is, prices are said to be *sticky* in the short run.

Because prices are sticky, various types of government policy have short-run effects that differ from their long-run effects. When the government reduces the quantity of money, for instance, it reduces the amount that people spend. Lower spending, together with prices that are stuck too high, reduces the quantity of goods and services that firms sell. Lower sales, in turn, cause firms to lay off workers. Thus, the reduction in the quantity of money raises unemployment temporarily until prices have fully adjusted to the change.

The tradeoff between inflation and unemployment is only temporary, but it can last for several years. The Phillips curve is, therefore, crucial for understanding many developments in the economy. In particular, policymakers can exploit this tradeoff using various policy instruments. By changing the amount that the government spends, the amount it taxes, and the amount of money it prints, policymakers can, in the short run, influence the combination of inflation and unemployment that the economy experiences. Because these instruments of

#### Phillips curve

*a curve that shows the short-run tradeoff between inflation and unemployment*

monetary and fiscal policy are potentially so powerful, how policymakers should use these instruments to control the economy, if at all, is a subject of continuing debate.

**QUICK QUIZ:** List and briefly explain the three principles that describe how the economy as a whole works.

**CONCLUSION**

You now have a taste of what economics is all about. In the coming chapters we will develop many specific insights about people, markets, and economies. Mastering these insights will take some effort, but it is not an overwhelming task. The field of economics is based on a few basic ideas that can be applied in many different situations.

Throughout this book we will refer back to the *Ten Principles of Economics* highlighted in this chapter and summarized in Table 1-1. Whenever we do so, a building-blocks icon will be displayed in the margin, as it is now. But even when that icon is absent, you should keep these building blocks in mind. Even the most sophisticated economic analysis is built using the ten principles introduced here.



**Table 1-1**  
TEN PRINCIPLES OF ECONOMICS

<b>HOW PEOPLE MAKE DECISIONS</b>	#1: People Face Tradeoffs
	#2: The Cost of Something Is What You Give Up to Get It
	#3: Rational People Think at the Margin
	#4: People Respond to Incentives
<b>HOW PEOPLE INTERACT</b>	#5: Trade Can Make Everyone Better Off
	#6: Markets Are Usually a Good Way to Organize Economic Activity
	#7: Governments Can Sometimes Improve Market Outcomes
<b>HOW THE ECONOMY AS A WHOLE WORKS</b>	#8: A Country’s Standard of Living Depends on Its Ability to Produce Goods and Services
	#9: Prices Rise When the Government Prints Too Much Money
	#10: Society Faces a Short-Run Tradeoff between Inflation and Unemployment

### Summary

- ◆ The fundamental lessons about individual decisionmaking are that people face tradeoffs among alternative goals, that the cost of any action is measured in terms of forgone opportunities, that rational people make decisions by comparing marginal costs and marginal benefits, and that people change their behavior in response to the incentives they face.
- ◆ The fundamental lessons about interactions among people are that trade can be mutually beneficial, that markets are usually a good way of coordinating trade among people, and that the government can potentially improve market outcomes if there is some market failure or if the market outcome is inequitable.
- ◆ The fundamental lessons about the economy as a whole are that productivity is the ultimate source of living standards, that money growth is the ultimate source of inflation, and that society faces a short-run tradeoff between inflation and unemployment.

### Key Concepts

scarcity, p. 4	marginal changes, p. 6	productivity, p. 12
economics, p. 4	market economy, p. 9	inflation, p. 13
efficiency, p. 5	market failure, p. 11	Phillips curve, p. 14
equity, p. 5	externality, p. 11	
opportunity cost, p. 6	market power, p. 11	

### Questions for Review

- Give three examples of important tradeoffs that you face in your life.
- What is the opportunity cost of seeing a movie?
- Water is necessary for life. Is the marginal benefit of a glass of water large or small?
- Why should policymakers think about incentives?
- Why isn't trade among countries like a game with some winners and some losers?
- What does the "invisible hand" of the marketplace do?
- Explain the two main causes of market failure and give an example of each.
- Why is productivity important?
- What is inflation, and what causes it?
- How are inflation and unemployment related in the short run?

### Problems and Applications

- Describe some of the tradeoffs faced by the following:
  - a family deciding whether to buy a new car
  - a member of Congress deciding how much to spend on national parks
  - a company president deciding whether to open a new factory
  - a professor deciding how much to prepare for class
- You are trying to decide whether to take a vacation. Most of the costs of the vacation (airfare, hotel, forgone wages) are measured in dollars, but the benefits of the vacation are psychological. How can you compare the benefits to the costs?
- You were planning to spend Saturday working at your part-time job, but a friend asks you to go skiing. What is the true cost of going skiing? Now suppose that you had been planning to spend the day studying at the library. What is the cost of going skiing in this case? Explain.
- You win \$100 in a basketball pool. You have a choice between spending the money now or putting it away for a year in a bank account that pays 5 percent interest. What is the opportunity cost of spending the \$100 now?
- The company that you manage has invested \$5 million in developing a new product, but the development is not quite finished. At a recent meeting, your salespeople report that the introduction of competing products has reduced the expected sales of your new product to \$3 million. If it would cost \$1 million to finish

development and make the product, should you go ahead and do so? What is the most that you should pay to complete development?

6. Three managers of the Magic Potion Company are discussing a possible increase in production. Each suggests a way to make this decision.

HARRY: We should examine whether our company's productivity—gallons of potion per worker—would rise or fall.

RON: We should examine whether our average cost—cost per worker—would rise or fall.

HERMIONE: We should examine whether the extra revenue from selling the additional potion would be greater or smaller than the extra costs.

Who do you think is right? Why?

7. The Social Security system provides income for people over age 65. If a recipient of Social Security decides to work and earn some income, the amount he or she receives in Social Security benefits is typically reduced.
- How does the provision of Social Security affect people's incentive to save while working?
  - How does the reduction in benefits associated with higher earnings affect people's incentive to work past age 65?
8. A recent bill reforming the government's antipoverty programs limited many welfare recipients to only two years of benefits.
- How does this change affect the incentives for working?
  - How might this change represent a tradeoff between equity and efficiency?
9. Your roommate is a better cook than you are, but you can clean more quickly than your roommate can. If your roommate did all of the cooking and you did all of the cleaning, would your chores take you more or less time than if you divided each task evenly? Give a similar example of how specialization and trade can make two countries both better off.
10. Suppose the United States adopted central planning for its economy, and you became the chief planner. Among the millions of decisions that you need to make for next year are how many compact discs to produce, what artists to record, and who should receive the discs.
- To make these decisions intelligently, what information would you need about the compact disc industry? What information would you need about each of the people in the United States?

- How would your decisions about CDs affect some of your other decisions, such as how many CD players to make or cassette tapes to produce? How might some of your other decisions about the economy change your views about CDs?
11. Explain whether each of the following government activities is motivated by a concern about equity or a concern about efficiency. In the case of efficiency, discuss the type of market failure involved.
- regulating cable-TV prices
  - providing some poor people with vouchers that can be used to buy food
  - prohibiting smoking in public places
  - breaking up Standard Oil (which once owned 90 percent of all oil refineries) into several smaller companies
  - imposing higher personal income tax rates on people with higher incomes
  - instituting laws against driving while intoxicated
12. Discuss each of the following statements from the standpoints of equity and efficiency.
- "Everyone in society should be guaranteed the best health care possible."
  - "When workers are laid off, they should be able to collect unemployment benefits until they find a new job."
13. In what ways is your standard of living different from that of your parents or grandparents when they were your age? Why have these changes occurred?
14. Suppose Americans decide to save more of their incomes. If banks lend this extra saving to businesses, which use the funds to build new factories, how might this lead to faster growth in productivity? Who do you suppose benefits from the higher productivity? Is society getting a free lunch?
15. Suppose that when everyone wakes up tomorrow, they discover that the government has given them an additional amount of money equal to the amount they already had. Explain what effect this doubling of the money supply will likely have on the following:
- the total amount spent on goods and services
  - the quantity of goods and services purchased if prices are sticky
  - the prices of goods and services if prices can adjust
16. Imagine that you are a policymaker trying to decide whether to reduce the rate of inflation. To make an intelligent decision, what would you need to know about inflation, unemployment, and the tradeoff between them?





# 2



## THINKING LIKE AN ECONOMIST

Every field of study has its own language and its own way of thinking. Mathematicians talk about axioms, integrals, and vector spaces. Psychologists talk about ego, id, and cognitive dissonance. Lawyers talk about venue, torts, and promissory estoppel.

Economics is no different. Supply, demand, elasticity, comparative advantage, consumer surplus, deadweight loss—these terms are part of the economist's language. In the coming chapters, you will encounter many new terms and some familiar words that economists use in specialized ways. At first, this new language may seem needlessly arcane. But, as you will see, its value lies in its ability to provide you a new and useful way of thinking about the world in which you live.

The single most important purpose of this book is to help you learn the economist's way of thinking. Of course, just as you cannot become a mathematician, psychologist, or lawyer overnight, learning to think like an economist will take

### IN THIS CHAPTER YOU WILL . . .

*See how economists  
apply the methods  
of science*

*Consider how  
assumptions and  
models can shed  
light on the world*

*Learn two simple  
models—the circular  
flow and the  
production  
possibilities frontier*

*Distinguish between  
microeconomics and  
macroeconomics*

*Learn the difference  
between positive and  
normative statements*

*Examine the role of  
economists in  
making policy*

*Consider why  
economists  
sometimes disagree  
with one another*

some time. Yet with a combination of theory, case studies, and examples of economics in the news, this book will give you ample opportunity to develop and practice this skill.

Before delving into the substance and details of economics, it is helpful to have an overview of how economists approach the world. This chapter, therefore, discusses the field's methodology. What is distinctive about how economists confront a question? What does it mean to think like an economist?

### THE ECONOMIST AS SCIENTIST

Economists try to address their subject with a scientist's objectivity. They approach the study of the economy in much the same way as a physicist approaches the study of matter and a biologist approaches the study of life: They devise theories, collect data, and then analyze these data in an attempt to verify or refute their theories.

To beginners, it can seem odd to claim that economics is a science. After all, economists do not work with test tubes or telescopes. The essence of science,



"I'm a social scientist, Michael. That means I can't explain electricity or anything like that, but if you ever want to know about people I'm your man."

however, is the *scientific method*—the dispassionate development and testing of theories about how the world works. This method of inquiry is as applicable to studying a nation’s economy as it is to studying the earth’s gravity or a species’ evolution. As Albert Einstein once put it, “The whole of science is nothing more than the refinement of everyday thinking.”

Although Einstein’s comment is as true for social sciences such as economics as it is for natural sciences such as physics, most people are not accustomed to looking at society through the eyes of a scientist. Let’s therefore discuss some of the ways in which economists apply the logic of science to examine how an economy works.

### THE SCIENTIFIC METHOD: OBSERVATION, THEORY, AND MORE OBSERVATION

Isaac Newton, the famous seventeenth-century scientist and mathematician, allegedly became intrigued one day when he saw an apple fall from an apple tree. This observation motivated Newton to develop a theory of gravity that applies not only to an apple falling to the earth but to any two objects in the universe. Subsequent testing of Newton’s theory has shown that it works well in many circumstances (although, as Einstein would later emphasize, not in all circumstances). Because Newton’s theory has been so successful at explaining observation, it is still taught today in undergraduate physics courses around the world.

This interplay between theory and observation also occurs in the field of economics. An economist might live in a country experiencing rapid increases in prices and be moved by this observation to develop a theory of inflation. The theory might assert that high inflation arises when the government prints too much money. (As you may recall, this was one of the *Ten Principles of Economics* in Chapter 1.) To test this theory, the economist could collect and analyze data on prices and money from many different countries. If growth in the quantity of money were not at all related to the rate at which prices are rising, the economist would start to doubt the validity of his theory of inflation. If money growth and inflation were strongly correlated in international data, as in fact they are, the economist would become more confident in his theory.

Although economists use theory and observation like other scientists, they do face an obstacle that makes their task especially challenging: Experiments are often difficult in economics. Physicists studying gravity can drop many objects in their laboratories to generate data to test their theories. By contrast, economists studying inflation are not allowed to manipulate a nation’s monetary policy simply to generate useful data. Economists, like astronomers and evolutionary biologists, usually have to make do with whatever data the world happens to give them.

To find a substitute for laboratory experiments, economists pay close attention to the natural experiments offered by history. When a war in the Middle East interrupts the flow of crude oil, for instance, oil prices skyrocket around the world. For consumers of oil and oil products, such an event depresses living standards. For economic policymakers, it poses a difficult choice about how best to respond. But for economic scientists, it provides an opportunity to study the effects of a key natural resource on the world’s economies, and this opportunity persists long after the wartime increase in oil prices is over. Throughout this book, therefore, we consider many historical episodes. These episodes are valuable to study because they



give us insight into the economy of the past and, more important, because they allow us to illustrate and evaluate economic theories of the present.

## THE ROLE OF ASSUMPTIONS

If you ask a physicist how long it would take for a marble to fall from the top of a ten-story building, she will answer the question by assuming that the marble falls in a vacuum. Of course, this assumption is false. In fact, the building is surrounded by air, which exerts friction on the falling marble and slows it down. Yet the physicist will correctly point out that friction on the marble is so small that its effect is negligible. Assuming the marble falls in a vacuum greatly simplifies the problem without substantially affecting the answer.

Economists make assumptions for the same reason: Assumptions can make the world easier to understand. To study the effects of international trade, for example, we may assume that the world consists of only two countries and that each country produces only two goods. Of course, the real world consists of dozens of countries, each of which produces thousands of different types of goods. But by assuming two countries and two goods, we can focus our thinking. Once we understand international trade in an imaginary world with two countries and two goods, we are in a better position to understand international trade in the more complex world in which we live.

The art in scientific thinking—whether in physics, biology, or economics—is deciding which assumptions to make. Suppose, for instance, that we were dropping a beach ball rather than a marble from the top of the building. Our physicist would realize that the assumption of no friction is far less accurate in this case: Friction exerts a greater force on a beach ball than on a marble. The assumption that gravity works in a vacuum is reasonable for studying a falling marble but not for studying a falling beach ball.

Similarly, economists use different assumptions to answer different questions. Suppose that we want to study what happens to the economy when the government changes the number of dollars in circulation. An important piece of this analysis, it turns out, is how prices respond. Many prices in the economy change infrequently; the newsstand prices of magazines, for instance, are changed only every few years. Knowing this fact may lead us to make different assumptions when studying the effects of the policy change over different time horizons. For studying the short-run effects of the policy, we may assume that prices do not change much. We may even make the extreme and artificial assumption that all prices are completely fixed. For studying the long-run effects of the policy, however, we may assume that all prices are completely flexible. Just as a physicist uses different assumptions when studying falling marbles and falling beach balls, economists use different assumptions when studying the short-run and long-run effects of a change in the quantity of money.

## ECONOMIC MODELS

High school biology teachers teach basic anatomy with plastic replicas of the human body. These models have all the major organs—the heart, the liver, the kidneys, and so on. The models allow teachers to show their students in a simple way how the important parts of the body fit together. Of course, these plastic models

are not actual human bodies, and no one would mistake the model for a real person. These models are stylized, and they omit many details. Yet despite this lack of realism—indeed, because of this lack of realism—studying these models is useful for learning how the human body works.

Economists also use models to learn about the world, but instead of being made of plastic, they are most often composed of diagrams and equations. Like a biology teacher's plastic model, economic models omit many details to allow us to see what is truly important. Just as the biology teacher's model does not include all of the body's muscles and capillaries, an economist's model does not include every feature of the economy.

As we use models to examine various economic issues throughout this book, you will see that all the models are built with assumptions. Just as a physicist begins the analysis of a falling marble by assuming away the existence of friction, economists assume away many of the details of the economy that are irrelevant for studying the question at hand. All models—in physics, biology, or economics—simplify reality in order to improve our understanding of it.

## OUR FIRST MODEL: THE CIRCULAR-FLOW DIAGRAM

The economy consists of millions of people engaged in many activities—buying, selling, working, hiring, manufacturing, and so on. To understand how the economy works, we must find some way to simplify our thinking about all these activities. In other words, we need a model that explains, in general terms, how the economy is organized and how participants in the economy interact with one another.

Figure 2-1 presents a visual model of the economy, called a **circular-flow diagram**. In this model, the economy has two types of decisionmakers—households and firms. Firms produce goods and services using inputs, such as labor, land, and capital (buildings and machines). These inputs are called the *factors of production*. Households own the factors of production and consume all the goods and services that the firms produce.

Households and firms interact in two types of markets. In the *markets for goods and services*, households are buyers and firms are sellers. In particular, households buy the output of goods and services that firms produce. In the *markets for the factors of production*, households are sellers and firms are buyers. In these markets, households provide firms the inputs that the firms use to produce goods and services. The circular-flow diagram offers a simple way of organizing all the economic transactions that occur between households and firms in the economy.

The inner loop of the circular-flow diagram represents the flows of goods and services between households and firms. The households sell the use of their labor, land, and capital to the firms in the markets for the factors of production. The firms then use these factors to produce goods and services, which in turn are sold to households in the markets for goods and services. Hence, the factors of production flow from households to firms, and goods and services flow from firms to households.

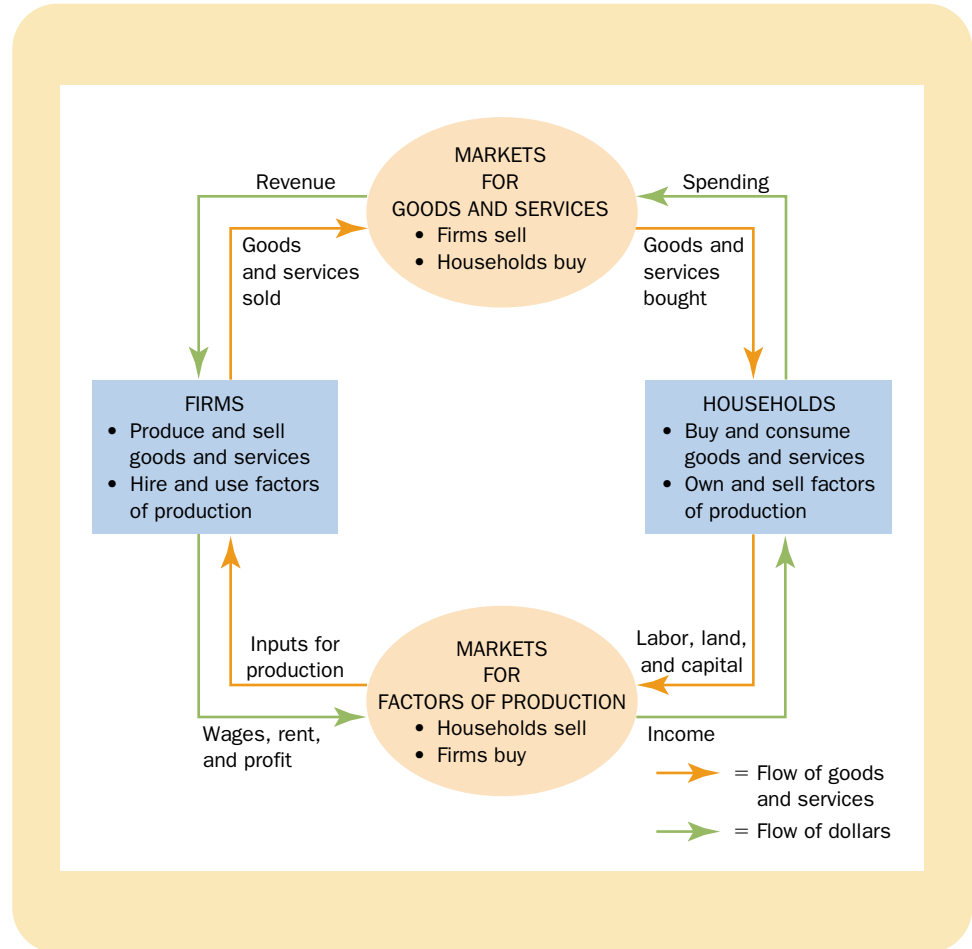
The outer loop of the circular-flow diagram represents the corresponding flow of dollars. The households spend money to buy goods and services from the firms. The firms use some of the revenue from these sales to pay for the factors of

### **circular-flow diagram**

*a visual model of the economy that shows how dollars flow through markets among households and firms*

**Figure 2-1**

**THE CIRCULAR FLOW.** This diagram is a schematic representation of the organization of the economy. Decisions are made by households and firms. Households and firms interact in the markets for goods and services (where households are buyers and firms are sellers) and in the markets for the factors of production (where firms are buyers and households are sellers). The outer set of arrows shows the flow of dollars, and the inner set of arrows shows the corresponding flow of goods and services.



production, such as the wages of their workers. What's left is the profit of the firm owners, who themselves are members of households. Hence, spending on goods and services flows from households to firms, and income in the form of wages, rent, and profit flows from firms to households.

Let's take a tour of the circular flow by following a dollar bill as it makes its way from person to person through the economy. Imagine that the dollar begins at a household, sitting in, say, your wallet. If you want to buy a cup of coffee, you take the dollar to one of the economy's markets for goods and services, such as your local Starbucks coffee shop. There you spend it on your favorite drink. When the dollar moves into the Starbucks cash register, it becomes revenue for the firm. The dollar doesn't stay at Starbucks for long, however, because the firm uses it to buy inputs in the markets for the factors of production. For instance, Starbucks might use the dollar to pay rent to its landlord for the space it occupies or to pay the wages of its workers. In either case, the dollar enters the income of some household and, once again, is back in someone's wallet. At that point, the story of the economy's circular flow starts once again.

The circular-flow diagram in Figure 2-1 is one simple model of the economy. It dispenses with details that, for some purposes, are significant. A more complex

and realistic circular-flow model would include, for instance, the roles of government and international trade. Yet these details are not crucial for a basic understanding of how the economy is organized. Because of its simplicity, this circular-flow diagram is useful to keep in mind when thinking about how the pieces of the economy fit together.

### OUR SECOND MODEL: THE PRODUCTION POSSIBILITIES FRONTIER

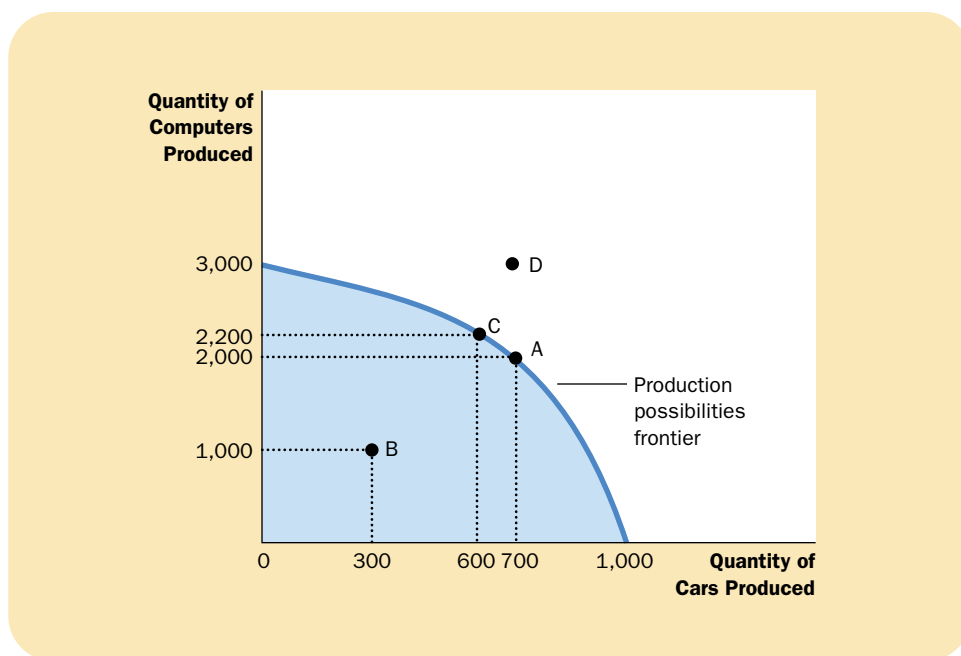
Most economic models, unlike the circular-flow diagram, are built using the tools of mathematics. Here we consider one of the simplest such models, called the production possibilities frontier, and see how this model illustrates some basic economic ideas.

Although real economies produce thousands of goods and services, let's imagine an economy that produces only two goods—cars and computers. Together the car industry and the computer industry use all of the economy's factors of production. The **production possibilities frontier** is a graph that shows the various combinations of output—in this case, cars and computers—that the economy can possibly produce given the available factors of production and the available production technology that firms can use to turn these factors into output.

Figure 2-2 is an example of a production possibilities frontier. In this economy, if all resources were used in the car industry, the economy would produce 1,000 cars and no computers. If all resources were used in the computer industry, the economy would produce 3,000 computers and no cars. The two end points of the production possibilities frontier represent these extreme possibilities. If the

**production possibilities frontier**

*a graph that shows the combinations of output that the economy can possibly produce given the available factors of production and the available production technology*



**Figure 2-2**

**THE PRODUCTION POSSIBILITIES FRONTIER.** The production possibilities frontier shows the combinations of output—in this case, cars and computers—that the economy can possibly produce. The economy can produce any combination on or inside the frontier. Points outside the frontier are not feasible given the economy's resources.

economy were to divide its resources between the two industries, it could produce 700 cars and 2,000 computers, shown in the figure by point A. By contrast, the outcome at point D is not possible because resources are scarce: The economy does not have enough of the factors of production to support that level of output. In other words, the economy can produce at any point on or inside the production possibilities frontier, but it cannot produce at points outside the frontier.

An outcome is said to be *efficient* if the economy is getting all it can from the scarce resources it has available. Points on (rather than inside) the production possibilities frontier represent efficient levels of production. When the economy is producing at such a point, say point A, there is no way to produce more of one good without producing less of the other. Point B represents an *inefficient* outcome. For some reason, perhaps widespread unemployment, the economy is producing less than it could from the resources it has available: It is producing only 300 cars and 1,000 computers. If the source of the inefficiency were eliminated, the economy could move from point B to point A, increasing production of both cars (to 700) and computers (to 2,000).



One of the *Ten Principles of Economics* discussed in Chapter 1 is that people face tradeoffs. The production possibilities frontier shows one tradeoff that society faces. Once we have reached the efficient points on the frontier, the only way of getting more of one good is to get less of the other. When the economy moves from point A to point C, for instance, society produces more computers but at the expense of producing fewer cars.



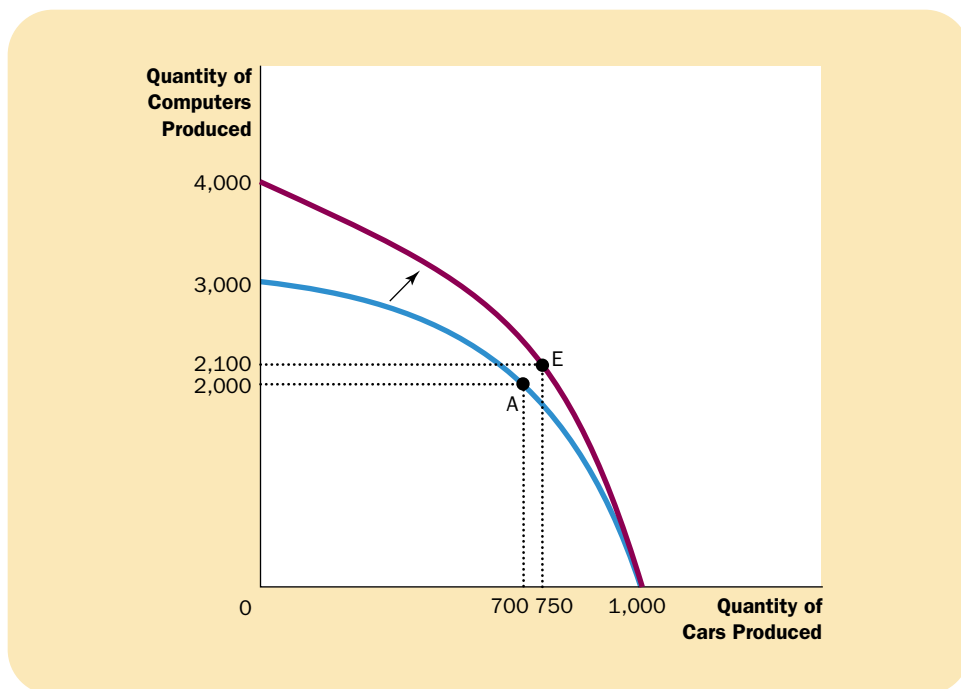
Another of the *Ten Principles of Economics* is that the cost of something is what you give up to get it. This is called the *opportunity cost*. The production possibilities frontier shows the opportunity cost of one good as measured in terms of the other good. When society reallocates some of the factors of production from the car industry to the computer industry, moving the economy from point A to point C, it gives up 100 cars to get 200 additional computers. In other words, when the economy is at point A, the opportunity cost of 200 computers is 100 cars.

Notice that the production possibilities frontier in Figure 2-2 is bowed outward. This means that the opportunity cost of cars in terms of computers depends on how much of each good the economy is producing. When the economy is using most of its resources to make cars, the production possibilities frontier is quite steep. Because even workers and machines best suited to making computers are being used to make cars, the economy gets a substantial increase in the number of computers for each car it gives up. By contrast, when the economy is using most of its resources to make computers, the production possibilities frontier is quite flat. In this case, the resources best suited to making computers are already in the computer industry, and each car the economy gives up yields only a small increase in the number of computers.

The production possibilities frontier shows the tradeoff between the production of different goods at a given time, but the tradeoff can change over time. For example, if a technological advance in the computer industry raises the number of computers that a worker can produce per week, the economy can make more computers for any given number of cars. As a result, the production possibilities frontier shifts outward, as in Figure 2-3. Because of this economic growth, society might move production from point A to point E, enjoying more computers and more cars.

The production possibilities frontier simplifies a complex economy to highlight and clarify some basic ideas. We have used it to illustrate some of the



**Figure 2-3**

A SHIFT IN THE PRODUCTION POSSIBILITIES FRONTIER. An economic advance in the computer industry shifts the production possibilities frontier outward, increasing the number of cars and computers the economy can produce.

concepts mentioned briefly in Chapter 1: scarcity, efficiency, tradeoffs, opportunity cost, and economic growth. As you study economics, these ideas will recur in various forms. The production possibilities frontier offers one simple way of thinking about them.

## MICROECONOMICS AND MACROECONOMICS

Many subjects are studied on various levels. Consider biology, for example. Molecular biologists study the chemical compounds that make up living things. Cellular biologists study cells, which are made up of many chemical compounds and, at the same time, are themselves the building blocks of living organisms. Evolutionary biologists study the many varieties of animals and plants and how species change gradually over the centuries.

Economics is also studied on various levels. We can study the decisions of individual households and firms. Or we can study the interaction of households and firms in markets for specific goods and services. Or we can study the operation of the economy as a whole, which is just the sum of the activities of all these decision-makers in all these markets.

The field of economics is traditionally divided into two broad subfields. **Microeconomics** is the study of how households and firms make decisions and how they interact in specific markets. **Macroeconomics** is the study of economy-wide phenomena. A microeconomist might study the effects of rent control on housing in New York City, the impact of foreign competition on the U.S. auto industry, or the effects of compulsory school attendance on workers' earnings. A

### **microeconomics**

*the study of how households and firms make decisions and how they interact in markets*

### **macroeconomics**

*the study of economy-wide phenomena, including inflation, unemployment, and economic growth*

macroeconomist might study the effects of borrowing by the federal government, the changes over time in the economy's rate of unemployment, or alternative policies to raise growth in national living standards.

Microeconomics and macroeconomics are closely intertwined. Because changes in the overall economy arise from the decisions of millions of individuals, it is impossible to understand macroeconomic developments without considering the associated microeconomic decisions. For example, a macroeconomist might study the effect of a cut in the federal income tax on the overall production of goods and services. To analyze this issue, he or she must consider how the tax cut affects the decisions of households about how much to spend on goods and services.

Despite the inherent link between microeconomics and macroeconomics, the two fields are distinct. In economics, as in biology, it may seem natural to begin with the smallest unit and build up. Yet doing so is neither necessary nor always the best way to proceed. Evolutionary biology is, in a sense, built upon molecular biology, since species are made up of molecules. Yet molecular biology and evolutionary biology are separate fields, each with its own questions and its own methods. Similarly, because microeconomics and macroeconomics address different questions, they sometimes take quite different approaches and are often taught in separate courses.

**QUICK QUIZ:** In what sense is economics like a science? ♦ Draw a production possibilities frontier for a society that produces food and clothing. Show an efficient point, an inefficient point, and an infeasible point. Show the effects of a drought. ♦ Define *microeconomics* and *macroeconomics*.

## THE ECONOMIST AS POLICY ADVISER

Often economists are asked to explain the causes of economic events. Why, for example, is unemployment higher for teenagers than for older workers? Sometimes economists are asked to recommend policies to improve economic outcomes. What, for instance, should the government do to improve the economic well-being of teenagers? When economists are trying to explain the world, they are scientists. When they are trying to help improve it, they are policy advisers.

## POSITIVE VERSUS NORMATIVE ANALYSIS

To help clarify the two roles that economists play, we begin by examining the use of language. Because scientists and policy advisers have different goals, they use language in different ways.

For example, suppose that two people are discussing minimum-wage laws. Here are two statements you might hear:

POLLY: Minimum-wage laws cause unemployment.

NORMA: The government should raise the minimum wage.

Ignoring for now whether you agree with these statements, notice that Polly and Norma differ in what they are trying to do. Polly is speaking like a scientist: She is making a claim about how the world works. Norma is speaking like a policy adviser: She is making a claim about how she would like to change the world.

In general, statements about the world are of two types. One type, such as Polly's, is positive. **Positive statements** are descriptive. They make a claim about how the world *is*. A second type of statement, such as Norma's, is normative. **Normative statements** are prescriptive. They make a claim about how the world *ought to be*.

A key difference between positive and normative statements is how we judge their validity. We can, in principle, confirm or refute positive statements by examining evidence. An economist might evaluate Polly's statement by analyzing data on changes in minimum wages and changes in unemployment over time. By contrast, evaluating normative statements involves values as well as facts. Norma's statement cannot be judged using data alone. Deciding what is good or bad policy is not merely a matter of science. It also involves our views on ethics, religion, and political philosophy.

Of course, positive and normative statements may be related. Our positive views about how the world works affect our normative views about what policies are desirable. Polly's claim that the minimum wage causes unemployment, if true, might lead us to reject Norma's conclusion that the government should raise the minimum wage. Yet our normative conclusions cannot come from positive analysis alone. Instead, they require both positive analysis and value judgments.

As you study economics, keep in mind the distinction between positive and normative statements. Much of economics just tries to explain how the economy works. Yet often the goal of economics is to improve how the economy works. When you hear economists making normative statements, you know they have crossed the line from scientist to policy adviser.

## ECONOMISTS IN WASHINGTON

President Harry Truman once said that he wanted to find a one-armed economist. When he asked his economists for advice, they always answered, "On the one hand, . . . On the other hand, . . ."

Truman was right in realizing that economists' advice is not always straightforward. This tendency is rooted in one of the *Ten Principles of Economics* in Chapter 1: People face tradeoffs. Economists are aware that tradeoffs are involved in most policy decisions. A policy might increase efficiency at the cost of equity. It might help future generations but hurt current generations. An economist who says that all policy decisions are easy is an economist not to be trusted.

Truman was also not alone among presidents in relying on the advice of economists. Since 1946, the president of the United States has received guidance from the Council of Economic Advisers, which consists of three members and a staff of several dozen economists. The council, whose offices are just a few steps from the White House, has no duty other than to advise the president and to write the annual *Economic Report of the President*.

The president also receives input from economists in many administrative departments. Economists at the Department of Treasury help design tax policy. Economists at the Department of Labor analyze data on workers and those looking for

### positive statements

*claims that attempt to describe the world as it is*

### normative statements

*claims that attempt to prescribe how the world should be*





“Let’s switch. I’ll make the policy, you implement it, and he’ll explain it.”

work in order to help formulate labor-market policies. Economists at the Department of Justice help enforce the nation’s antitrust laws.

Economists are also found outside the administrative branch of government. To obtain independent evaluations of policy proposals, Congress relies on the advice of the Congressional Budget Office, which is staffed by economists. The Federal Reserve, the quasi-governmental institution that sets the nation’s monetary policy, employs hundreds of economists to analyze economic developments in the United States and throughout the world. Table 2-1 lists the Web sites of some of these agencies.

The influence of economists on policy goes beyond their role as advisers: Their research and writings often affect policy indirectly. Economist John Maynard Keynes offered this observation:

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.

**Table 2-1**

**WEB SITES.** Here are the Web sites for a few of the government agencies that are responsible for collecting economic data and making economic policy.

Department of Commerce	<a href="http://www.doc.gov">www.doc.gov</a>
Bureau of Labor Statistics	<a href="http://www.bls.gov">www.bls.gov</a>
Congressional Budget Office	<a href="http://www.cbo.gov">www.cbo.gov</a>
Federal Reserve Board	<a href="http://www.federalreserve.gov">www.federalreserve.gov</a>

Although these words were written in 1935, they remain true today. Indeed, the “academic scribbler” now influencing public policy is often Keynes himself.

**QUICK QUIZ:** Give an example of a positive statement and an example of a normative statement. ♦ Name three parts of government that regularly rely on advice from economists.

## WHY ECONOMISTS DISAGREE

“If all economists were laid end to end, they would not reach a conclusion.” This quip from George Bernard Shaw is revealing. Economists as a group are often criticized for giving conflicting advice to policymakers. President Ronald Reagan once joked that if the game Trivial Pursuit were designed for economists, it would have 100 questions and 3,000 answers.

Why do economists so often appear to give conflicting advice to policymakers? There are two basic reasons:

- ♦ Economists may disagree about the validity of alternative positive theories about how the world works.
- ♦ Economists may have different values and, therefore, different normative views about what policy should try to accomplish.

Let’s discuss each of these reasons.

## DIFFERENCES IN SCIENTIFIC JUDGMENTS

Several centuries ago, astronomers debated whether the earth or the sun was at the center of the solar system. More recently, meteorologists have debated whether the earth is experiencing “global warming” and, if so, why. Science is a search for understanding about the world around us. It is not surprising that as the search continues, scientists can disagree about the direction in which truth lies.

Economists often disagree for the same reason. Economics is a young science, and there is still much to be learned. Economists sometimes disagree because they have different hunches about the validity of alternative theories or about the size of important parameters.

For example, economists disagree about whether the government should levy taxes based on a household’s income or its consumption (spending). Advocates of a switch from the current income tax to a consumption tax believe that the change would encourage households to save more, because income that is saved would not be taxed. Higher saving, in turn, would lead to more rapid growth in productivity and living standards. Advocates of the current income tax believe that household saving would not respond much to a change in the tax laws. These two groups of economists hold different normative views about the tax system because they have different positive views about the responsiveness of saving to tax incentives.

## DIFFERENCES IN VALUES

Suppose that Peter and Paul both take the same amount of water from the town well. To pay for maintaining the well, the town taxes its residents. Peter has income of \$50,000 and is taxed \$5,000, or 10 percent of his income. Paul has income of \$10,000 and is taxed \$2,000, or 20 percent of his income.

Is this policy fair? If not, who pays too much and who pays too little? Does it matter whether Paul's low income is due to a medical disability or to his decision to pursue a career in acting? Does it matter whether Peter's high income is due to a large inheritance or to his willingness to work long hours at a dreary job?

These are difficult questions on which people are likely to disagree. If the town hired two experts to study how the town should tax its residents to pay for the well, we would not be surprised if they offered conflicting advice.

This simple example shows why economists sometimes disagree about public policy. As we learned earlier in our discussion of normative and positive analysis, policies cannot be judged on scientific grounds alone. Economists give conflicting advice sometimes because they have different values. Perfecting the science of economics will not tell us whether it is Peter or Paul who pays too much.

## PERCEPTION VERSUS REALITY

Because of differences in scientific judgments and differences in values, some disagreement among economists is inevitable. Yet one should not overstate the amount of disagreement. In many cases, economists do offer a united view.

Table 2-2 contains ten propositions about economic policy. In a survey of economists in business, government, and academia, these propositions were endorsed by an overwhelming majority of respondents. Most of these propositions would fail to command a similar consensus among the general public.

The first proposition in the table is about rent control. For reasons we will discuss in Chapter 6, almost all economists believe that rent control adversely affects the availability and quality of housing and is a very costly way of helping the most needy members of society. Nonetheless, many city governments choose to ignore the advice of economists and place ceilings on the rents that landlords may charge their tenants.

The second proposition in the table concerns tariffs and import quotas. For reasons we will discuss in Chapter 3 and more fully in Chapter 9, almost all economists oppose such barriers to free trade. Nonetheless, over the years, the president and Congress have chosen to restrict the import of certain goods. In 1993 the North American Free Trade Agreement (NAFTA), which reduced barriers to trade among the United States, Canada, and Mexico, passed Congress, but only by a narrow margin, despite overwhelming support from economists. In this case, economists did offer united advice, but many members of Congress chose to ignore it.

Why do policies such as rent control and import quotas persist if the experts are united in their opposition? The reason may be that economists have not yet convinced the general public that these policies are undesirable. One purpose of this book is to make you understand the economist's view of these and other subjects and, perhaps, to persuade you that it is the right one.

Table 2-2

TEN PROPOSITIONS ABOUT WHICH MOST ECONOMISTS AGREE

PROPOSITION (AND PERCENTAGE OF ECONOMISTS WHO AGREE)

1. A ceiling on rents reduces the quantity and quality of housing available. (93%)
2. Tariffs and import quotas usually reduce general economic welfare. (93%)
3. Flexible and floating exchange rates offer an effective international monetary arrangement. (90%)
4. Fiscal policy (e.g., tax cut and/or government expenditure increase) has a significant stimulative impact on a less than fully employed economy. (90%)
5. If the federal budget is to be balanced, it should be done over the business cycle rather than yearly. (85%)
6. Cash payments increase the welfare of recipients to a greater degree than do transfers-in-kind of equal cash value. (84%)
7. A large federal budget deficit has an adverse effect on the economy. (83%)
8. A minimum wage increases unemployment among young and unskilled workers. (79%)
9. The government should restructure the welfare system along the lines of a “negative income tax.” (79%)
10. Effluent taxes and marketable pollution permits represent a better approach to pollution control than imposition of pollution ceilings. (78%)

SOURCE: Richard M. Alston, J. R. Kearl, and Michael B. Vaughn, “Is There Consensus among Economists in the 1990s?” *American Economic Review* (May 1992): 203–209.

**QUICK QUIZ:** Why might economic advisers to the president disagree about a question of policy?

LET’S GET GOING

The first two chapters of this book have introduced you to the ideas and methods of economics. We are now ready to get to work. In the next chapter we start learning in more detail the principles of economic behavior and economic policy.

As you proceed through this book, you will be asked to draw on many of your intellectual skills. You might find it helpful to keep in mind some advice from the great economist John Maynard Keynes:

The study of economics does not seem to require any specialized gifts of an unusually high order. Is it not . . . a very easy subject compared with the higher branches of philosophy or pure science? An easy subject, at which very few excel! The paradox finds its explanation, perhaps, in that the master-economist must possess a rare *combination* of gifts. He must be mathematician, historian, statesman, philosopher—in some degree. He must understand symbols and speak in words. He must contemplate the particular in terms of the general, and touch abstract and concrete in the same flight of thought. He must study the

present in the light of the past for the purposes of the future. No part of man's nature or his institutions must lie entirely outside his regard. He must be purposeful and disinterested in a simultaneous mood; as aloof and incorruptible as an artist, yet sometimes as near the earth as a politician.

It is a tall order. But with practice, you will become more and more accustomed to thinking like an economist.

### Summary

- ◆ Economists try to address their subject with a scientist's objectivity. Like all scientists, they make appropriate assumptions and build simplified models in order to understand the world around them. Two simple economic models are the circular-flow diagram and the production possibilities frontier.
- ◆ The field of economics is divided into two subfields: microeconomics and macroeconomics. Microeconomists study decisionmaking by households and firms and the interaction among households and firms in the marketplace. Macroeconomists study the forces and trends that affect the economy as a whole.
- ◆ A positive statement is an assertion about how the world *is*. A normative statement is an assertion about how the world *ought to be*. When economists make normative statements, they are acting more as policy advisers than scientists.
- ◆ Economists who advise policymakers offer conflicting advice either because of differences in scientific judgments or because of differences in values. At other times, economists are united in the advice they offer, but policymakers may choose to ignore it.

### Key Concepts

circular-flow diagram, p. 23

production possibilities frontier, p. 25

microeconomics, p. 27

macroeconomics, p. 27

positive statements, p. 29

normative statements, p. 29

### Questions for Review

1. How is economics like a science?
2. Why do economists make assumptions?
3. Should an economic model describe reality exactly?
4. Draw and explain a production possibilities frontier for an economy that produces milk and cookies. What happens to this frontier if disease kills half of the economy's cow population?
5. Use a production possibilities frontier to describe the idea of "efficiency."
6. What are the two subfields into which economics is divided? Explain what each subfield studies.
7. What is the difference between a positive and a normative statement? Give an example of each.
8. What is the Council of Economic Advisers?
9. Why do economists sometimes offer conflicting advice to policymakers?



### Problems and Applications

1. Describe some unusual language used in one of the other fields that you are studying. Why are these special terms useful?
2. One common assumption in economics is that the products of different firms in the same industry are indistinguishable. For each of the following industries, discuss whether this is a reasonable assumption.
  - a. steel
  - b. novels
  - c. wheat
  - d. fast food
3. Draw a circular-flow diagram. Identify the parts of the model that correspond to the flow of goods and services and the flow of dollars for each of the following activities.
  - a. Sam pays a storekeeper \$1 for a quart of milk.
  - b. Sally earns \$4.50 per hour working at a fast food restaurant.
  - c. Serena spends \$7 to see a movie.
  - d. Stuart earns \$10,000 from his 10 percent ownership of Acme Industrial.
4. Imagine a society that produces military goods and consumer goods, which we'll call "guns" and "butter."
  - a. Draw a production possibilities frontier for guns and butter. Explain why it most likely has a bowed-out shape.
  - b. Show a point that is impossible for the economy to achieve. Show a point that is feasible but inefficient.
  - c. Imagine that the society has two political parties, called the Hawks (who want a strong military) and the Doves (who want a smaller military). Show a point on your production possibilities frontier that the Hawks might choose and a point the Doves might choose.
  - d. Imagine that an aggressive neighboring country reduces the size of its military. As a result, both the Hawks and the Doves reduce their desired production of guns by the same amount. Which party would get the bigger "peace dividend," measured by the increase in butter production? Explain.
5. The first principle of economics discussed in Chapter 1 is that people face tradeoffs. Use a production possibilities frontier to illustrate society's tradeoff between a clean environment and high incomes. What do you suppose determines the shape and position of the frontier? Show what happens to the frontier if engineers develop an automobile engine with almost no emissions.
6. Classify the following topics as relating to microeconomics or macroeconomics.
  - a. a family's decision about how much income to save
  - b. the effect of government regulations on auto emissions
  - c. the impact of higher national saving on economic growth
  - d. a firm's decision about how many workers to hire
  - e. the relationship between the inflation rate and changes in the quantity of money
7. Classify each of the following statements as positive or normative. Explain.
  - a. Society faces a short-run tradeoff between inflation and unemployment.
  - b. A reduction in the rate of growth of money will reduce the rate of inflation.
  - c. The Federal Reserve should reduce the rate of growth of money.
  - d. Society ought to require welfare recipients to look for jobs.
  - e. Lower tax rates encourage more work and more saving.
8. Classify each of the statements in Table 2-2 as positive, normative, or ambiguous. Explain.
9. If you were president, would you be more interested in your economic advisers' positive views or their normative views? Why?
10. The *Economic Report of the President* contains statistical information about the economy as well as the Council of Economic Advisers' analysis of current policy issues. Find a recent copy of this annual report at your library and read a chapter about an issue that interests you. Summarize the economic problem at hand and describe the council's recommended policy.
11. Who is the current chairman of the Federal Reserve? Who is the current chair of the Council of Economic Advisers? Who is the current secretary of the treasury?
12. Look up one of the Web sites listed in Table 2-1. What recent economic trends or issues are addressed there?
13. Would you expect economists to disagree less about public policy as time goes on? Why or why not? Can their differences be completely eliminated? Why or why not?

## APPENDIX

### GRAPHING: A BRIEF REVIEW

Many of the concepts that economists study can be expressed with numbers—the price of bananas, the quantity of bananas sold, the cost of growing bananas, and so on. Often these economic variables are related to one another. When the price of bananas rises, people buy fewer bananas. One way of expressing the relationships among variables is with graphs.

Graphs serve two purposes. First, when developing economic theories, graphs offer a way to visually express ideas that might be less clear if described with equations or words. Second, when analyzing economic data, graphs provide a way of finding how variables are in fact related in the world. Whether we are working with theory or with data, graphs provide a lens through which a recognizable forest emerges from a multitude of trees.

Numerical information can be expressed graphically in many ways, just as a thought can be expressed in words in many ways. A good writer chooses words that will make an argument clear, a description pleasing, or a scene dramatic. An effective economist chooses the type of graph that best suits the purpose at hand.

In this appendix we discuss how economists use graphs to study the mathematical relationships among variables. We also discuss some of the pitfalls that can arise in the use of graphical methods.

#### GRAPHS OF A SINGLE VARIABLE

Three common graphs are shown in Figure 2A-1. The *pie chart* in panel (a) shows how total income in the United States is divided among the sources of income, including compensation of employees, corporate profits, and so on. A slice of the pie represents each source's share of the total. The *bar graph* in panel (b) compares a measure of average income, called real GDP per person, for four countries. The height of each bar represents the average income in each country. The *time-series* graph in panel (c) traces the rising productivity in the U.S. business sector over time. The height of the line shows output per hour in each year. You have probably seen similar graphs presented in newspapers and magazines.

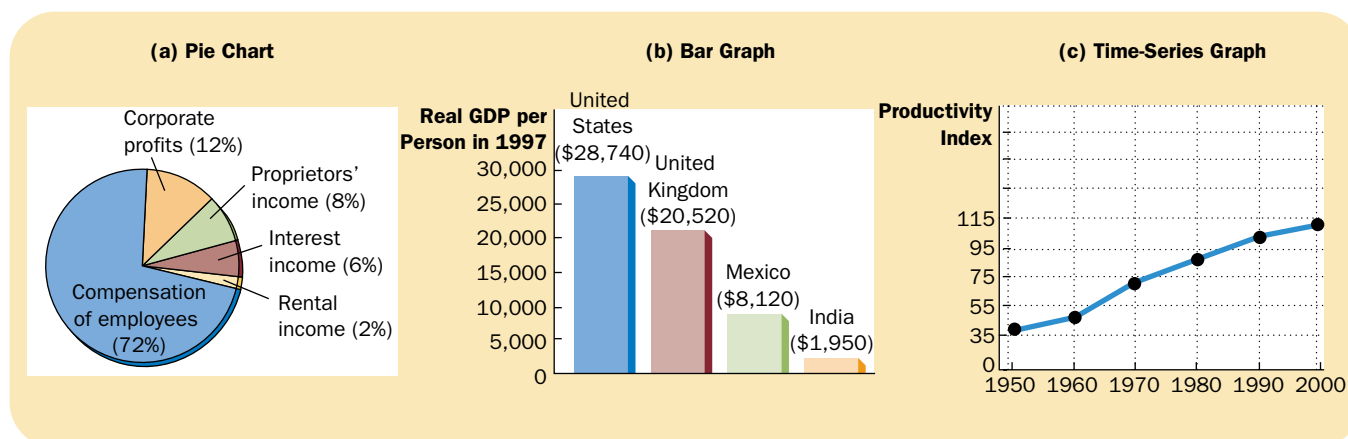


Figure 2A-1

**TYPES OF GRAPHS.** The pie chart in panel (a) shows how U.S. national income is derived from various sources. The bar graph in panel (b) compares the average income in four countries. The time-series graph in panel (c) shows the growth in productivity of the U.S. business sector from 1950 to 2000.

## GRAPHS OF TWO VARIABLES: THE COORDINATE SYSTEM

Although the three graphs in Figure 2A-1 are useful in showing how a variable changes over time or across individuals, such graphs are limited in how much they can tell us. These graphs display information only on a single variable. Economists are often concerned with the relationships between variables. Thus, they need to be able to display two variables on a single graph. The *coordinate system* makes this possible.

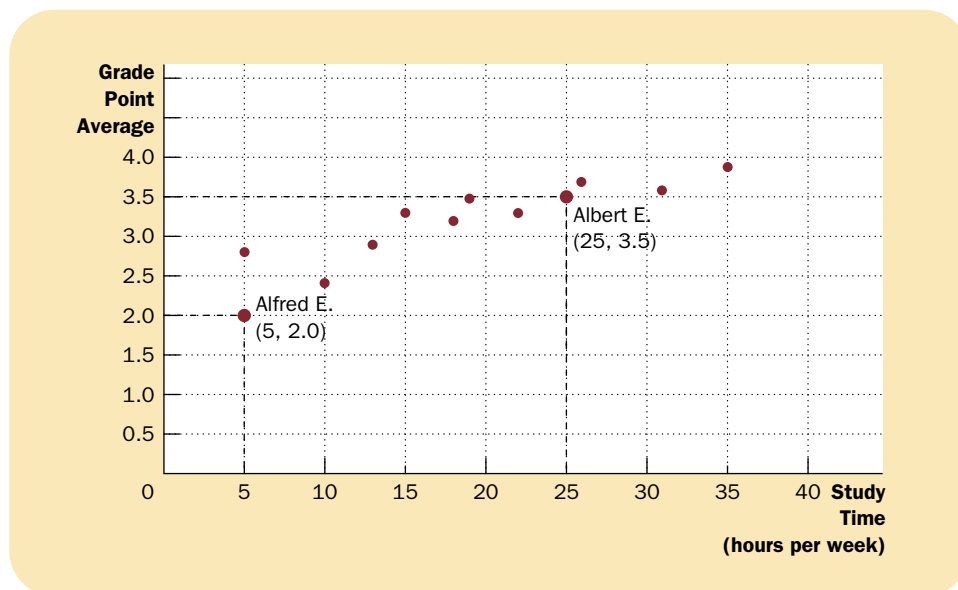
Suppose you want to examine the relationship between study time and grade point average. For each student in your class, you could record a pair of numbers: hours per week spent studying and grade point average. These numbers could then be placed in parentheses as an *ordered pair* and appear as a single point on the graph. Albert E., for instance, is represented by the ordered pair (25 hours/week, 3.5 GPA), while his “what-me-worry?” classmate Alfred E. is represented by the ordered pair (5 hours/week, 2.0 GPA).

We can graph these ordered pairs on a two-dimensional grid. The first number in each ordered pair, called the *x-coordinate*, tells us the horizontal location of the point. The second number, called the *y-coordinate*, tells us the vertical location of the point. The point with both an *x-coordinate* and a *y-coordinate* of zero is known as the *origin*. The two coordinates in the ordered pair tell us where the point is located in relation to the origin: *x* units to the right of the origin and *y* units above it.

Figure 2A-2 graphs grade point average against study time for Albert E., Alfred E., and their classmates. This type of graph is called a *scatterplot* because it plots scattered points. Looking at this graph, we immediately notice that points farther to the right (indicating more study time) also tend to be higher (indicating a better grade point average). Because study time and grade point average typically move in the same direction, we say that these two variables have a *positive*

**Figure 2A-2**

USING THE COORDINATE SYSTEM. Grade point average is measured on the vertical axis and study time on the horizontal axis. Albert E., Alfred E., and their classmates are represented by various points. We can see from the graph that students who study more tend to get higher grades.



*correlation*. By contrast, if we were to graph party time and grades, we would likely find that higher party time is associated with lower grades; because these variables typically move in opposite directions, we would call this a *negative correlation*. In either case, the coordinate system makes the correlation between the two variables easy to see.

## CURVES IN THE COORDINATE SYSTEM

Students who study more do tend to get higher grades, but other factors also influence a student's grade. Previous preparation is an important factor, for instance, as are talent, attention from teachers, even eating a good breakfast. A scatterplot like Figure 2A-2 does not attempt to isolate the effect that study has on grades from the effects of other variables. Often, however, economists prefer looking at how one variable affects another holding everything else constant.

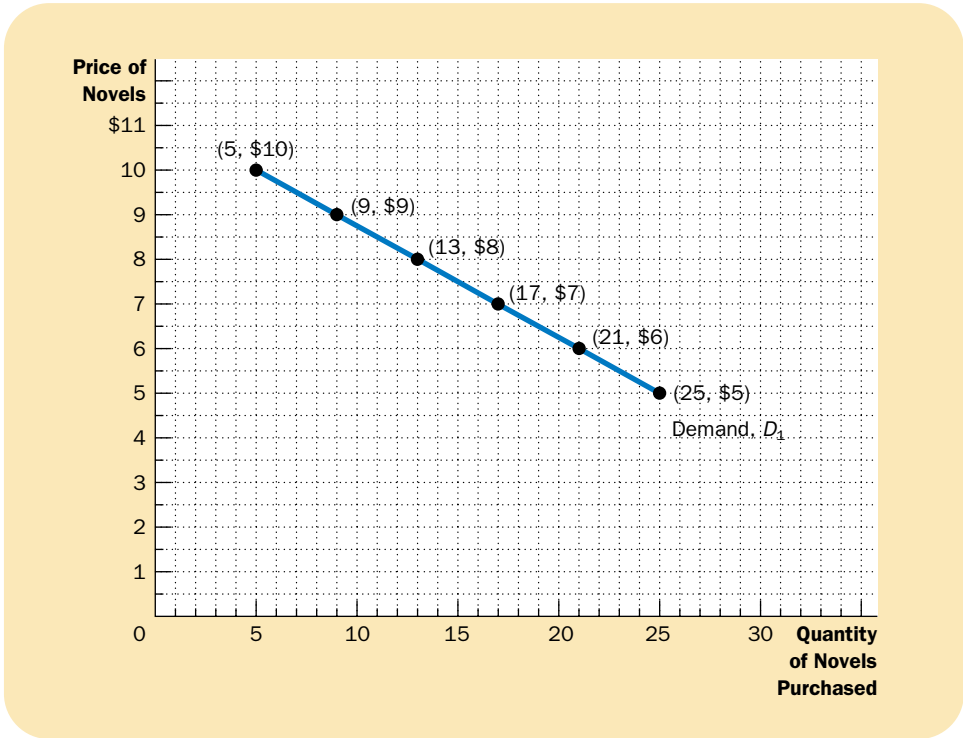
To see how this is done, let's consider one of the most important graphs in economics—the *demand curve*. The demand curve traces out the effect of a good's price on the quantity of the good consumers want to buy. Before showing a demand curve, however, consider Table 2A-1, which shows how the number of novels that Emma buys depends on her income and on the price of novels. When novels are cheap, Emma buys them in large quantities. As they become more expensive, she borrows books from the library instead of buying them or chooses to go to the movies instead of reading. Similarly, at any given price, Emma buys more novels when she has a higher income. That is, when her income increases, she spends part of the additional income on novels and part on other goods.

We now have three variables—the price of novels, income, and the number of novels purchased—which is more than we can represent in two dimensions. To

PRICE	INCOME		
	\$20,000	\$30,000	\$40,000
\$10	2 novels	5 novels	8 novels
9	6	9	12
8	10	13	16
7	14	17	20
6	18	21	24
5	22	25	28
	Demand curve, $D_3$	Demand curve, $D_1$	Demand curve, $D_2$

**Table 2A-1**

NOVELS PURCHASED BY EMMA. This table shows the number of novels Emma buys at various incomes and prices. For any given level of income, the data on price and quantity demanded can be graphed to produce Emma's demand curve for novels, as in Figure 2A-3.



**Figure 2A-3**

DEMAND CURVE. The line  $D_1$  shows how Emma's purchases of novels depend on the price of novels when her income is held constant. Because the price and the quantity demanded are negatively related, the demand curve slopes downward.

put the information from Table 2A-1 in graphical form, we need to hold one of the three variables constant and trace out the relationship between the other two. Because the demand curve represents the relationship between price and quantity demanded, we hold Emma's income constant and show how the number of novels she buys varies with the price of novels.

Suppose that Emma's income is \$30,000 per year. If we place the number of novels Emma purchases on the  $x$ -axis and the price of novels on the  $y$ -axis, we can

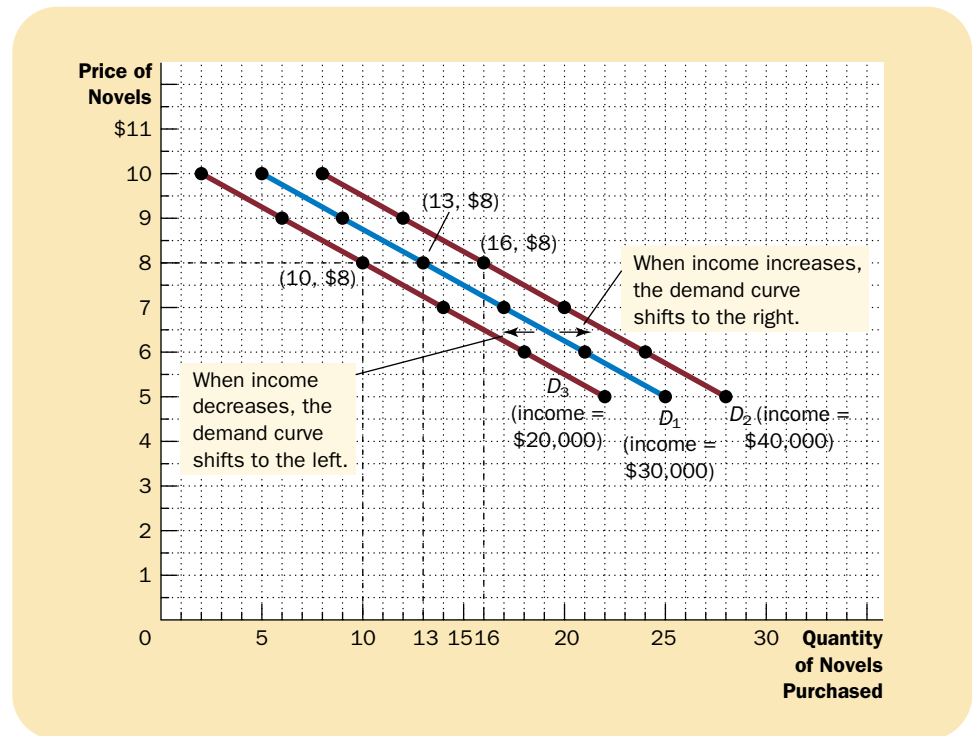
graphically represent the middle column of Table 2A-1. When the points that represent these entries from the table—(5 novels, \$10), (9 novels, \$9), and so on—are connected, they form a line. This line, pictured in Figure 2A-3, is known as Emma’s demand curve for novels; it tells us how many novels Emma purchases at any given price. The demand curve is downward sloping, indicating that a higher price reduces the quantity of novels demanded. Because the quantity of novels demanded and the price move in opposite directions, we say that the two variables are *negatively related*. (Conversely, when two variables move in the same direction, the curve relating them is upward sloping, and we say the variables are *positively related*.)

Now suppose that Emma’s income rises to \$40,000 per year. At any given price, Emma will purchase more novels than she did at her previous level of income. Just as earlier we drew Emma’s demand curve for novels using the entries from the middle column of Table 2A-1, we now draw a new demand curve using the entries from the right-hand column of the table. This new demand curve (curve  $D_2$ ) is pictured alongside the old one (curve  $D_1$ ) in Figure 2A-4; the new curve is a similar line drawn farther to the right. We therefore say that Emma’s demand curve for novels *shifts* to the right when her income increases. Likewise, if Emma’s income were to fall to \$20,000 per year, she would buy fewer novels at any given price and her demand curve would shift to the left (to curve  $D_3$ ).

In economics, it is important to distinguish between *movements along a curve* and *shifts of a curve*. As we can see from Figure 2A-3, if Emma earns \$30,000 per year and novels cost \$8 apiece, she will purchase 13 novels per year. If the price of novels falls to \$7, Emma will increase her purchases of novels to 17 per year. The demand curve, however, stays fixed in the same place. Emma still buys the same

**Figure 2A-4**

**SHIFTING DEMAND CURVES.**  
 The location of Emma’s demand curve for novels depends on how much income she earns. The more she earns, the more novels she will purchase at any given price, and the farther to the right her demand curve will lie. Curve  $D_1$  represents Emma’s original demand curve when her income is \$30,000 per year. If her income rises to \$40,000 per year, her demand curve shifts to  $D_2$ . If her income falls to \$20,000 per year, her demand curve shifts to  $D_3$ .

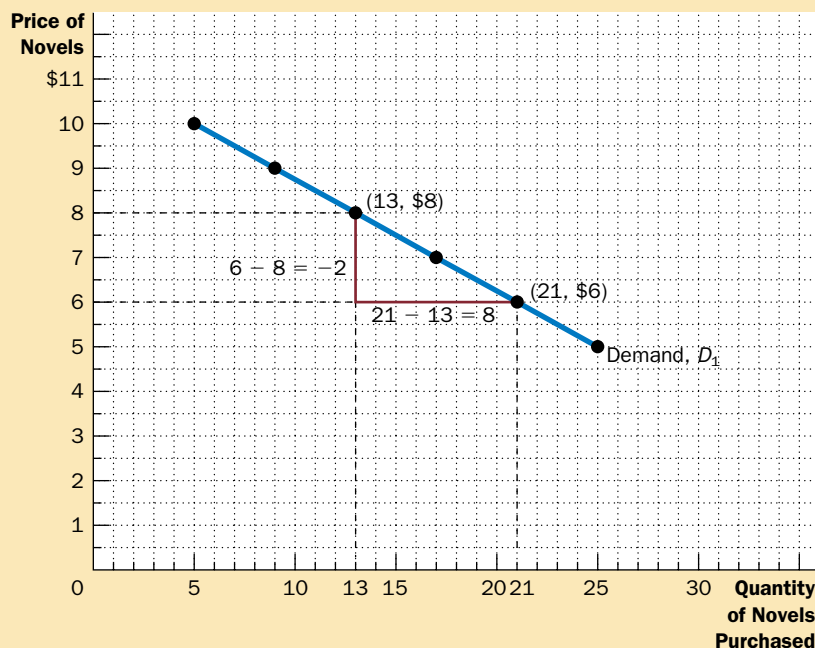


number of novels at *each price*, but as the price falls she moves along her demand curve from left to right. By contrast, if the price of novels remains fixed at \$8 but her income rises to \$40,000, Emma increases her purchases of novels from 13 to 16 per year. Because Emma buys more novels *at each price*, her demand curve shifts out, as shown in Figure 2A-4.

There is a simple way to tell when it is necessary to shift a curve. When a variable that is not named on either axis changes, the curve shifts. Income is on neither the *x*-axis nor the *y*-axis of the graph, so when Emma’s income changes, her demand curve must shift. Any change that affects Emma’s purchasing habits besides a change in the price of novels will result in a shift in her demand curve. If, for instance, the public library closes and Emma must buy all the books she wants to read, she will demand more novels at each price, and her demand curve will shift to the right. Or, if the price of movies falls and Emma spends more time at the movies and less time reading, she will demand fewer novels at each price, and her demand curve will shift to the left. By contrast, when a variable on an axis of the graph changes, the curve does not shift. We read the change as a movement along the curve.

### SLOPE

One question we might want to ask about Emma is how much her purchasing habits respond to price. Look at the demand curve pictured in Figure 2A-5. If this curve is very steep, Emma purchases nearly the same number of novels regardless



**Figure 2A-5**

**CALCULATING THE SLOPE OF A LINE.** To calculate the slope of the demand curve, we can look at the changes in the *x*- and *y*-coordinates as we move from the point (21 novels, \$6) to the point (13 novels, \$8). The slope of the line is the ratio of the change in the *y*-coordinate (−2) to the change in the *x*-coordinate (+8), which equals −1/4.

of whether they are cheap or expensive. If this curve is much flatter, Emma purchases many fewer novels when the price rises. To answer questions about how much one variable responds to changes in another variable, we can use the concept of *slope*.

The slope of a line is the ratio of the vertical distance covered to the horizontal distance covered as we move along the line. This definition is usually written out in mathematical symbols as follows:

$$\text{slope} = \frac{\Delta y}{\Delta x},$$

where the Greek letter  $\Delta$  (delta) stands for the change in a variable. In other words, the slope of a line is equal to the “rise” (change in  $y$ ) divided by the “run” (change in  $x$ ). The slope will be a small positive number for a fairly flat upward-sloping line, a large positive number for a steep upward-sloping line, and a negative number for a downward-sloping line. A horizontal line has a slope of zero because in this case the  $y$ -variable never changes; a vertical line is defined to have an infinite slope because the  $y$ -variable can take any value without the  $x$ -variable changing at all.

What is the slope of Emma’s demand curve for novels? First of all, because the curve slopes down, we know the slope will be negative. To calculate a numerical value for the slope, we must choose two points on the line. With Emma’s income at \$30,000, she will purchase 21 novels at a price of \$6 or 13 novels at a price of \$8. When we apply the slope formula, we are concerned with the change between these two points; in other words, we are concerned with the difference between them, which lets us know that we will have to subtract one set of values from the other, as follows:

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{\text{first } y\text{-coordinate} - \text{second } y\text{-coordinate}}{\text{first } x\text{-coordinate} - \text{second } x\text{-coordinate}} = \frac{6 - 8}{21 - 13} = \frac{-2}{8} = \frac{-1}{4}.$$

Figure 2A-5 shows graphically how this calculation works. Try computing the slope of Emma’s demand curve using two different points. You should get exactly the same result,  $-1/4$ . One of the properties of a straight line is that it has the same slope everywhere. This is not true of other types of curves, which are steeper in some places than in others.

The slope of Emma’s demand curve tells us something about how responsive her purchases are to changes in the price. A small slope (a number close to zero) means that Emma’s demand curve is relatively flat; in this case, she adjusts the number of novels she buys substantially in response to a price change. A larger slope (a number farther from zero) means that Emma’s demand curve is relatively steep; in this case, she adjusts the number of novels she buys only slightly in response to a price change.

## CAUSE AND EFFECT

Economists often use graphs to advance an argument about how the economy works. In other words, they use graphs to argue about how one set of events *causes* another set of events. With a graph like the demand curve, there is no doubt about cause and effect. Because we are varying price and holding all other



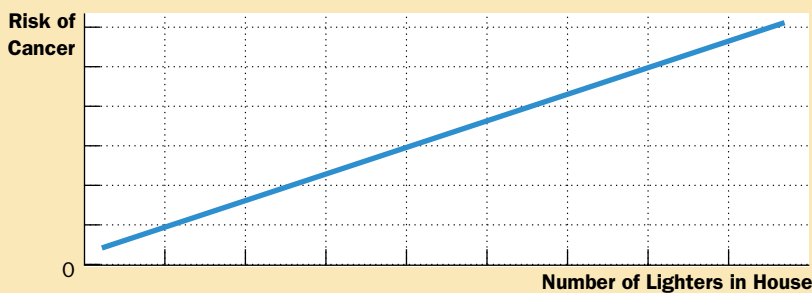
variables constant, we know that changes in the price of novels cause changes in the quantity Emma demands. Remember, however, that our demand curve came from a hypothetical example. When graphing data from the real world, it is often more difficult to establish how one variable affects another.

The first problem is that it is difficult to hold everything else constant when measuring how one variable affects another. If we are not able to hold variables constant, we might decide that one variable on our graph is causing changes in the other variable when actually those changes are caused by a third *omitted* variable not pictured on the graph. Even if we have identified the correct two variables to look at, we might run into a second problem—*reverse causality*. In other words, we might decide that A causes B when in fact B causes A. The omitted-variable and reverse-causality traps require us to proceed with caution when using graphs to draw conclusions about causes and effects.

**Omitted Variables** To see how omitting a variable can lead to a deceptive graph, let's consider an example. Imagine that the government, spurred by public concern about the large number of deaths from cancer, commissions an exhaustive study from Big Brother Statistical Services, Inc. Big Brother examines many of the items found in people's homes to see which of them are associated with the risk of cancer. Big Brother reports a strong relationship between two variables: the number of cigarette lighters that a household owns and the probability that someone in the household will develop cancer. Figure 2A-6 shows this relationship.

What should we make of this result? Big Brother advises a quick policy response. It recommends that the government discourage the ownership of cigarette lighters by taxing their sale. It also recommends that the government require warning labels: "Big Brother has determined that this lighter is dangerous to your health."

In judging the validity of Big Brother's analysis, one question is paramount: Has Big Brother held constant every relevant variable except the one under consideration? If the answer is no, the results are suspect. An easy explanation for Figure 2A-6 is that people who own more cigarette lighters are more likely to smoke cigarettes and that cigarettes, not lighters, cause cancer. If Figure 2A-6 does not



**Figure 2A-6**

GRAPH WITH AN OMITTED VARIABLE. The upward-sloping curve shows that members of households with more cigarette lighters are more likely to develop cancer. Yet we should not conclude that ownership of lighters causes cancer because the graph does not take into account the number of cigarettes smoked.

hold constant the amount of smoking, it does not tell us the true effect of owning a cigarette lighter.

This story illustrates an important principle: When you see a graph being used to support an argument about cause and effect, it is important to ask whether the movements of an omitted variable could explain the results you see.

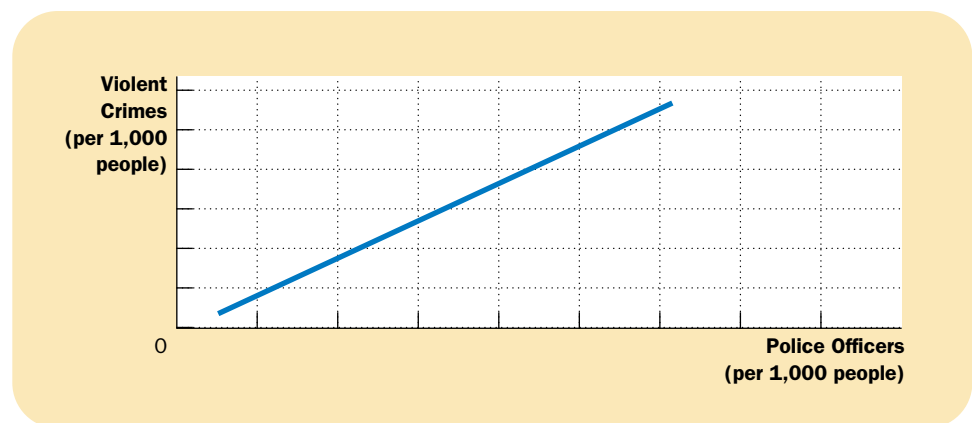
**Reverse Causality** Economists can also make mistakes about causality by misreading its direction. To see how this is possible, suppose the Association of American Anarchists commissions a study of crime in America and arrives at Figure 2A-7, which plots the number of violent crimes per thousand people in major cities against the number of police officers per thousand people. The anarchists note the curve's upward slope and argue that because police increase rather than decrease the amount of urban violence, law enforcement should be abolished.

If we could run a controlled experiment, we would avoid the danger of reverse causality. To run an experiment, we would set the number of police officers in different cities randomly and then examine the correlation between police and crime. Figure 2A-7, however, is not based on such an experiment. We simply observe that more dangerous cities have more police officers. The explanation for this may be that more dangerous cities hire more police. In other words, rather than police causing crime, crime may cause police. Nothing in the graph itself allows us to establish the direction of causality.

It might seem that an easy way to determine the direction of causality is to examine which variable moves first. If we see crime increase and then the police force expand, we reach one conclusion. If we see the police force expand and then crime increase, we reach the other. Yet there is also a flaw with this approach: Often people change their behavior not in response to a change in their present conditions but in response to a change in their *expectations* of future conditions. A city that expects a major crime wave in the future, for instance, might well hire more police now. This problem is even easier to see in the case of babies and minivans. Couples often buy a minivan in anticipation of the birth of a child. The

**Figure 2A-7**

GRAPH SUGGESTING REVERSE CAUSALITY. The upward-sloping curve shows that cities with a higher concentration of police are more dangerous. Yet the graph does not tell us whether police cause crime or crime-plagued cities hire more police.



minivan comes before the baby, but we wouldn't want to conclude that the sale of minivans causes the population to grow!

There is no complete set of rules that says when it is appropriate to draw causal conclusions from graphs. Yet just keeping in mind that cigarette lighters don't cause cancer (omitted variable) and minivans don't cause larger families (reverse causality) will keep you from falling for many faulty economic arguments.