

CHAPTER

1

Ten Principles of Economics

The word *economy* comes from the Greek word *oikonomos*, which means “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 household members do which tasks and what each member receives in return: Who cooks dinner? Who does the laundry? Who gets the extra dessert at dinner? Who gets to drive the car? In short, a household must allocate its scarce resources (time, dessert, car mileage) among its various members, taking into account each member’s abilities, efforts, and desires.

Like a household, a society faces many decisions. It must find some way to 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, it must also allocate the goods and services they produce. It must decide who will eat caviar and who will eat potatoes. It must decide who will drive a Ferrari and who will take the bus.



scarcity

the limited nature of society's resources

economics

the study of how society manages its scarce resources

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 each member of a household cannot get everything she wants, each individual in a society cannot attain the highest standard of living to which she might aspire.

Economics is the study of how society manages its scarce resources. In most societies, resources are allocated not by an all-powerful dictator but through the combined choices 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 many 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 the 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.

The study of economics has many facets, but it is unified by several central ideas. In this chapter, we look at *Ten Principles of Economics*. Don't worry if you don't understand them all at first or if you aren't completely convinced. We explore these ideas more fully in later chapters. The ten principles are introduced here to give you a sense of what economics is all about. Consider this chapter a "preview of coming attractions."

1-1 How People Make Decisions

There is no mystery to what an economy is. Whether we are talking about the economy of Los Angeles, the United States, or the whole world, an economy is just a group of people dealing 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, our first four principles concern individual decision making.

1-1a Principle 1: People Face Trade-Offs

You may have heard the old saying, "There ain't no such thing as a free lunch." Grammar aside, there is much truth to this adage. To get something that we like, we usually have to give up something else that we also 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, spend all of it studying psychology, or divide it 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 she could have spent napping, bike riding, playing video games, or working at her part-time job for some extra spending money.

Consider parents deciding how to spend their family income. They can buy food, clothing, or a family vacation. Or they can save some of their income for retirement or their 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 trade-offs. One classic trade-off is between "guns and butter." The more a society spends on national defense (guns) to protect itself from foreign aggressors, the less it can spend on consumer goods (butter) to raise its standard of living. Also important

in modern society is the trade-off 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 these higher costs, the firms end up earning smaller profits, paying lower wages, charging higher prices, or doing some combination of these three. Thus, while pollution regulations yield a cleaner environment and the improved health that comes with it, this benefit comes at the cost of reducing the well-being of the regulated firms' owners, workers, and customers.

Another trade-off society faces is between efficiency and equality. **Efficiency** means that society is getting the maximum benefits from its scarce resources. **Equality** means that those benefits are distributed uniformly among society's members. In other words, efficiency refers to the size of the economic pie, and equality refers to how the pie is divided into individual slices.

When government policies are designed, these two goals often conflict. Consider, for instance, policies aimed at equalizing the distribution of economic well-being. Some of these policies, such as the welfare system or unemployment insurance, try to help the 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. Though these policies achieve greater equality, they reduce 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 shrinks.

Recognizing that people face trade-offs 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 would reduce our material standard of living. The government should not ignore the poor just because helping them would distort work incentives. Nonetheless, people are likely to make good decisions only if they understand the options available to them. Our study of economics, therefore, starts by acknowledging life's trade-offs.

1-1b Principle 2: The Cost of Something Is What You Give Up to Get It

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

Consider the decision to go to college. The main benefits are intellectual enrichment and a lifetime of better job opportunities. But what are the costs? To answer this question, you might be tempted to add up the money you spend on tuition, books, room, and board. Yet this total does not truly represent what you give up to spend a year in college.

This calculation has two problems. First, it includes some things that are not really costs of going to college. Even if you quit school, you need a place to sleep and food to eat. Room and board are costs of going to college only to the extent that they exceed the cost of living and eating at home or in your own apartment. Second, this calculation 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 and earning money. For most students, the earnings they give up to attend school are the largest cost of their education.

efficiency

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

equality

the property of distributing economic prosperity uniformly among the members of society

opportunity cost

whatever must be given up to obtain some item

The **opportunity cost** of an item is what you give up to get that item. When making any decision, decision makers should take into account the opportunity costs of each possible action. In fact, they usually do. College athletes who can earn millions dropping out of school and playing professional sports are well aware that their opportunity cost of attending college is very high. Not surprisingly, they often decide that the benefit of a college education is not worth the cost.

rational people

people who systematically and purposefully do the best they can to achieve their objectives

1-1c Principle 3: Rational People Think at the Margin

Economists normally assume that people are rational. **Rational people** systematically and purposefully do the best they can to achieve their objectives, given the available opportunities. As you study economics, you will encounter firms that decide how many workers to hire and how much product to make and sell to maximize profits. You will also encounter individuals who decide how much time to spend working and what goods and services to buy with the resulting income to achieve the highest possible level of satisfaction.

Rational people know that decisions in life are rarely black and white but often involve shades of gray. At dinnertime, you don't ask yourself "Should I fast or eat like a pig?" More likely, the question you face is "Should I take that extra spoonful of mashed potatoes?" When exams roll around, your decision is not between blowing them off and studying 24 hours a day but whether to spend an extra hour reviewing your notes instead of playing video games. Economists use the term **marginal change** to describe a small incremental adjustment 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. Rational people make decisions by comparing *marginal benefits* and *marginal costs*.

For example, suppose you are considering watching a movie tonight. You pay \$40 a month for a movie streaming service that gives you unlimited access to its film library, and you typically watch 8 movies a month. What cost should you take into account when deciding whether to stream another movie? You might at first think the answer is \$40/8, or \$5, which is the *average* cost of a movie. More relevant for your decision, however, is the *marginal cost*—the extra cost that you would incur by streaming another film. Here, the marginal cost is zero because you pay the same \$40 for the service regardless of how many movies you stream. In other words, at the margin, streaming a movie is free. The only cost of watching a movie tonight is the time it takes away from other activities, such as working at a job or (better yet) reading this textbook.

Thinking at the margin also works for business decisions. Consider an airline deciding how much to charge passengers who fly standby. Suppose that flying a 200-seat plane across the United States costs the airline \$100,000. The average cost of each seat is \$500 (\$100,000/200). One might be tempted to conclude that the airline should never sell a ticket for less than \$500. But imagine that a plane is about to take off with 10 empty seats and a standby passenger waiting at the gate is willing to pay \$300 for a seat. Should the airline sell the ticket? Of course it should. If the plane has empty seats, the cost of adding one more passenger is tiny. The *average* cost of flying a passenger is \$500, but the *marginal cost* is merely the cost of the can of soda that the extra passenger will consume and the small bit of jet fuel needed to carry the extra passenger's weight. As long as the standby passenger pays more than the marginal cost, selling the ticket is profitable. Thus, a rational airline can increase profits by thinking at the margin.

Marginal decision making can explain some otherwise puzzling phenomena. Here is a classic question: Why is water so cheap, while diamonds are so

expensive? Humans need water to survive, while diamonds are unnecessary. Yet people are willing to pay much more for a diamond than for a cup of water. The reason is that a person's willingness to pay for a good is based on the marginal benefit that an extra unit of the good would yield. The marginal benefit, in turn, depends on how many units a person already has. Water is essential, but the marginal benefit of an extra cup is small because water is plentiful. By contrast, no one needs diamonds to survive, but because diamonds are so rare, the marginal benefit of an extra diamond is large.

A rational decision maker takes an action if and only if the action's marginal benefit exceeds its marginal cost. This principle explains why people use their movie streaming services as much as they do, why airlines are willing to sell tickets below average cost, and why people pay more for diamonds than for water. It can take some time to get used to the logic of marginal thinking, but the study of economics will give you ample opportunity to practice.

1-1d Principle 4: People Respond to Incentives

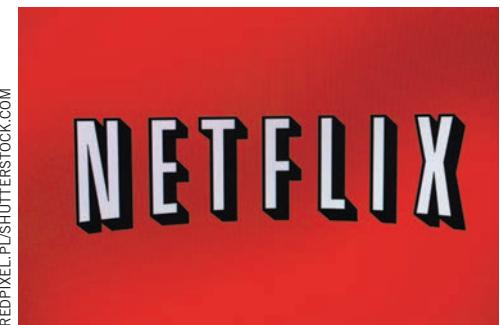
An **incentive** is something that induces a person to act, such as the prospect of a punishment or reward. Because rational people make decisions by comparing costs and benefits, they respond to incentives. You will see that incentives play a central role in the study of economics. One economist went so far as to suggest that the entire field could be summarized as simply "People respond to incentives. The rest is commentary."

Incentives are key to analyzing how markets work. For example, when the price of apples rises, people decide to eat fewer apples. At the same time, apple orchards decide to hire more workers and harvest more apples. In other words, a higher price in a market provides an incentive for buyers to consume less and an incentive for sellers to produce more. As we will see, the influence of prices on the behavior of consumers and producers is crucial to how a market economy allocates scarce resources.

Public policymakers should never forget about incentives: Many policies change the costs or benefits that people face and, as a result, alter their behavior. A tax on gasoline, for instance, encourages people to drive smaller, more fuel-efficient cars. That is one reason people drive smaller cars in Europe, where gasoline taxes are high, than in the United States, where gasoline taxes are low. A higher gasoline tax also encourages people to carpool, take public transportation, live closer to where they work, or switch to hybrid or electric cars.

When policymakers fail to consider how their policies affect incentives, they often face unintended consequences. For example, consider public policy regarding auto safety. Today, all cars have seat belts, but this was not true 60 years ago. In 1965, Ralph Nader's book *Unsafe at Any Speed* generated much public concern over auto safety. Congress responded with laws requiring seat belts as standard equipment on new cars.

How does a seat belt law affect auto safety? The direct effect is obvious: When a person wears a seat belt, the likelihood of surviving an auto accident rises. But that's not the end of the story. The law also affects behavior by altering incentives. 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, perhaps



Many movie streaming services set the marginal cost of a movie equal to zero.

incentive

something that induces a person to act

unconsciously, the marginal benefit from safer driving to the marginal cost. As a result, they drive more slowly and carefully when the benefit of increased safety is high. For example, when road conditions are icy, people drive more attentively and at lower speeds than they do when road conditions are clear.

Consider how a seat belt law alters a driver's cost-benefit calculation. Seat belts make accidents less costly by reducing the risk of injury or death. In other words, seat belts reduce the benefits of slow and careful driving. People respond to seat belts as they would to an improvement in road conditions—by driving faster and less carefully. The result of a seat belt law, therefore, is a larger number of accidents. The decline in safe driving has a clear, adverse impact on pedestrians, who are more likely to find themselves in an accident but (unlike the drivers) don't have the benefit of added protection.

At first, this discussion of incentives and seat belts might seem like idle speculation. Yet in a classic 1975 study, economist Sam Peltzman argued that auto-safety laws have had many of these effects. According to Peltzman's evidence, these laws give rise not only to fewer deaths per accident but also to more accidents. He concluded that 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 offbeat and controversial example of the general principle that people respond to incentives. When analyzing any policy, we must consider not only the direct effects but also the less obvious indirect effects that work through incentives. If the policy changes incentives, it will cause people to alter their behavior.

QuickQuiz

1. Economics is best defined as the study of
 - a. how society manages its scarce resources.
 - b. how to run a business most profitably.
 - c. how to predict inflation, unemployment, and stock prices.
 - d. how the government can stop the harm from unchecked self-interest.
2. Your opportunity cost of going to a movie is
 - a. the price of the ticket.
 - b. the price of the ticket plus the cost of any soda and popcorn you buy at the theater.
 - c. the total cash expenditure needed to go to the movie plus the value of your time.
 - d. zero, as long as you enjoy the movie and consider it a worthwhile use of time and money.
3. A marginal change is one that
 - a. is not important for public policy.
 - b. incrementally alters an existing plan.
 - c. makes an outcome inefficient.
 - d. does not influence incentives.
4. Because people respond to incentives,
 - a. policymakers can alter outcomes by changing punishments or rewards.
 - b. policies can have unintended consequences.
 - c. society faces a trade-off between efficiency and equality.
 - d. All of the above.

Answers at end of chapter.

1-2 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.

1-2a Principle 5: Trade Can Make Everyone Better Off

You may have heard on the news that the Chinese are our competitors in the world economy. In some ways, this is true because American firms and Chinese firms produce many of the same goods. Companies in the United States and China compete for the same customers in the markets for clothing, toys, solar panels, automobile tires, and many other items.

Yet it is easy to be misled when thinking about competition among countries. Trade between the United States and China is not like a sports contest in which one side wins and the other side loses. 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, 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. In a sense, each family in an economy competes 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, sew its own clothes, and build its own home. Clearly, your family gains much from being able to trade with others. Trade allows each person to specialize in the activities 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.

Like families, countries also benefit from being able 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 Chinese, as well as the French, Egyptians, and Brazilians, are as much our partners in the world economy as they are our competitors.

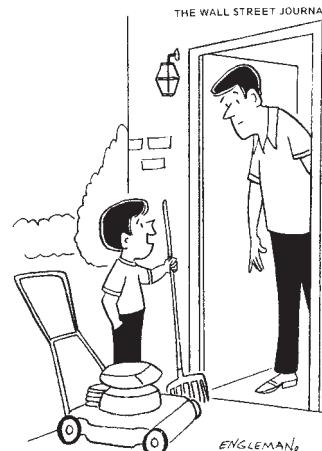
1-2b Principle 6: Markets Are Usually a Good Way to Organize Economic Activity

The collapse of communism in the Soviet Union and Eastern Europe in the late 1980s and early 1990s was one of the last century's most transformative events. Communist countries operated on the premise that government officials were in the best position to allocate the economy's scarce resources. These central 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 well-being for the country as a whole.

Most countries that once had centrally planned economies have abandoned the system and instead have adopted 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. In a market economy, no one is looking out for the 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 decision making and self-interested decision makers, market economies have proven remarkably successful in organizing economic activity to promote overall prosperity.

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:



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"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

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 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. In any market, buyers look at the price when deciding how much to demand, and sellers look at the price when deciding how much to supply. As a result of these decisions, market prices reflect both the value of a good to society and the cost to society of making the good. Smith’s great insight was that prices adjust to guide buyers and sellers to reach outcomes that, in many cases, maximize the well-being of society as a whole.

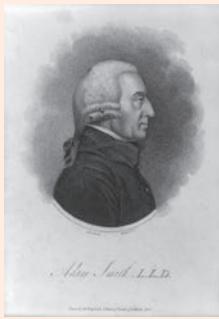
Smith’s insight has an important corollary: When a government prevents prices from adjusting naturally to supply and demand, it impedes the invisible hand’s ability to coordinate the decisions of the households and firms that make up an economy. This corollary explains why taxes adversely affect the allocation of resources: They distort prices and thus the decisions of households and firms. It also explains the problems caused by policies that 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 necessary information about consumers’ tastes and producers’ costs, which in a market economy is reflected in prices. Central planners failed because they tried to run the economy with one hand tied behind their backs—the invisible hand of the marketplace.

FYI

Adam Smith and the Invisible Hand

It may be only a coincidence that Adam Smith’s great book *The Wealth of Nations* was published in 1776, the exact year in which American revolutionaries signed the Declaration of Independence. But the two documents share a point of view that was prevalent at the time: Individuals are usually best left to their own devices, without the heavy hand of government directing their actions. This political philosophy provides the intellectual foundation for the market economy and for a free society more generally.

Why do decentralized market economies work 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:



Adam Smith.

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Man has almost constant occasion for the help of his brethren, and it is in 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 favour, and show them that it is for their own advantage to do for him what he requires of them. . . . Give me that which I want, and you shall have this which you want, is

the meaning of every such offer; and it is in this manner that we obtain from one another the far greater part of those good offices which we stand in need of.

It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages. Nobody but a beggar chooses to depend chiefly upon the benevolence of his fellow-citizens. . . .

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.

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 more fully the strengths and weaknesses of the market’s invisible hand. ■

CASE STUDY

ADAM SMITH WOULD HAVE LOVED UBER

You have probably never lived in a centrally planned economy, but if you have ever tried to hail a cab in a major city, you have likely experienced a highly regulated market. In many cities, the local government imposes strict controls in the market for taxis. The rules usually go well beyond regulation of insurance and safety. For example, the government may limit entry into the market by approving only a certain number of taxi medallions or permits. It may determine the prices that taxis are allowed to charge. The government uses its police powers—that is, the threat of fines or jail time—to keep unauthorized drivers off the streets and prevent drivers from charging unauthorized prices.

In 2009, however, this highly controlled market was invaded by a disruptive force: Uber, a company that provides a smartphone app to connect passengers and drivers. Because Uber cars do not roam the streets looking for taxi-hailing pedestrians, they are technically not taxis and so are not subject to the same regulations. But they offer much the same service. Indeed, rides from Uber cars are often more convenient. On a cold and rainy day, who wants to stand on the side of the road waiting for an empty cab to drive by? It is more pleasant to remain inside, use your smartphone to arrange a ride, and stay warm and dry until the car arrives.

Uber cars often charge less than taxis, but not always. Uber's prices rise significantly when there is a surge in demand, such as during a sudden rainstorm or late on New Year's Eve, when numerous tipsy partiers are looking for a safe way to get home. By contrast, regulated taxis are typically prevented from surge pricing.

Not everyone is fond of Uber. Drivers of traditional taxis complain that this new competition cuts into their source of income. This is hardly a surprise: Suppliers of goods and services often dislike new competitors. But vigorous competition among producers makes a market work well for consumers.

That is why economists love Uber. A 2014 survey of several dozen prominent economists asked whether car services such as Uber increased consumer well-being. Every single economist said "Yes." The economists were also asked whether surge pricing increased consumer well-being. "Yes," said 85 percent of them. Surge pricing makes consumers pay more at times, but because Uber drivers respond to incentives, it also increases the quantity of car services supplied when they are most needed. Surge pricing also helps allocate the services to those consumers who value them most highly and reduces the costs of searching and waiting for a car.

If Adam Smith were alive today, he would surely have the Uber app on his phone. ●

1-2c Principle 7: Governments Can Sometimes Improve Market Outcomes

If the invisible hand of the market is so great, why do we need government? One purpose of studying economics is to refine your view about the proper role and scope of government policy.

One reason we need government is that the invisible hand can work its magic only if the government enforces the rules and maintains the institutions that are key to a market economy. Most important, market economies need institutions to enforce **property rights** so individuals can own and control scarce resources. A farmer won't grow food if she expects her crop to be stolen; a restaurant won't serve meals unless it is assured that customers will pay before they leave; and a film company won't produce movies if too many potential customers avoid paying by making illegal copies. We all rely on government-provided police and courts to enforce our rights over the things we produce—and the invisible hand counts on our ability to enforce those rights.

Another reason we need government is that, although the invisible hand is powerful, it is not omnipotent. There are two broad rationales for a government to


RICHARD LEVINE/ALAMY STOCK PHOTO

Technology can improve this market.

property rights

the ability of an individual to own and exercise control over scarce resources

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

intervene in the economy and change the allocation of resources that people would choose on their own: to promote efficiency or to promote equality. That is, most policies aim either to enlarge the economic pie or to change how the pie is divided.

Consider first the goal of efficiency. Although the invisible hand usually leads markets to allocate resources to maximize the size of the economic pie, this is not always the case. Economists use the term **market failure** to refer to a situation in which the market on its own fails to produce an efficient allocation of resources. As we will see, one possible cause of market failure is an **externality**, which is the impact of one person's actions on the well-being of a bystander. The classic example of an externality is pollution. When the production of a good pollutes the air and creates health problems for those who live near the factories, the market on its own may fail to take this cost into account. Another possible cause of market failure is **market power**, which refers to the ability of a single person or firm (or a small group of them) to unduly influence market prices. For example, if everyone in town needs water but there is only one well, the owner of the well does not face the rigorous competition with which the invisible hand normally keeps self-interest in check; she may take advantage of this opportunity by restricting the output of water so she can charge a higher price. In the presence of externalities or market power, well-designed public policy can enhance economic efficiency.

Now consider the goal of equality. Even when the invisible hand yields efficient outcomes, it can nonetheless leave sizable disparities in economic well-being. 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 healthcare. This inequality may, depending on one's political philosophy, call for government intervention. In practice, many public policies, such as the income tax and the welfare system, aim to achieve a more equal distribution of economic well-being.

To say that the government *can* improve market outcomes 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 to reward the politically powerful. Sometimes they are made by well-intentioned leaders who are not fully informed. As you study economics, you will become a better judge of when a government policy is justifiable because it promotes efficiency or equality and when it is not.

QuickQuiz

5. International trade benefits a nation when
 - a. its revenue from selling abroad exceeds its outlays from buying abroad.
 - b. its trading partners experience reduced economic well-being.
 - c. all nations are specializing in producing what they do best.
 - d. no domestic jobs are lost because of trade.
6. Adam Smith's "invisible hand" refers to
 - a. the subtle and often hidden methods that businesses use to profit at consumers' expense.
 - b. the ability of free markets to reach desirable outcomes, despite the self-interest of market participants.
 - c. the ability of government regulation to benefit consumers even if the consumers are unaware of the regulations.
 - d. the way in which producers or consumers in unregulated markets impose costs on innocent bystanders.
7. Governments may intervene in a market economy in order to
 - a. protect property rights.
 - b. correct a market failure due to externalities.
 - c. achieve a more equal distribution of income.
 - d. All of the above.

Answers at end of chapter.

1-3 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.

1-3a 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 2017, the average American earned about \$60,000. In the same year, the average German earned about \$51,000, the average Chinese about \$17,000, and the average Nigerian only \$6,000. Not surprisingly, this large variation in average income is reflected in various measures of quality of life. Citizens of high-income countries have more computers, more cars, better nutrition, better healthcare, and a longer life expectancy than do 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 U.S. 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 by each unit of labor input. In nations where workers can produce a large quantity of goods and services per hour, most people enjoy a high standard of living; in nations where workers are less productive, most people endure a more meager existence. Similarly, the growth rate of a nation’s productivity determines the growth rate of its average income.

The 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 less important. 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 explained the slow growth in U.S. incomes during the 1970s and 1980s. Yet the real villain was 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 they need to produce goods and services, and have access to the best available technology.

productivity

the quantity of goods and services produced from each unit of labor input

1-3b Principle 9: Prices Rise When the Government Prints Too Much Money

In January 1921, a daily newspaper in Germany cost 0.30 marks. Less than 2 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.

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!"

Although the United States has never experienced inflation even close to that of Germany in the 1920s, inflation has at times been a problem. During the 1970s, the overall level of prices more than doubled, and President Gerald Ford called inflation "public enemy number one." By contrast, inflation in the two decades of the 21st century has run about 2 percent per year; at this rate, it takes 35 years for prices to double. Because high inflation imposes various costs on society, keeping inflation at a reasonable rate is a goal of economic policymakers around the world.

What causes inflation? In almost all cases of large or persistent inflation, the culprit is 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 return of low inflation in the 1980s was associated with slower growth in the quantity of money.

1-3c Principle 10: Society Faces a Short-Run Trade-Off between Inflation and Unemployment

While an increase in the quantity of money primarily raises prices in the long run, the short-run story is more complex. Most economists describe the short-run effects of money growth as follows:

- Increasing the amount of money in the economy stimulates the overall level of spending and thus the demand for goods and services.
- Higher demand may over time cause firms to raise their prices, but in the meantime, it also encourages them to hire more workers and produce a larger quantity of goods and services.
- More hiring means lower unemployment.

This line of reasoning leads to one final economy-wide trade-off: a short-run trade-off between inflation and unemployment.

Although some economists still question these ideas, most accept that society faces a short-run trade-off 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 trade-off regardless of whether inflation and unemployment both start out at high levels (as they did in the early 1980s), at low levels (as they did in the late 1990s), or someplace in between. This short-run trade-off plays a key role in the analysis of the **business cycle**—the irregular and largely unpredictable fluctuations in economic activity, as measured by the production of goods and services or the number of people employed.

Policymakers can exploit the short-run trade-off between inflation and unemployment 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 influence the overall demand for goods and services. Changes in demand in turn influence the combination of inflation and unemployment that the economy experiences in the short run. Because these instruments of economic policy are so powerful, how policymakers should use them to control the economy, if at all, is a subject of continuing debate.

business cycle
fluctuations in economic activity, such as employment and production

QuickQuiz

8. The main reason that some nations have higher average living standards than others is that
- the richer nations have exploited the poorer ones.
 - the central banks of some nations have created more money.
 - some nations have stronger laws protecting worker rights.
 - some nations have higher levels of productivity.
9. If a nation has high and persistent inflation, the most likely explanation is
- the central bank creating excessive amounts of money.
 - unions bargaining for excessively high wages.
10. If a central bank uses the tools of monetary policy to reduce the demand for goods and services, the likely result is _____ inflation and _____ unemployment in the short run.
- lower; lower
 - lower; higher
 - higher; higher
 - higher; lower

Answers at end of chapter.

1-4 Conclusion

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

Throughout this book, we will refer back to the *Ten Principles of Economics* introduced in this chapter and summarized in Table 1. Keep these building blocks in mind. Even the most sophisticated economic analysis is founded on these ten principles.

How People Make Decisions

1. People face trade-offs.
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.

How People Interact

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.

How the Economy as a Whole Works

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 trade-off between inflation and unemployment.

TABLE 1

Ten Principles of Economics

CHAPTER IN A NUTSHELL

- The fundamental lessons about individual decision making are that people face trade-offs 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 and interdependence can be mutually beneficial, that markets are usually a good way of coordinating economic activity among people, and that governments can potentially improve market outcomes by remedying a market failure or by promoting greater economic equality.
- The fundamental lessons about the economy as a whole are that productivity is the ultimate source of living standards, that growth in the quantity of money is the ultimate source of inflation, and that society faces a short-run trade-off between inflation and unemployment.

KEY CONCEPTS

scarcity, p. 2
 economics, p. 2
 efficiency, p. 3
 equality, p. 3
 opportunity cost, p. 4
 rational people, p. 4

marginal change, p. 4
 incentive, p. 5
 market economy, p. 7
 property rights, p. 9
 market failure, p. 10

externality, p. 10
 market power, p. 10
 productivity, p. 11
 inflation, p. 11
 business cycle, p. 12

QUESTIONS FOR REVIEW

1. Give three examples of important trade-offs that you face in your life.
2. What items would you include to figure out the opportunity cost of a vacation to Disney World?
3. Water is necessary for life. Is the marginal benefit of a glass of water large or small?
4. Why should policymakers think about incentives?
5. Why isn't trade between two countries like a game in which one country wins and the other loses?
6. What does the "invisible hand" of the marketplace do?
7. What are the two main causes of market failure? Give an example of each.
8. Why is productivity important?
9. What is inflation and what causes it?
10. How are inflation and unemployment related in the short run?

PROBLEMS AND APPLICATIONS

1. Describe some of the trade-offs faced by each of 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
 - a recent college graduate deciding whether to go to graduate school
2. You are trying to decide whether to take a vacation. Most of the costs of the vacation (airfare, hotel, and forgone wages) are measured in dollars, but the benefits of the vacation are psychological. How can you compare the benefits to the costs?
3. 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 you had been planning to spend the day studying at the library. What is the cost of going skiing in this case? Explain.

4. You win \$100 in a basketball pool. You have a choice between spending the money now and 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?
5. 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. A 1996 bill reforming the federal government's antipoverty programs limited many welfare recipients to only 2 years of benefits.
 - a. How does this change affect the incentives for working?
 - b. How might this change represent a trade-off between equality and efficiency?
7. Explain whether each of the following government activities is motivated by a concern about equality or a concern about efficiency. In the case of efficiency, discuss the type of market failure involved.
 - a. regulating cable TV prices
 - b. providing some poor people with vouchers that can be used to buy food
 - c. prohibiting smoking in public places
- d. breaking up Standard Oil (which once owned 90 percent of all U.S. oil refineries) into several smaller companies
- e. imposing higher personal income tax rates on people with higher incomes
- f. enacting laws against driving while intoxicated
8. Discuss each of the following statements from the standpoints of equality and efficiency.
 - a. "Everyone in society should be guaranteed the best healthcare possible."
 - b. "When workers are laid off, they should be able to collect unemployment benefits until they find a new job."
9. 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?
10. Suppose Americans decide to save more of their incomes. If banks lend this extra saving to businesses that 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?
11. During the Revolutionary War, the American colonies could not raise enough tax revenue to fully fund the war effort. To make up the difference, the colonies decided to print more money. Printing money to cover expenditures is sometimes referred to as an "inflation tax." Who do you think is being "taxed" when more money is printed? Why?

QuickQuiz Answers

1. a 2. c 3. b 4. d 5. c 6. b 7. d 8. d 9. a 10. b



CHAPTER 2

Thinking Like an Economist

Every field of study has its own language and 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 with a new and useful way of thinking about the world in which you live.

The purpose of this book is to help you learn the economist's way of thinking. Just as you cannot become a mathematician, psychologist, or lawyer overnight, learning to think like an economist will take 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 discusses the field's methodology. What is distinctive about how economists confront a question? What does it mean to think like an economist?



2-1 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 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 to verify or refute their theories.

To beginners, the claim that economics is a science can seem odd. After all, economists do not work with test tubes or telescopes. The essence of science, 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 a scientific lens. Let's discuss some of the ways economists apply the logic of science to examine how an economy works.

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"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."

2-1a The Scientific Method: Observation, Theory, and More Observation

Isaac Newton, the famous 17th-century scientist and mathematician, allegedly became intrigued one day when he saw an apple fall from a 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 (but not all, as Einstein would later show). Because Newton's theory has been so successful at explaining what we observe around us, it is still taught in undergraduate physics courses around the world.

This interplay between theory and observation also occurs in economics. An economist might live in a country experiencing rapidly increasing 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. 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 unrelated to the rate of price increase, the economist would start to doubt the validity of this theory of inflation. If money growth and inflation were correlated in international data, as in fact they are, the economist would become more confident in the theory.

Although economists use theory and observation like other scientists, they face an obstacle that makes their task especially challenging: In economics, conducting experiments is often impractical. Physicists studying gravity can drop 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 gives 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 supply 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, the event provides an opportunity to study the effects of a key natural resource on the world's economies. Throughout this book, we consider

many historical episodes. Studying these episodes is valuable because they give us insight into the economy of the past and allow us to illustrate and evaluate economic theories of the present.

2-1b The Role of Assumptions

If you ask a physicist how long it would take a marble to fall from the top of a ten-story building, he will likely 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 point out that the friction on the marble is so small that its effect is negligible. Assuming the marble falls in a vacuum simplifies the problem without substantially affecting the answer.

Economists make assumptions for the same reason: Assumptions can simplify the complex world and make it easier to understand. To study the effects of international trade, for example, we might assume that the world consists of only two countries and that each country produces only two goods. In reality, there are many countries, each of which produces thousands of different types of goods. But by considering a world with only two countries and two goods, we can focus our thinking on the essence of the problem. Once we understand international trade in this simplified imaginary world, 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 instead of dropping a marble from the top of the building, we were dropping a beach ball of the same weight. Our physicist would realize that the assumption of no friction is less accurate in this case: Friction exerts a greater force on the beach ball because it is much larger than a marble. The assumption that gravity works in a vacuum is reasonable when studying a falling marble but not when 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, change only once 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 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.

2-1c 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, liver, kidneys, and so on—and allow teachers to show their students very simply how the important parts of the body fit together. Because these plastic models are stylized and omit many details, no one would mistake one of them for a real person. 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 unlike plastic manikins, their models mostly consist 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 the body's muscles and blood vessels, 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 details of the economy that are irrelevant to the question at hand. All models—in physics, biology, and economics—simplify reality to improve our understanding of it.

2-1d 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.

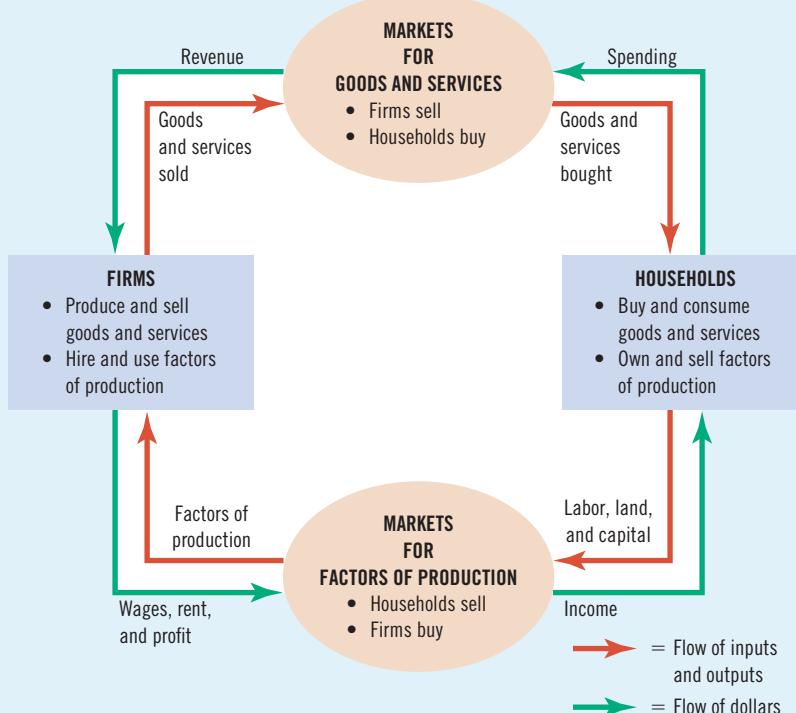
circular-flow diagram
a visual model of the economy that shows how dollars flow through markets among households and firms

Figure 1 presents a visual model of the economy called the **circular-flow diagram**. In this model, the economy is simplified to include only two types of decision makers—firms and households. 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.

FIGURE 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 inputs and outputs.



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 the inputs that firms use to produce goods and services. The circular-flow diagram offers a simple way of organizing all the transactions that occur between households and firms in an economy.

The two loops of the circular-flow diagram are distinct but related. The inner loop represents the flows of inputs and outputs. Households sell the use of their labor, land, and capital to firms in the markets for the factors of production. Firms then use these factors to produce goods and services, which in turn are sold to households in the markets for goods and services. The outer loop of the diagram represents the corresponding flow of dollars. Households spend money to buy goods and services from firms. The firms use some of the revenue from these sales for payments to the factors of production, such as workers' wages. What's left is the profit for the firm owners, who are themselves members of 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—say, in your wallet. If you want a cup of coffee, you take the dollar (along with a few of its brothers and sisters) to the market for coffee, which is one of the many markets for goods and services. When you buy your favorite drink at your local Starbucks, the dollar moves into the shop's cash register, becoming revenue for the firm. The dollar doesn't stay at Starbucks for long, however, because the firm spends it on inputs in the markets for the factors of production. 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 1 is a simple model of the economy. A more complex and realistic circular-flow model would include, for instance, the roles of government and international trade. (A portion of that dollar you gave to Starbucks might be used to pay taxes or to buy coffee beans from a farmer in Brazil.) 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.

2-1e Our Second Model: The Production Possibilities Frontier

Most economic models, unlike the circular-flow diagram, are built using the tools of mathematics. Here we use one of the simplest such models, called the production possibilities frontier, to illustrate some basic economic ideas.

Although real economies produce thousands of goods and services, let's consider 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 use to turn these factors into output.

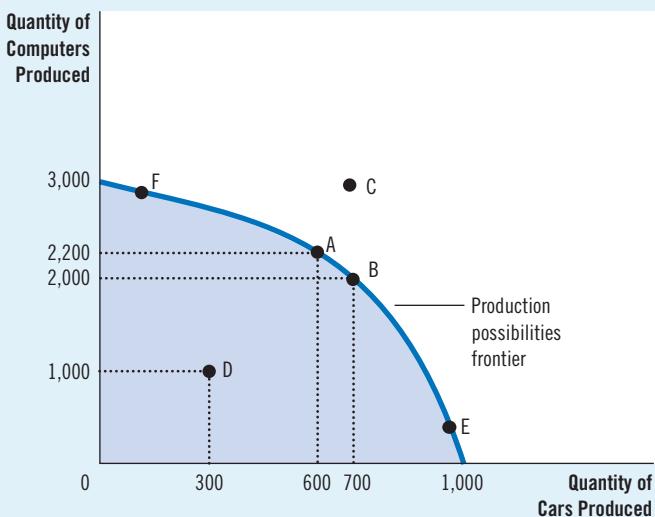
Figure 2 shows this economy's production possibilities frontier. If the economy uses all its resources in the car industry, it produces 1,000 cars and no computers. If it uses all its resources in the computer industry, it produces 3,000 computers and no cars. The two endpoints of the production possibilities frontier represent these extreme possibilities.

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**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. The slope of the production possibilities frontier measures the opportunity cost of a car in terms of computers. This opportunity cost varies, depending on how much of the two goods the economy is producing.



More likely, the economy divides its resources between the two industries, producing some cars and some computers. For example, it can produce 600 cars and 2,200 computers, shown in the figure by point A. Or, by moving some of the factors of production to the car industry from the computer industry, the economy can produce 700 cars and 2,000 computers, represented by point B.

Because resources are scarce, not every conceivable outcome is feasible. For example, no matter how resources are allocated between the two industries, the economy cannot produce the amount of cars and computers represented by point C. Given the technology available for making cars and computers, the economy does not have enough of the factors of production to support that level of output. With the resources it has, 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 D 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 is eliminated, the economy can increase its production of both goods. For example, if the economy moves from point D to point A, its production of cars increases from 300 to 600, and its production of computers increases from 1,000 to 2,200.

One of the *Ten Principles of Economics* in Chapter 1 is that people face trade-offs. The production possibilities frontier shows one trade-off that society faces. Once we have reached an efficient point on the frontier, the only way of producing more

of one good is to produce less of the other. When the economy moves from point A to point B, for instance, society produces 100 more cars at the expense of producing 200 fewer computers.

This trade-off helps us understand another of the *Ten Principles of Economics*: 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 moves from point A to point B, it gives up 200 computers to get 100 additional cars. That is, at point A, the opportunity cost of 100 cars is 200 computers. Put another way, the opportunity cost of each car is two computers. Notice that the opportunity cost of a car equals the slope of the production possibilities frontier. (Slope is discussed in the graphing appendix to this chapter.)

The opportunity cost of a car in terms of the number of computers is not constant in this economy but depends on how many cars and computers the economy is producing. This is reflected in the shape of the production possibilities frontier. Because the production possibilities frontier in Figure 2 is bowed outward, the opportunity cost of a car is highest when the economy is producing many cars and few computers, such as at point E, where the frontier is steep. When the economy is producing few cars and many computers, such as at point F, the frontier is flatter, and the opportunity cost of a car is lower.

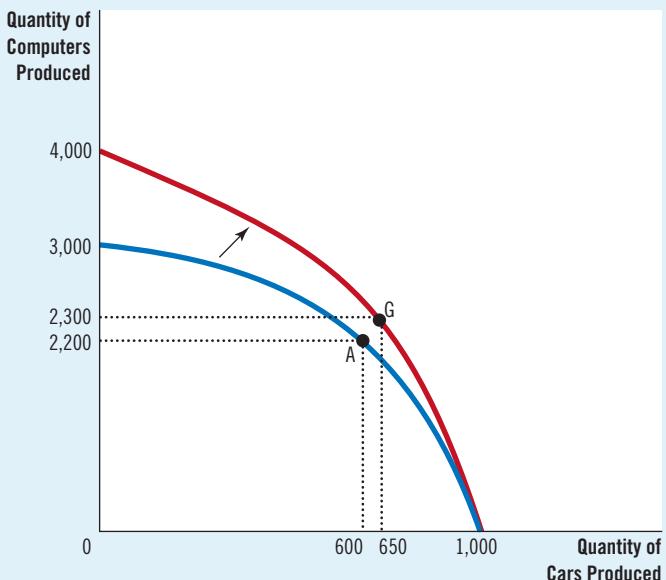
Economists believe that production possibilities frontiers often have this bowed-out shape. When the economy is using most of its resources to make computers, the resources best suited to car production, such as skilled autoworkers, are being used in the computer industry. Because these workers probably aren't very good at making computers, increasing car production by one unit will cause only a slight reduction in the number of computers produced. Thus, at point F, the opportunity cost of a car in terms of computers is small, and the frontier is relatively flat. By contrast, when the economy is using most of its resources to make cars, such as at point E, the resources best suited to making cars are already at work in the car industry. Producing an additional car now requires moving some of the best computer technicians out of the computer industry and turning them into autoworkers. As a result, producing an additional car requires a substantial loss of computer output. The opportunity cost of a car is high, and the frontier is steep.

The production possibilities frontier shows the trade-off between the outputs of different goods at a given time, but the trade-off can change over time. For example, suppose a technological advance in the computer industry raises the number of computers that a worker can produce per week. This advance expands society's set of opportunities. For any given number of cars, the economy can now make more computers. If the economy does not produce any computers, it can still produce 1,000 cars, so one endpoint of the frontier stays the same. But if the economy devotes some of its resources to the computer industry, it will produce more computers from those resources. As a result, the production possibilities frontier shifts outward, as in Figure 3.

This figure shows what happens when an economy grows. Society can move production from a point on the old frontier to a point on the new frontier. Which point it chooses depends on its preferences for the two goods. In this example, society moves from point A to point G, enjoying more computers (2,300 instead of 2,200) and more cars (650 instead of 600).

FIGURE 3**A Shift in the Production Possibilities Frontier**

A technological advance in the computer industry enables the economy to produce more computers for any given number of cars. As a result, the production possibilities frontier shifts outward. If the economy moves from point A to point G, then the production of both cars and computers increases.



The production possibilities frontier simplifies a complex economy to highlight some basic but powerful ideas: scarcity, efficiency, trade-offs, 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.

2-1f 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 gradually change over the centuries.

Economics is also studied on various levels. We can study the decisions of individual households and firms. 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 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 education on workers' earnings. A macroeconomist might study the effects of borrowing by the federal government, the changes over time in the economy's unemployment rate, or alternative policies to promote growth in national living standards.

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

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 underlying microeconomic decisions. For example, a macroeconomist might study the effect of a federal income tax cut on the overall production of goods and services. But to analyze this issue, he must consider how the tax cut affects households' decisions about how much to spend on goods and services.

Despite the inherent link between microeconomics and macroeconomics, the two fields are distinct. Because they address different questions, each field has its own set of models, which are often taught in separate courses.

QuickQuiz

1. An economic model is
 - a. a mechanical machine that replicates the functioning of the economy.
 - b. a fully detailed, realistic description of the economy.
 - c. a simplified representation of some aspect of the economy.
 - d. a computer program that predicts the future of the economy.
2. The circular-flow diagram illustrates that, in markets for the factors of production,
 - a. households are sellers, and firms are buyers.
 - b. households are buyers, and firms are sellers.
 - c. households and firms are both buyers.
 - d. households and firms are both sellers.
3. A point inside the production possibilities frontier is
 - a. efficient but not feasible.
 - b. feasible but not efficient.
 - c. both efficient and feasible.
 - d. neither efficient nor feasible.
4. All of the following topics fall within the study of microeconomics EXCEPT
 - a. the impact of cigarette taxes on the smoking behavior of teenagers.
 - b. the role of Microsoft's market power in the pricing of software.
 - c. the effectiveness of antipoverty programs in reducing homelessness.
 - d. the influence of the government budget deficit on economic growth.

Answers at end of chapter.

2-2 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 well-being of teenagers? When economists are trying to explain the world, they are scientists. When they are helping improve it, they are policy advisers.

2-2a Positive versus Normative Analysis

To clarify the two roles that economists play, let's examine 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:

PRISHA: Minimum-wage laws cause unemployment.

NOAH: The government should raise the minimum wage.


**IN THE
NEWS**

Why Tech Companies Hire Economists

Many high-tech companies find expertise in economics a useful input into their decision making.

Goodbye, Ivory Tower. Hello, Silicon Valley Candy Store

By Steve Lohr

For eight years, Jack Coles had an economist's dream job at Harvard Business School.

His research focused on the design of efficient markets, an important and growing field that has influenced such things as Treasury bill auctions and decisions on who receives organ transplants. He even got to work with Alvin E. Roth, who won a Nobel in economic science in 2012.

But prestige was not enough to keep Mr. Coles at Harvard. In 2013, he moved to the San Francisco Bay Area. He now works at Airbnb, the online lodging marketplace, one of a number of tech companies luring economists with the promise of big sets of data and big salaries.

Silicon Valley is turning to the dismal science in its never-ending quest to squeeze more money out of old markets and build new ones. In turn, the economists say they are eager to explore the digital world for fresh insights into timeless economic questions of pricing, incentives and behavior.

"It's an absolute candy store for economists," Mr. Coles said. . . .

Businesses have been hiring economists for years. Usually, they are asked to study macroeconomic trends—topics like recessions and currency exchange rates—and help their employers deal with them.

But what the tech economists are doing is different: Instead of thinking about national or global trends, they are studying the data trails of consumer behavior to help digital companies make smart decisions that strengthen their online marketplaces in areas like advertising, movies, music, travel and lodging.

Tech outfits including giants like Amazon, Facebook, Google and Microsoft and up-and-comers like Airbnb and Uber hope that sort of improved efficiency means more profit.

At Netflix, Randall Lewis, an economic research scientist, is finely measuring the effectiveness of advertising. His work also gets at the correlation-or-causation conundrum in economic behavior: What consumer actions occur coincidentally after people see ads, and what actions are most likely caused by the ads?

At Airbnb, Mr. Coles is researching the company's marketplace of hosts and guests

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

In general, statements about the world come in two types. One type, such as Prisha's, is positive. **Positive statements** are descriptive. They make a claim about how the world *is*. A second type of statement, such as Noah'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 Prisha'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. Noah's statement cannot be judged using data alone. Deciding what is good or bad policy is not just a matter of science. It also involves our views on ethics, religion, and political philosophy.

Positive and normative statements are fundamentally different, but within a person's set of beliefs, they are often intertwined. In particular, positive views about how the world works affect normative views about what policies are desirable.

positive statements

claims that attempt to describe the world as it is

normative statements

claims that attempt to prescribe how the world should be

for insights, both to help build the business and to understand behavior. One study focuses on procrastination—a subject of great interest to behavioral economists—by looking at bookings. Are they last-minute? Made weeks or months in advance? Do booking habits change by age, gender or country of origin?

"They are microeconomic experts, heavy on data and computing tools like machine learning and writing algorithms," said Tom Beers, executive director of the National Association for Business Economics.

Understanding how digital markets work is getting a lot of attention now, said Hal Varian, Google's chief economist. But, he said, "I thought it was fascinating years ago."

Mr. Varian, 69, is the godfather of the tech industry's in-house economists. Once a well-known professor at the University of California, Berkeley, Mr. Varian showed up at Google in 2002, part time at first, but soon became an employee. He helped refine Google's AdWords

marketplace, where advertisers bid to have their ads shown on search pages....

For the moment, Amazon seems to be the most aggressive recruiter of economists. It even has an Amazon Economists website for soliciting résumés. In a video on the site, Patrick Bajari, the company's chief economist, says the economics team has contributed to decisions that have had "multibillion-dollar impacts" for the company....

A current market-design challenge for Amazon and Microsoft is their big cloud computing services. These digital services, for example, face a peak-load problem, much as electric utilities do.

How do you sell service at times when there is a risk some customers may be bumped off? Run an auction for what customers are willing to pay for interruptible service? Or offer set discounts for different levels of risk? Both Amazon and Microsoft are working on that now.

To answer such questions, economists work in teams with computer scientists and people in business. In tech companies, market design involves not only economics but also engineering and marketing. How hard is a certain approach technically? How easy is it to explain to customers?

"Economics influences rather than determines decisions," said Preston McAfee, Microsoft's chief economist, who previously worked at Google and Yahoo. ■

Questions to Discuss

1. Think of some firms that you often interact with. How might the input of economists improve their businesses?
2. After studying economics in college, what kind of businesses would be most fun to work for?

Source: *New York Times*, September 4, 2016.

Prisha's claim that the minimum wage causes unemployment, if true, might lead her to reject Noah's conclusion that the government should raise the minimum wage. Yet normative conclusions cannot come from positive analysis alone; they involve value judgments as well.

As you study economics, keep in mind the distinction between positive and normative statements because it will help you stay focused on the task at hand. Much of economics is positive: It just tries to explain how the economy works. Yet those who use economics often have normative goals: They want to learn how to improve the economy. When you hear economists making normative statements, you know they are speaking not as scientists but as policy advisers.

2-2b 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 that economists' advice is not always straightforward. This tendency is rooted in one of the *Ten Principles of Economics*: People face trade-offs. Economists are aware that trade-offs are involved in most policy decisions. A policy might increase efficiency at the cost of equality. It might help future generations but hurt the current generation. An economist who says that all policy decisions are easy is an economist not to be trusted.



*"Let's switch.
I'll make the policy, you
implement it, and he'll
explain it."*

Truman was not the only president who relied on economists' advice. 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 a few 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*, which discusses recent developments in the economy and presents the council's analysis of current policy issues.

The president also receives input from economists in many administrative departments. Economists at the Office of Management and Budget help formulate spending plans and regulatory policies. Economists at the Department of the Treasury help design tax policy. Economists at the Department of Labor analyze data on workers and those looking for work 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 executive 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 institution that sets the nation's monetary policy, employs hundreds of economists to analyze developments in the United States and throughout the world.

The influence of economists on policy goes beyond their role as advisers: Their research and writings can 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.

These words were written in 1935, but they remain true today. Indeed, the "academic scribbler" now influencing public policy is often Keynes himself.

2-2c Why Economists' Advice Is Not Always Followed

Economists who advise presidents and other elected leaders know that their recommendations are not always heeded. Frustrating as this can be, it is easy to understand. The process by which economic policy is actually made differs in many ways from the idealized policy process assumed in economics textbooks.

Throughout this text, whenever we discuss policy, we often focus on one question: What is the best policy for the government to pursue? We act as if policy were set by a benevolent king. Once the king figures out the right policy, he has no trouble putting his ideas into action.

In the real world, figuring out the right policy is only part of a leader's job, sometimes the easiest part. After a president hears from his economic advisers what policy they deem best, he turns to other advisers for related input. His communications advisers will tell him how best to explain the proposed policy to the public, and they will try to anticipate any misunderstandings that might make the challenge more difficult. His press advisers will tell him how the news media will report on his proposal and what opinions will likely be expressed on the nation's editorial pages. His legislative affairs advisers will tell him how Congress will

view the proposal, what amendments members of Congress will suggest, and the likelihood that Congress will pass some version of the president's proposal into law. His political advisers will tell him which groups will organize to support or oppose the proposed policy, how this proposal will affect his standing among different groups in the electorate, and whether it will change support for any of the president's other policy initiatives. After weighing all this advice, the president then decides how to proceed.

Making economic policy in a representative democracy is a messy affair, and there are often good reasons why presidents (and other politicians) do not advance the policies that economists advocate. Economists offer crucial input to the policy process, but their advice is only one ingredient of a complex recipe.

QuickQuiz

5. Which of the following is a positive, rather than a normative, statement?
 - a. Law X will reduce national income.
 - b. Law X is a good piece of legislation.
 - c. Congress ought to pass law X.
 - d. The president should veto law X.
6. The following parts of government regularly rely on the advice of economists:
 - a. Department of Treasury.
 - b. Office of Management and Budget.
 - c. Department of Justice.
 - d. All of the above.

Answers at end of chapter.

2-3 Why Economists Disagree

"If all the 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 of how the world works.
- Economists may have different values and therefore different normative views about what government policy should aim to accomplish.

Let's discuss each of these reasons.

2-3a 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, climatologists have debated whether the earth is experiencing global warming and, if so, why. Science is an ongoing search to understand the world around us. It is not surprising that as the search continues, scientists sometimes disagree about the direction in which truth lies.

Economists often disagree for the same reason. Although the field of economics sheds light on much about the world (as you will see throughout this book),

there is still much to be learned. Sometimes economists disagree because they have different hunches about the validity of alternative theories. Sometimes they disagree because of different judgments about the size of the parameters that measure how economic variables are related.

For example, economists debate whether the government should tax 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 free resources for capital accumulation, leading to more rapid growth in productivity and living standards. Advocates of the current income tax system 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 saving's responsiveness to tax incentives.

2-3b Differences in Values

Suppose that Jack and Jill both take the same amount of water from the town well. To pay for maintaining the well, the town taxes its residents. Jill has income of \$150,000 and is taxed \$15,000, or 10 percent of her income. Jack has income of \$40,000 and is taxed \$6,000, or 15 percent of his income.

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

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

This simple example shows why economists sometimes disagree about public policy. As we know from our discussion of normative and positive analysis, policies cannot be judged on scientific grounds alone. Sometimes, economists give conflicting advice because they have different values or political philosophies. Perfecting the science of economics will not tell us whether Jack or Jill pays too much.

2-3c 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. Economists agree with one another more often than is sometimes understood.

Table 1 contains twenty propositions about economic policy. In surveys of professional economists, these propositions were endorsed by an overwhelming majority of respondents. Most of these propositions would fail to command a similar consensus among the public.

The first proposition in the table is about rent control, a policy that sets a legal maximum on the amount landlords can charge for their apartments. Almost all economists believe that rent control adversely affects the availability and quality of housing and is a costly way of helping the neediest members of society. Nonetheless, many city governments ignore the advice of economists and place ceilings on the rents that landlords may charge their tenants.

The second proposition in the table concerns policies that restrict trade among nations: tariffs (taxes on imports) and import quotas (limits on how much of a good can be purchased from abroad). For reasons we discuss more fully in later chapters,

TABLE 1

**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. The United States should not restrict employers from outsourcing work to foreign countries. (90%)
 6. Economic growth in developed countries like the United States leads to greater levels of well-being. (88%)
 7. The United States should eliminate agricultural subsidies. (85%)
 8. An appropriately designed fiscal policy can increase the long-run rate of capital formation. (85%)
 9. Local and state governments should eliminate subsidies to professional sports franchises. (85%)
 10. If the federal budget is to be balanced, it should be done over the business cycle rather than yearly. (85%)
 11. The gap between Social Security funds and expenditures will become unsustainably large within the next 50 years if current policies remain unchanged. (85%)
 12. Cash payments increase the welfare of recipients to a greater degree than do transfers-in-kind of equal cash value. (84%)
 13. A large federal budget deficit has an adverse effect on the economy. (83%)
 14. The redistribution of income in the United States is a legitimate role for the government. (83%)
 15. Inflation is caused primarily by too much growth in the money supply. (83%)
 16. The United States should not ban genetically modified crops. (82%)
 17. A minimum wage increases unemployment among young and unskilled workers. (79%)
 18. The government should restructure the welfare system along the lines of a “negative income tax.” (79%)
 19. Effluent taxes and marketable pollution permits represent a better approach to pollution control than the imposition of pollution ceilings. (78%)
 20. Government subsidies on ethanol in the United States should be reduced or eliminated. (78%)

Source: Richard M. Alston, J. R. Kearn, and Michael B. Vaughn, “Is There Consensus among Economists in the 1990s?” *American Economic Review* (May 1992): 203–209; Dan Fuller and Doris Geide-Stevenson, “Consensus among Economists Revisited,” *Journal of Economics Education* (Fall 2003): 369–387; Robert Whaples, “Do Economists Agree on Anything? Yes!” *Economists’ Voice* (November 2006): 1–6; Robert Whaples, “The Policy Views of American Economic Association Members: The Results of a New Survey,” *Econ Journal Watch* (September 2009): 337–348.

almost all economists oppose such barriers to free trade. Nonetheless, over the years, presidents and Congress have often chosen to restrict the import of certain goods. The policies of the Trump administration are a vivid example.

Why do policies such as rent control and trade barriers persist if the experts are united in their opposition? It may be that the realities of the political process stand



Ticket Resale

“Laws that limit the resale of tickets for entertainment and sports events make potential audience members for those events worse off on average.”

What do economists say?



Response	Percentage
Agree	80%
Uncertain	12%
Disagree	8%

Source: IGM Economic Experts Panel, April 16, 2012.

as immovable obstacles. But it also may be that economists have not yet convinced enough of the public that these policies are undesirable. One purpose of this book is to help you understand the economist’s view on these and other subjects and, perhaps, to persuade you that it is the right one.

As you read the book, you will occasionally see small boxes called “Ask the Experts.” These are based on the IGM Economics Experts Panel, an ongoing survey of several dozen prominent economists. Every few weeks, these experts are offered a proposition and then asked whether they agree with it, disagree with it, or are uncertain. The results in these boxes will give you a sense of when economists are united, when they are divided, and when they just don’t know what to think.

You can see an example here regarding the resale of tickets to entertainment and sporting events. Lawmakers sometimes try to prohibit reselling tickets, or “scalping” as it is sometimes called. The survey results show that many economists side with the scalpers rather than the lawmakers.

QuickQuiz

7. Economists may disagree because they have
 - a. hunches about the validity of alternative theories.
 - b. judgments about the size of key parameters.
 - c. political philosophies about the goals of public policy.
 - d. All of the above.
8. Most economists believe that tariffs are
 - a. a good way to promote domestic economic growth.
 - b. a poor way to raise general economic well-being.
 - c. an often necessary response to foreign competition.
 - d. an efficient way for the government to raise revenue.

Answers at end of chapter.

2-4 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 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

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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.

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

CHAPTER IN A NUTSHELL

- Economists try to address their subject with a scientist's objectivity. Like all scientists, they make appropriate assumptions and build simplified models to understand the world around them. Two simple economic models are the circular-flow diagram and the production possibilities frontier. The circular-flow diagram shows how households and firms interact in markets for goods and services and in markets for the factors of production. The production possibilities frontier shows how society faces a trade-off between producing different goods.
- The field of economics is divided into two sub-fields: microeconomics and macroeconomics. Microeconomists study decision making by households and firms and the interactions 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*. While positive statements can be judged based on facts and the scientific method, normative statements entail value judgments as well. When economists make normative statements, they are acting more as policy advisers than as scientists.
- Economists who advise policymakers sometimes 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 the advice because of the many forces and constraints imposed on them by the political process.

KEY CONCEPTS

circular-flow diagram, *p.* 20

production possibilities frontier, *p.* 21

microeconomics, *p.* 24

macroeconomics, *p.* 24

positive statements, *p.* 26

normative statements, *p.* 26

QUESTIONS FOR REVIEW

1. In what ways is economics a science?
2. Why do economists make assumptions?
3. Should an economic model describe reality exactly?
4. Name a way that your family interacts in the markets for the factors of production and a way that it interacts in the markets for goods and services.
5. Name one economic interaction that isn't covered by the simplified circular-flow diagram.
6. Draw and explain a production possibilities frontier for an economy that produces milk and cookies.

What happens to this frontier if a disease kills half of the economy's cows?

7. Use a production possibilities frontier to describe the idea of *efficiency*.
8. What are the two subfields of economics? Explain what each subfield studies.
9. What is the difference between a positive and a normative statement? Give an example of each.
10. Why do economists sometimes offer conflicting advice to policymakers?

PROBLEMS AND APPLICATIONS

1. 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. Selena pays a storekeeper \$1 for a quart of milk.
 - b. Stuart earns \$8 per hour working at a fast-food restaurant.
 - c. Shanna spends \$40 to get a haircut.
 - d. Salma earns \$20,000 from her 10 percent ownership of Acme Industrial.
 2. 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. Using the concept of opportunity cost, explain why it most likely has a bowed-out shape.
 - b. Show a point on the graph that is impossible for the economy to achieve. Show a point on the graph 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 that 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.
 3. The first principle of economics in Chapter 1 is that people face trade-offs. Use a production possibilities frontier to illustrate society's trade-off between two "goods"—a clean environment and the quantity of industrial output. What do you suppose determines the shape and position of the frontier? Show what happens to the frontier if engineers develop a new way of producing electricity that emits fewer pollutants.
 4. An economy consists of three workers: Larry, Moe, and Curly. Each works 10 hours a day and can produce two services: mowing lawns and washing
- cars. In an hour, Larry can either mow one lawn or wash one car; Moe can either mow one lawn or wash two cars; and Curly can either mow two lawns or wash one car.
- a. Calculate how much of each service is produced in the following scenarios, which we label A, B, C, and D:
 - All three spend all their time mowing lawns. (A)
 - All three spend all their time washing cars. (B)
 - All three spend half their time on each activity. (C)
 - Larry spends half his time on each activity, while Moe only washes cars and Curly only mows lawns. (D)
 - b. Graph the production possibilities frontier for this economy. Using your answers to part a, identify points A, B, C, and D on your graph.
 - c. Explain why the production possibilities frontier has the shape it does.
 - d. Are any of the allocations calculated in part a inefficient? Explain.
5. Classify each of 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
 6. Classify each of the following statements as positive or normative. Explain.
 - a. Society faces a short-run trade-off between inflation and unemployment.
 - b. A reduction in the growth rate of the money supply will reduce the rate of inflation.
 - c. The Federal Reserve should reduce the growth rate of the money supply.
 - d. Society ought to require welfare recipients to look for jobs.
 - e. Lower tax rates encourage more work and more saving.

QuickQuiz Answers

1. c 2. a 3. b 4. d 5. a 6. d 7. d 8. b



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 theories, graphs offer a visual way to express ideas that might be less clear if described with equations or words. Second, when analyzing data, graphs provide a powerful way of finding and interpreting patterns. 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 there are many ways to express a thought in words. 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 when using graphical methods.

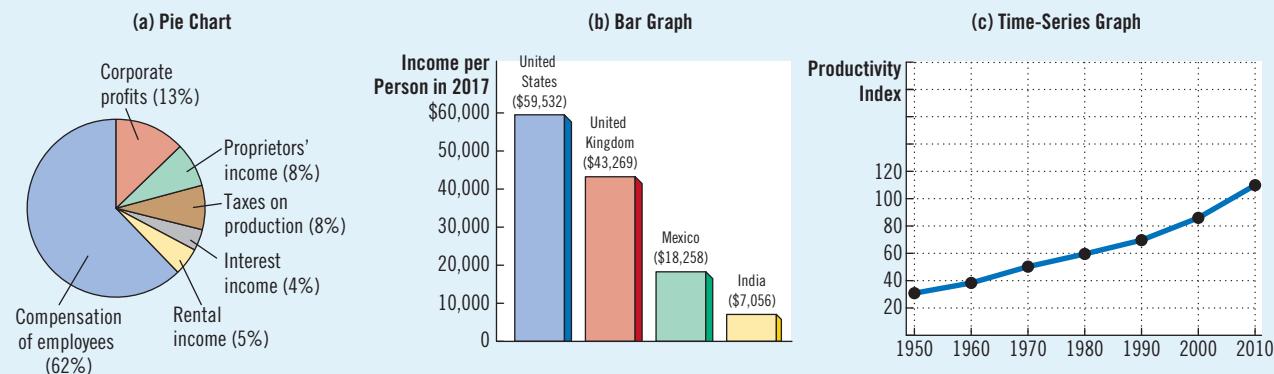
Graphs of a Single Variable

Three common graphs are shown in Figure A-1. The *pie chart* in panel (a) shows how total income in the United States is divided among the sources of income,

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 productivity of labor in U.S. businesses over time.

FIGURE A-1

Types of Graphs



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 income in 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 in newspapers and magazines.

Graphs of Two Variables: The Coordinate System

The three graphs in Figure A-1 are useful in showing how a variable changes over time or across individuals, but they are limited in how much they can tell us. These graphs display information only about a single variable. Economists are often concerned with the relationships between variables. Thus, they need 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).

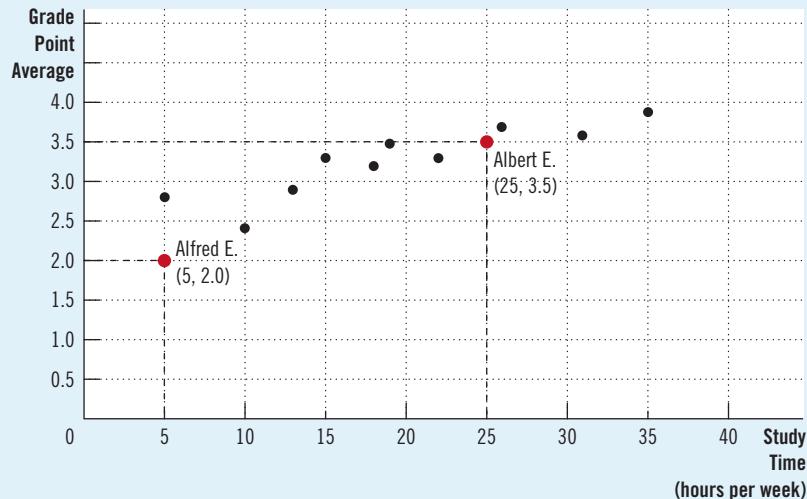
We can graph these ordered pairs on a two-dimensional grid. The first number in each ordered pair, called the *x-coordinate*, tells us the horizontal location of the point. The second number, called the *y-coordinate*, tells us the vertical location of the point. The point with both an *x*-coordinate 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 A-2 graphs grade point average against study time for Albert E., Alfred E., and their classmates. This type of graph is called a *scatter plot* 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

FIGURE A-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.



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 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 say that they have a *negative correlation*. In either case, the coordinate system makes the correlation between 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 grades. Previous preparation is an important factor, for instance, as are talent, attention from teachers, even eating a good breakfast. A scatter plot like Figure A-2 does not attempt to isolate the effect that studying 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 A-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 instead borrows books from the library or chooses to go to the movies rather than read. 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 put the information from Table A-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 \$40,000 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

Price	For \$30,000 Income:	For \$40,000 Income:	For \$50,000 Income:
\$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 A-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 shown in Figures A-3 and A-4.

can graphically represent the middle column of Table A-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 A-3, is known as Emma's demand curve for novels; it tells us how many novels Emma purchases at any given price, holding income constant. 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 that the variables are *positively related*.)

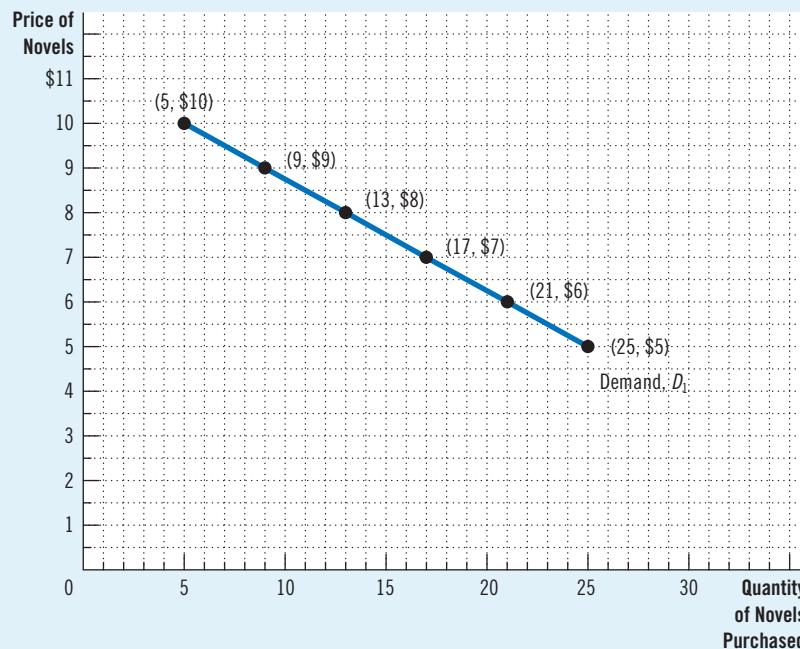
Now suppose that Emma's income rises to \$50,000 per year. At any given price, Emma will purchase more novels than she did at her previous level of income. Just as we earlier drew Emma's demand curve for novels using the entries from the middle column of Table A-1, we now draw a new demand curve using the entries from the right column of the table. This new demand curve (curve D_2) is pictured alongside the old one (curve D_1) in Figure A-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 \$30,000 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 A-3, if Emma earns \$40,000 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 A-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.



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 \$50,000, 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 A-4.

There is a simple way to tell when it is necessary to shift a curve: *When a relevant 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. The same is true for any change that affects Emma's purchasing habits, with the sole exception of a change in the price of novels. 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 changes in price. Look at the demand curve pictured in Figure A-5. If this curve is very steep, Emma purchases nearly the same number of novels regardless of whether they are cheap or expensive. If this curve is much flatter, the number of novels Emma purchases is more sensitive to changes in the price. To answer questions about how much one variable responds to changes in another variable, we can use the concept of *slope*.

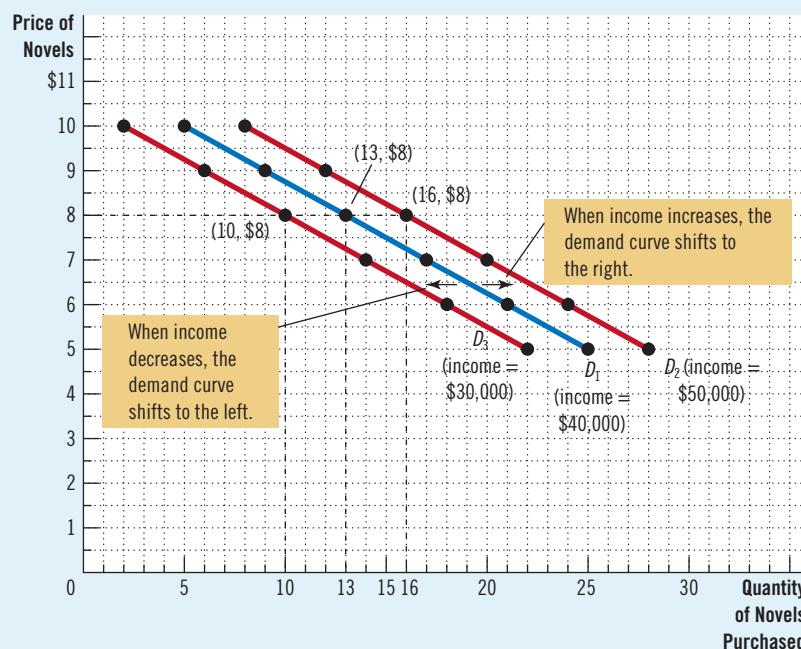


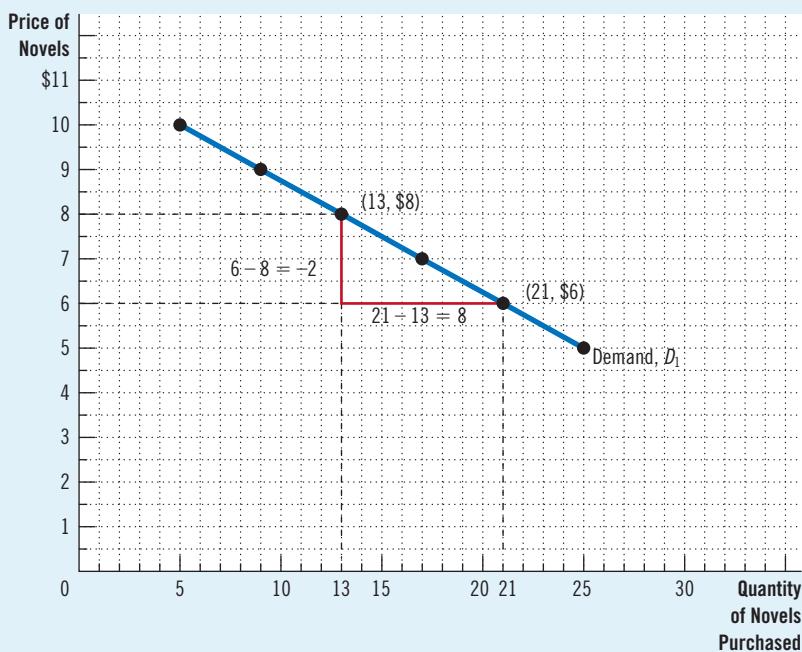
FIGURE A-4

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 \$40,000 per year. If her income rises to \$50,000 per year, her demand curve shifts to D_2 . If her income falls to \$30,000 per year, her demand curve shifts to D_3 .

FIGURE A-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 $-\frac{1}{4}$.



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 Δ (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).

For an upward-sloping line, the slope is a positive number because the changes in x and y move in the same direction: if x increases so does y , and if x decreases so does y . For a fairly flat upward-sloping line, the slope is a small positive number. For a steep upward-sloping line, the line is a large positive number.

For a downward-sloping line, the slope is a negative number because the changes in x and y move in opposite directions: if x increases, y decreases, and if x decreases, y increases. For a fairly flat downward-sloping line, the slope is a small negative number. For a steep downward-sloping line, the slope is a large negative number.

A horizontal line has a slope of zero because in this case the y -variable never changes. A vertical line is said 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 \$40,000, 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:

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

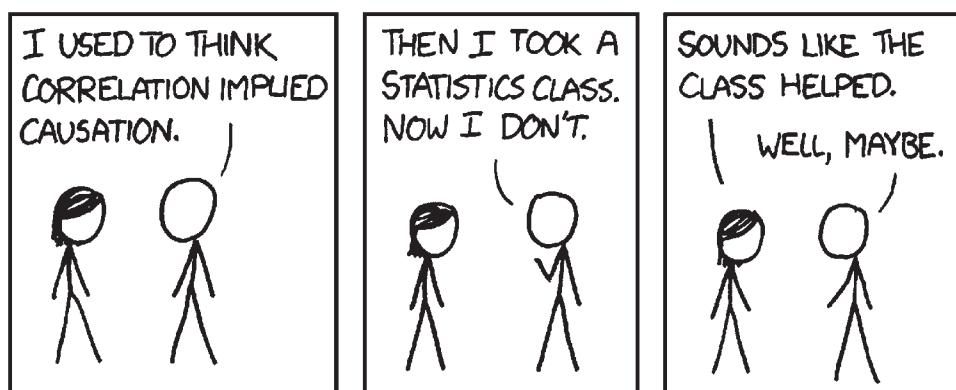
Figure A-5 shows graphically how this calculation works. Try computing the slope of Emma's demand curve using two different points. You should get the same result, $-\frac{1}{4}$. One of the properties of a straight line is that it has the same slope everywhere. This is not true of other types of curves, 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 negative 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 negative 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 studying the relationship between two variables. If we are not able to hold other variables constant, we might decide that one variable on our graph is causing changes in the other variable when those changes are actually being 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 A-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 key: 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 A-6 is that people who own more cigarette lighters are more likely to smoke cigarettes and that cigarettes, not lighters, cause cancer. If Figure A-6 does not 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 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.

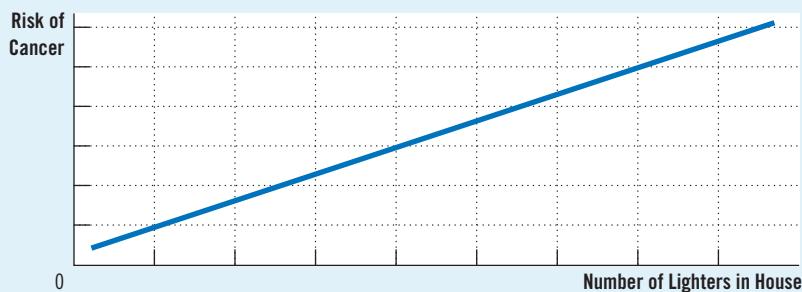
Reverse Causality Economists can also make mistakes about causality by misreading its direction. To see how this is possible, suppose the Association of American Anarchists commissions a study of crime in America and arrives at Figure A-7, which plots the number of violent crimes per thousand people 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.

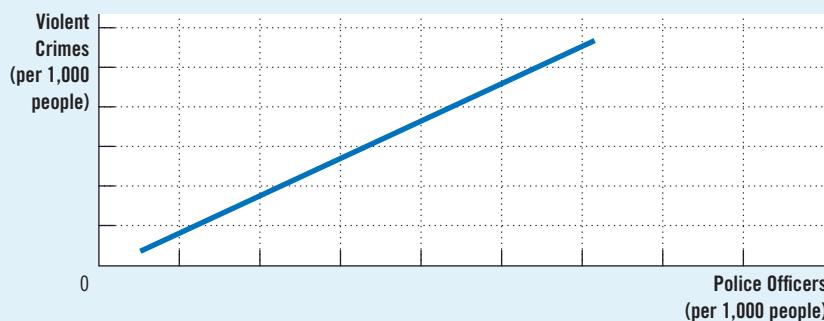
Figure A-7, however, does not prove the Anarchists' point. The graph simply shows that more dangerous cities have more police officers. The explanation may be that more dangerous cities hire more police. In other words, rather than police causing crime, crime may cause police. We could avoid the danger of reverse

FIGURE A-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.



**FIGURE A-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.

causality by running a controlled experiment. In this case, we would randomly assign different numbers of police to different cities and then examine the correlation between police and crime. Without such an experiment, establishing the direction of causality is difficult at best.

It might seem that we could determine the direction of causality by examining 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 conclusion. This approach, however, is also flawed: Often, people change their behavior not in response to a change in their present conditions but in response to a change in their *expectations* about future conditions. A city that expects a major crime wave in the future, for instance, might 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 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 that minivans don't cause larger families (reverse causality) will keep you from falling for many faulty economic arguments.



CHAPTER 3

Interdependence and the Gains from Trade

Consider your typical day. You wake up in the morning and pour yourself juice from oranges grown in Florida and coffee from beans grown in Brazil. Over breakfast, you read a newspaper written in New York on a tablet made in China. You get dressed in clothes made of cotton grown in Georgia and sewn in factories in Thailand. You drive to class in a car made of parts manufactured in more than a dozen countries around the world. Then you open up your economics textbook written by an author living in Massachusetts, published by a company located in Ohio, and printed on paper made from trees grown in Oregon.

Every day, you rely on many people, most of whom you have never met, to provide you with the goods and services that you enjoy. Such interdependence is possible because people trade with one another. Those people providing you with goods and services are not acting out of generosity. Nor is some government



agency directing them to satisfy your desires. Instead, people provide you and other consumers with the goods and services they produce because they get something in return.

In subsequent chapters, we examine how an economy coordinates the activities of millions of people with varying tastes and abilities. As a starting point for this analysis, this chapter considers the reasons for economic interdependence. One of the *Ten Principles of Economics* in Chapter 1 is that trade can make everyone better off. We now examine this principle more closely. What exactly do people gain when they trade with one another? Why do people choose to become interdependent?

The answers to these questions are key to understanding the modern global economy. Most countries today import from abroad many of the goods and services they consume, and they export to foreign customers many of the goods and services they produce. The analysis in this chapter explains interdependence not only among individuals but also among nations. As we will see, the gains from trade are much the same whether you are buying a haircut from your local barber or a T-shirt made by a worker on the other side of the globe.

3-1 A Parable for the Modern Economy

To understand why people choose to depend on others for goods and services and how this choice improves their lives, let's examine a simple economy. Imagine that there are only two goods in the world: meat and potatoes. And there are only two people: a cattle rancher named Ruby and a potato farmer named Frank. Both Ruby and Frank would like to eat a diet of both meat and potatoes.

The gains from trade are clearest if Ruby can produce only meat and Frank can produce only potatoes. In one scenario, Frank and Ruby could choose to have nothing to do with each other. But after several months of eating beef roasted, broiled, seared, and grilled, Ruby might decide that self-sufficiency is not all it's cracked up to be. Frank, who has been eating potatoes mashed, fried, baked, and scalloped, would likely agree. It is easy to see that trade would allow both of them to enjoy greater variety: Each could then have a steak with a baked potato or a burger with fries.

Although this scene shows most simply how everyone can benefit from trade, the gains would be similar if Frank and Ruby were each capable of producing the other good, but only at great cost. Suppose, for example, that Ruby can grow potatoes but her land is not very well suited for it. Similarly, suppose that Frank can raise cattle and produce meat but is not very good at it. In this case, Frank and Ruby each benefit by specializing in what he or she does best and then trading with the other person.

The gains from trade are less obvious, however, when one person is better at producing *every* good. For example, suppose that Ruby is better at raising cattle *and* better at growing potatoes than Frank. In this case, should Ruby remain self-sufficient? Or is there still reason for her to trade with Frank? To answer this question, let's look more closely at the factors that affect such a decision.

3-1a Production Possibilities

Suppose that Frank and Ruby each work 8 hours per day and can devote this time to growing potatoes, raising cattle, or a combination of the two. The table in Figure 1 shows the amount of time each person requires to produce 1 ounce of each

good. Frank can produce an ounce of potatoes in 15 minutes and an ounce of meat in 60 minutes. Ruby, who is more productive in both activities, can produce an ounce of potatoes in 10 minutes and an ounce of meat in 20 minutes. The last two columns in the table show the amounts of meat or potatoes Frank and Ruby can produce if they devote all 8 hours to producing only that good.

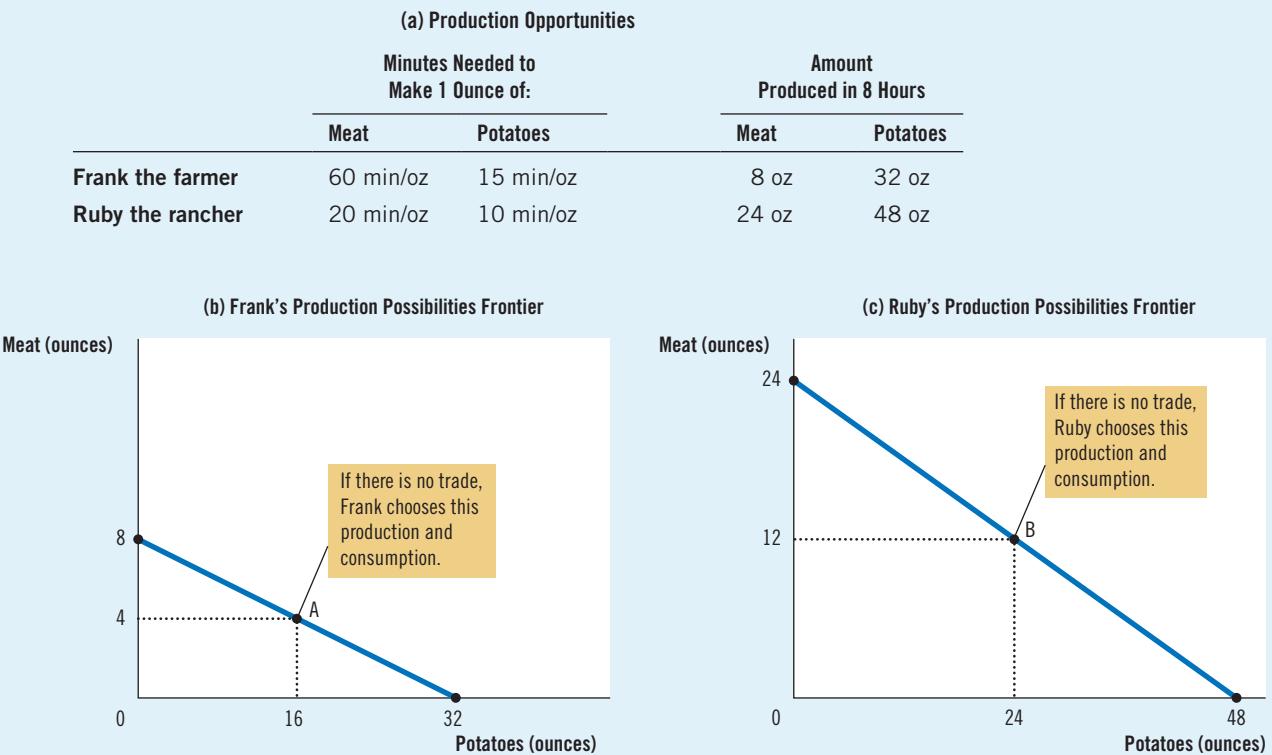
Panel (b) of Figure 1 illustrates the amounts of meat and potatoes that Frank can produce. If he spends all 8 hours of his time growing potatoes, Frank produces 32 ounces of potatoes (measured on the horizontal axis) and no meat. If he spends all of his time raising cattle, he produces 8 ounces of meat (measured on the vertical axis) and no potatoes. If Frank divides his time equally between the two activities, spending 4 hours on each, he produces 16 ounces of potatoes and 4 ounces of meat. The figure shows these three possible outcomes and all others in between.

This graph is Frank's production possibilities frontier. As we discussed in Chapter 2, a production possibilities frontier shows the various mixes of output that an economy can produce. It illustrates one of the *Ten Principles of Economics* in

Panel (a) shows the production opportunities available to Frank the farmer and Ruby the rancher. Panel (b) shows the combinations of meat and potatoes that Frank can produce. Panel (c) shows the combinations of meat and potatoes that Ruby can produce. Both production possibilities frontiers are derived assuming that Frank and Ruby each work 8 hours per day. If there is no trade, each person's production possibilities frontier is also his or her consumption possibilities frontier.

FIGURE 1

The Production Possibilities Frontier



Chapter 1: People face trade-offs. Here Frank faces a trade-off between producing meat and producing potatoes.

You may recall that the production possibilities frontier in Chapter 2 was drawn bowed out. In that case, the rate at which society could trade one good for the other depended on the amounts that were being produced. Here, however, Frank's technology for producing meat and potatoes (as summarized in Figure 1) allows him to switch between the two goods at a constant rate. Whenever Frank spends 1 hour less producing meat and 1 hour more producing potatoes, he reduces his output of meat by 1 ounce and raises his output of potatoes by 4 ounces—and this is true regardless of how much he is already producing. As a result, the production possibilities frontier is a straight line.

Panel (c) of Figure 1 shows Ruby's production possibilities frontier. If she spends all 8 hours of her time growing potatoes, Ruby produces 48 ounces of potatoes and no meat. If she spends all of her time raising cattle, she produces 24 ounces of meat and no potatoes. If Ruby divides her time equally, spending 4 hours on each activity, she produces 24 ounces of potatoes and 12 ounces of meat. Once again, the production possibilities frontier shows all the possible outcomes.

If Frank and Ruby choose to be self-sufficient rather than trade with each other, then each consumes exactly what he or she produces. In this case, the production possibilities frontier is also the consumption possibilities frontier. That is, without trade, Figure 1 shows the possible combinations of meat and potatoes that Frank and Ruby can each produce and then consume.

These production possibilities frontiers are useful in showing the trade-offs that Frank and Ruby face, but they do not tell us what each will choose to do. To determine their choices, we need to know something about their tastes. Let's suppose that Frank and Ruby choose the combinations identified by points A and B in Figure 1. Based on his production opportunities and food preferences, Frank decides to produce and consume 16 ounces of potatoes and 4 ounces of meat, while Ruby decides to produce and consume 24 ounces of potatoes and 12 ounces of meat.

3-1b Specialization and Trade

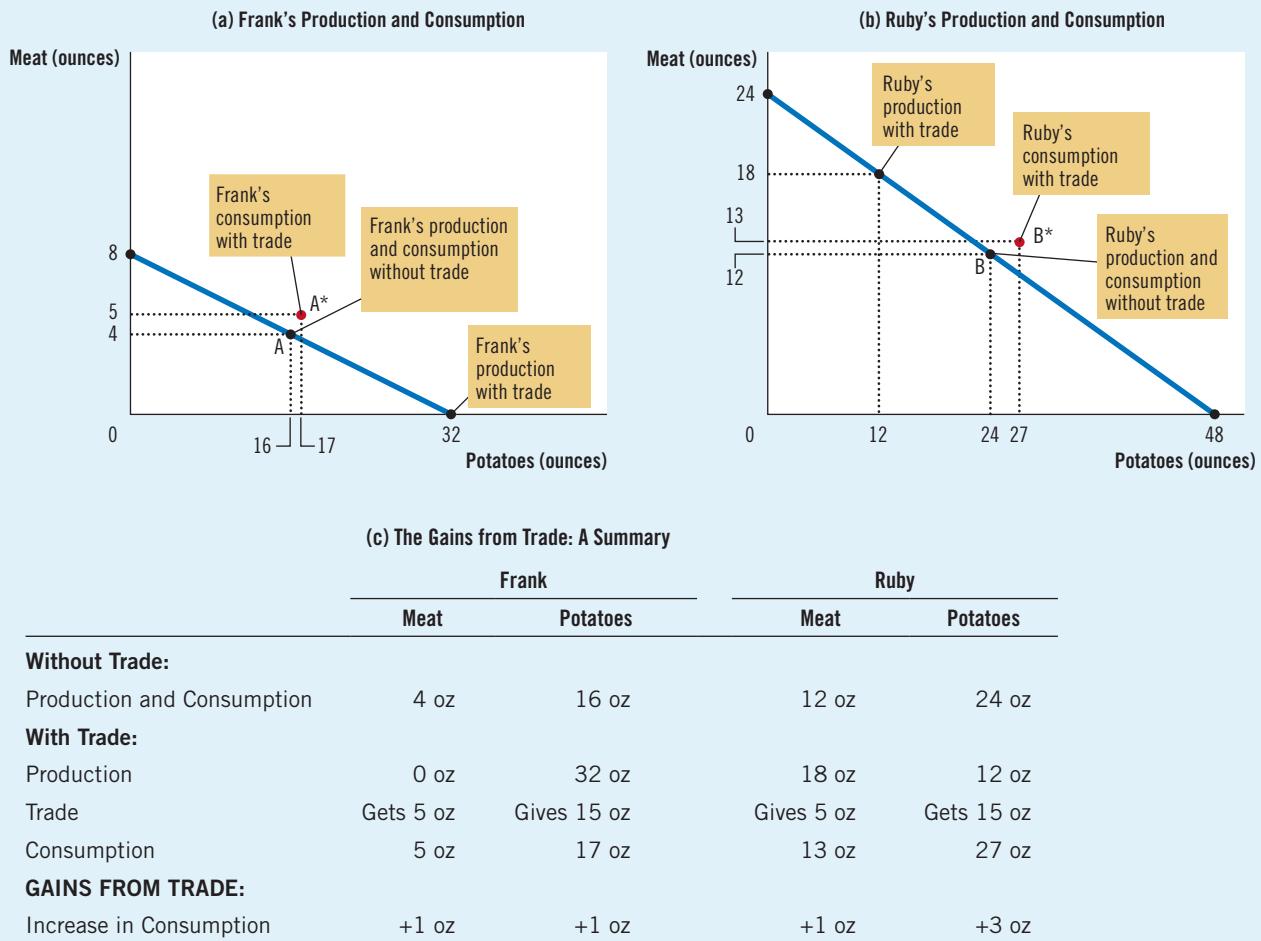
After several years of eating combination B, Ruby gets an idea and visits Frank:

RUBY: Frank, my friend, have I got a deal for you! I know how to improve life for both of us. I think you should stop producing meat altogether and devote all your time to growing potatoes. According to my calculations, if you work 8 hours a day growing potatoes, you'll produce 32 ounces of potatoes. You can then give me 15 of those 32 ounces, and I'll give you 5 ounces of meat in return. In the end, you'll get to eat 17 ounces of potatoes and 5 ounces of meat every day, instead of the 16 ounces of potatoes and 4 ounces of meat you now get. With my plan, you'll have more of *both* foods. [To illustrate her point, Ruby shows Frank panel (a) of Figure 2.]

FRANK: (sounding skeptical): That seems like a good deal for me. But I don't understand why you are offering it. If the deal is so good for me, it can't be good for you too.

RUBY: Oh, but it is! Suppose I spend 6 hours a day raising cattle and 2 hours growing potatoes. Then I can produce 18 ounces of meat and 12 ounces of potatoes. After I give you 5 ounces of my meat in

The proposed trade between Frank the farmer and Ruby the rancher offers each of them a combination of meat and potatoes that would be impossible in the absence of trade. In panel (a), Frank gets to consume at point A* rather than point A. In panel (b), Ruby gets to consume at point B* rather than point B. Trade allows each to consume more meat and more potatoes.

FIGURE 2
How Trade Expands the Set of Consumption Opportunities


exchange for 15 ounces of your potatoes, I'll end up with 13 ounces of meat and 27 ounces of potatoes, instead of the 12 ounces of meat and 24 ounces of potatoes that I now get. So I will also consume more of both foods than I do now. [She points out panel (b) of Figure 2.]

FRANK: I don't know. . . . This sounds too good to be true.

RUBY: It's really not as complicated as it seems. Here—I've summarized my proposal for you in a simple table. [Ruby shows Frank a copy of the table at the bottom of Figure 2.]

FRANK: (after pausing to study the table): These calculations seem correct, but I am puzzled. How can this deal make us both better off?

RUBY: We can both benefit because trade allows each of us to specialize in doing what we do best. You will spend more time growing potatoes and less time raising cattle. I will spend more time raising cattle and less time growing potatoes. As a result of specialization and trade, each of us can consume more meat and more potatoes without working any more hours.

QuickQuiz

1. Before Frank and Ruby engage in trade, each of them
 - a. consumes at a point inside his or her production possibilities frontier.
 - b. consumes at a point on his or her production possibilities frontier.
 - c. consumes at a point outside his or her production possibilities frontier.
 - d. consumes the same amounts of meat and potatoes as the other.
2. After Frank and Ruby engage in trade, each of them
 - a. consumes at a point inside his or her production possibilities frontier.
 - b. consumes at a point on his or her production possibilities frontier.
 - c. consumes at a point outside his or her production possibilities frontier.
 - d. consumes the same amounts of meat and potatoes as the other.

Answers at end of chapter.

3-2 Comparative Advantage: The Driving Force of Specialization

Ruby's explanation of the gains from trade, though correct, poses a puzzle: If Ruby is better at both raising cattle and growing potatoes, how can Frank ever specialize in doing what he does best? Frank doesn't seem to do anything best. To solve this puzzle, we need to look at the principle of *comparative advantage*.

As a first step in developing this principle, consider the following question: In our example, who can produce potatoes at a lower cost—Frank or Ruby? There are two possible answers, and in these two answers lie the solution to our puzzle and the key to understanding the gains from trade.

3-2a Absolute Advantage

One way to answer the question about the cost of producing potatoes is to compare the inputs required by the two producers. Economists use the term **absolute advantage** when comparing the productivity of one person, firm, or nation to that of another. The producer that requires a smaller quantity of inputs to produce a good is said to have an absolute advantage in producing that good.

In our example, time is the only input, so we can determine absolute advantage by looking at how much time each type of production takes. Ruby has an absolute advantage in producing both meat and potatoes because she requires less time than Frank to produce a unit of either good. Ruby needs to input only 20 minutes to produce an ounce of meat, whereas Frank needs 60 minutes. Similarly, Ruby needs only 10 minutes to produce an ounce of potatoes, whereas Frank needs 15 minutes. Thus, if we measure cost in terms of the quantity of inputs, Ruby has the lower cost of producing potatoes.

3-2b Opportunity Cost and Comparative Advantage

There is another way to look at the cost of producing potatoes. Rather than comparing inputs required, we can compare opportunity costs. Recall from Chapter 1 that the **opportunity cost** of some item is what we give up to get that item. In our

absolute advantage

the ability to produce a good using fewer inputs than another producer

opportunity cost

whatever must be given up to obtain some item

example, we assumed that Frank and Ruby each spend 8 hours a day working. Time spent producing potatoes takes away from time available for producing meat. When reallocating time between the two goods, Ruby and Frank give up units of one good to produce units of the other, thereby moving along the production possibilities frontier. The opportunity cost measures the trade-off between the two goods that each producer faces.

Let's first consider Ruby's opportunity cost. According to the table in panel (a) of Figure 1, producing 1 ounce of potatoes takes 10 minutes of work. When Ruby spends those 10 minutes producing potatoes, she spends 10 fewer minutes producing meat. Because Ruby needs 20 minutes to produce 1 ounce of meat, 10 minutes of work would yield $\frac{1}{2}$ ounce of meat. Hence, Ruby's opportunity cost of producing 1 ounce of potatoes is $\frac{1}{2}$ ounce of meat.

Now consider Frank's opportunity cost. Producing 1 ounce of potatoes takes him 15 minutes. Because he needs 60 minutes to produce 1 ounce of meat, 15 minutes of work would yield $\frac{1}{4}$ ounce of meat. Hence, Frank's opportunity cost of producing 1 ounce of potatoes is $\frac{1}{4}$ ounce of meat.

Table 1 shows the opportunity costs of meat and potatoes for the two producers. Notice that the opportunity cost of meat is the inverse of the opportunity cost of potatoes. Because 1 ounce of potatoes costs Ruby $\frac{1}{2}$ ounce of meat, 1 ounce of meat costs her 2 ounces of potatoes. Similarly, because 1 ounce of potatoes costs Frank $\frac{1}{4}$ ounce of meat, 1 ounce of meat costs him 4 ounces of potatoes.

Economists use the term **comparative advantage** when describing the opportunity costs faced by two producers. The producer who gives up less of other goods to produce Good X has the smaller opportunity cost of producing Good X and is said to have a comparative advantage in producing it. In our example, Frank has a lower opportunity cost of producing potatoes than Ruby: An ounce of potatoes costs Frank only $\frac{1}{4}$ ounce of meat, but it costs Ruby $\frac{1}{2}$ ounce of meat. Conversely, Ruby has a lower opportunity cost of producing meat than Frank: An ounce of meat costs Ruby 2 ounces of potatoes, but it costs Frank 4 ounces of potatoes. Thus, Frank has a comparative advantage in growing potatoes, and Ruby has a comparative advantage in producing meat.

Although it is possible for one person to have an absolute advantage in both goods (as Ruby does in our example), it is impossible for one person to have a comparative advantage in both goods. Because the opportunity cost of one good is the inverse of the opportunity cost of the other, if a person's opportunity cost of one good is relatively high, the opportunity cost of the other good must be relatively low. Comparative advantage reflects the relative opportunity cost. Unless two people have the same opportunity cost, one person will have a comparative advantage in one good, and the other person will have a comparative advantage in the other good.

comparative advantage
the ability to produce a good at a lower opportunity cost than another producer

Opportunity Cost of:		
	1 oz of Meat	1 oz of Potatoes
Frank the farmer	4 oz potatoes	$\frac{1}{4}$ oz meat
Ruby the rancher	2 oz potatoes	$\frac{1}{2}$ oz meat

TABLE 1

The Opportunity Cost of Meat and Potatoes

3-2c Comparative Advantage and Trade

The gains from specialization and trade are based not on absolute advantage but on comparative advantage. When each person specializes in producing the good in which he or she has a comparative advantage, total production in the economy rises. This increase in the size of the economic pie can be used to make everyone better off.

In our example, Frank spends more time growing potatoes, and Ruby spends more time producing meat. As a result, the total production of potatoes rises from 40 to 44 ounces, and the total production of meat rises from 16 to 18 ounces. Frank and Ruby share the benefits of this increased production.

We can also view the gains from trade in terms of the price that each party pays the other. Because Frank and Ruby have different opportunity costs, they can both get a bargain. That is, each of them benefits from trade by obtaining a good at a price that is lower than his or her opportunity cost of that good.

Consider the proposed deal from Frank's viewpoint. Frank receives 5 ounces of meat in exchange for 15 ounces of potatoes. In other words, Frank buys each ounce of meat for a price of 3 ounces of potatoes. This price of meat is lower than his opportunity cost of an ounce of meat, which is 4 ounces of potatoes. Frank benefits from the deal because he gets to buy meat at a good price.

Now consider the deal from Ruby's viewpoint. Ruby gets 15 ounces of potatoes in exchange for 5 ounces of meat. That is, the price of an ounce of potatoes is $\frac{1}{3}$ ounce of meat. This price of potatoes is lower than her opportunity cost of an ounce of potatoes, which is $\frac{1}{2}$ ounce of meat. Ruby benefits because she gets to buy potatoes at a good price.

The story of Ruby the rancher and Frank the farmer has a simple moral, which should now be clear: *Trade can benefit everyone in society because it allows people to specialize in the activities in which they have a comparative advantage.*

3-2d The Price of the Trade

The principle of comparative advantage establishes that there are gains from specialization and trade, but it raises a couple of related questions: What determines the price at which trade takes place? How are the gains from trade shared between the trading parties? The precise answers to these questions are beyond the scope of this chapter, but we can state one general rule: *For both parties to gain from trade, the price at which they trade must lie between their opportunity costs.*

In our example, Frank and Ruby agreed to trade at a rate of 3 ounces of potatoes for each ounce of meat. This price is between Ruby's opportunity cost (2 ounces of potatoes per ounce of meat) and Frank's opportunity cost (4 ounces of potatoes per ounce of meat). The price need not be exactly in the middle for both parties to gain, but it must be somewhere between 2 and 4.

To see why the price has to be in this range, consider what would happen if it were not. If the price of meat were below 2 ounces of potatoes, both Frank and Ruby would want to buy meat, because the price would be below each of their opportunity costs. Similarly, if the price of meat were above 4 ounces of potatoes, both would want to sell meat, because the price would be above their opportunity costs. But this economy has only two people. They cannot both be buyers of meat, nor can they both be sellers. Someone has to take the other side of the deal.

A mutually advantageous trade can be struck at a price between 2 and 4. In this price range, Ruby wants to sell meat to buy potatoes, and Frank wants to sell

potatoes to buy meat. Each party can buy a good at a price that is lower than his or her opportunity cost of that good. In the end, each person specializes in the good in which he or she has a comparative advantage and, as a result, is better off.

FYI

The Legacy of Adam Smith and David Ricardo

Economists have long understood the gains from trade. Here is how the great economist Adam Smith put the argument:

It is a maxim of every prudent master of a family, never to attempt to make at home what it will cost him more to make than to buy. The tailor does not attempt to make his own shoes, but buys them of the shoemaker. The shoemaker does not attempt to make his own clothes but employs a tailor. The farmer attempts to make neither the one nor the other, but employs those different artificers. All of them find it for their interest to employ their whole industry in a way in which they have some advantage over their neighbors, and to purchase with a part of its produce, or what is the same thing, with the price of part of it, whatever else they have occasion for.



BETTMANN/GETTY IMAGES

David Ricardo

This quotation is from Smith's 1776 book *The Wealth of Nations*, which was a landmark in the analysis of trade and economic interdependence.

Smith's book inspired David Ricardo, a millionaire stockbroker, to become an economist. In his 1817 book *On the Principles of Political Economy and Taxation*, Ricardo developed the principle of comparative advantage as we know it today. He considered an example with two goods (wine and cloth) and two countries (England and Portugal). He showed that both countries can gain by opening up trade and specializing based on comparative advantage.

Ricardo's theory is the starting point of modern international economics, but his defense of free trade was not a mere academic exercise. Ricardo put his beliefs to work as a member of the British Parliament, where he opposed the Corn Laws, which restricted grain imports.

The conclusions of Adam Smith and David Ricardo on the gains from trade have held up well over time. Although economists often disagree on questions of policy, they are united in their support of free trade. Moreover, the central argument for free trade has not changed much in the past two centuries. Even though the field of economics has broadened its scope and refined its theories since the time of Smith and Ricardo, economists' opposition to trade restrictions is still based largely on the principle of comparative advantage. ■

QuickQuiz

3. In an hour, Mateo can wash 2 cars or mow 1 lawn, and Sophia can wash 3 cars or mow 1 lawn. Who has the absolute advantage in car washing, and who has the absolute advantage in lawn mowing?
 - a. Mateo in washing, Sophia in mowing
 - b. Sophia in washing, Mateo in mowing
 - c. Mateo in washing, neither in mowing
 - d. Sophia in washing, neither in mowing
4. Between Mateo and Sophia, who has the comparative advantage in car washing, and who has the comparative advantage in lawn mowing?
 - a. Mateo in washing, Sophia in mowing
 - b. Sophia in washing, Mateo in mowing
5. When Mateo and Sophia produce efficiently and make a mutually beneficial trade based on comparative advantage,
 - a. Mateo mows more and Sophia washes more.
 - b. Mateo washes more and Sophia mows more.
 - c. Mateo and Sophia both wash more.
 - d. Mateo and Sophia both mow more.

Answers at end of chapter.

3-3 Applications of Comparative Advantage



PATRICK SMITH/GETTY IMAGES SPORT/GETTY IMAGES

LeBron James may be good at pushing a lawnmower, but it's not his comparative advantage.

imports

goods produced abroad and sold domestically

exports

goods produced domestically and sold abroad

The principle of comparative advantage explains interdependence and the gains from trade. Because interdependence is so prevalent in the modern world, the principle of comparative advantage has many applications. Here are two examples, one fanciful and one of great practical importance.

3-3a Should LeBron James Mow His Own Lawn?

LeBron James is a great athlete. One of the best basketball players of all time, he can jump higher and shoot better than most other people. Most likely, he is talented at other physical activities as well. For example, let's imagine that LeBron can mow his lawn faster than anyone else. But just because he *can* mow his lawn fast, does this mean he *should*?

To answer this question, we can use the concepts of opportunity cost and comparative advantage. Let's say that LeBron can mow his lawn in 2 hours. In those same 2 hours, he could film a television commercial and earn \$30,000. By contrast, Kaitlyn, the girl next door, can mow LeBron's lawn in 4 hours. In those same 4 hours, Kaitlyn could work at McDonald's and earn \$50.

In this example, LeBron has an absolute advantage in mowing lawns because he can do the work with a lower input of time. Yet because LeBron's opportunity cost of mowing the lawn is \$30,000 and Kaitlyn's opportunity cost is only \$50, Kaitlyn has a comparative advantage in mowing lawns.

The gains from trade here are tremendous. Rather than mowing his own lawn, LeBron should film the commercial and hire Kaitlyn to mow the lawn. As long as LeBron pays Kaitlyn more than \$50 and less than \$30,000, both of them are better off.

3-3b Should the United States Trade with Other Countries?

Just as individuals can benefit from specialization and trade with one another, so can populations of people in different countries. Many of the goods that Americans enjoy are produced abroad, and many of the goods produced in the United States are sold abroad. Goods produced abroad and sold domestically are called **imports**. Goods produced domestically and sold abroad are called **exports**.

To see how countries can benefit from trade, suppose there are two countries, the United States and Japan, and two goods, food and cars. Imagine that the two countries produce cars equally well: An American worker and a Japanese worker can each produce one car per month. By contrast, because the United States has more fertile land, it is better at producing food: A U.S. worker can produce 2 tons of food per month, whereas a Japanese worker can produce only 1 ton of food per month.

The principle of comparative advantage states that each good should be produced by the country that has the lower opportunity cost of producing that good. Because the opportunity cost of a car is 2 tons of food in the United States but only 1 ton of food in Japan, Japan has a comparative advantage in producing cars. Japan should produce more cars than it wants for its own use and export some of them to the United States. Similarly, because the opportunity cost of a ton of food is 1 car in Japan but only $\frac{1}{2}$ car in the United States, the United States has a comparative advantage in producing food. The United States should produce more food than it wants to consume and export some to Japan. Through specialization and trade, both countries can enjoy more food and more cars.

To be sure, the issues involved in trade among nations are more complex than this example suggests. Most important, each country has many people, and trade may

affect them in different ways. When the United States exports food and imports cars, the impact on an American farmer is not the same as the impact on an American autoworker. As a result, international trade can make some individuals worse off, even as it makes the country as a whole better off. Yet this example teaches an important lesson: Contrary to the opinions sometimes voiced by politicians and pundits, international trade is not like war, in which some countries win and others lose. Trade allows all countries to achieve greater prosperity.

3-4 Conclusion

You should now understand more fully the benefits of living in an interdependent economy. When Americans buy tube socks from China, when residents of Maine drink orange juice from Florida, and when a homeowner hires the kid next door to mow her lawn, the same economic forces are at work. The principle of comparative advantage shows that trade can make everyone better off.

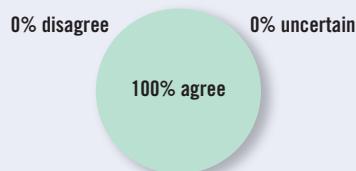
Having seen why interdependence is desirable, you might ask how it is possible. How do free societies coordinate the diverse activities of all the people involved in their economies? What ensures that goods and services will get from those who should be producing them to those who should be consuming them? In a world with only two people, such as Ruby the rancher and Frank the farmer, the answer is simple: These two people can bargain and allocate resources between themselves. In the real world with billions of people, the answer is less obvious. We take up this issue in the next chapter, where we see that free societies allocate resources through the market forces of supply and demand.

ASK THE EXPERTS

Trade between China and the United States

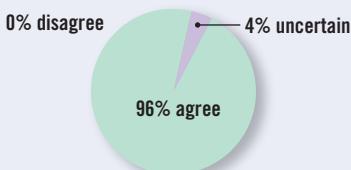
"Trade with China makes most Americans better off because, among other advantages, they can buy goods that are made or assembled more cheaply in China."

What do economists say?



"Some Americans who work in the production of competing goods, such as clothing and furniture, are made worse off by trade with China."

What do economists say?



Source: IGM Economic Experts Panel, June 19, 2012.

QuickQuiz

6. A nation will typically import those goods in which
 - a. the nation has an absolute advantage.
 - b. the nation has a comparative advantage.
 - c. other nations have an absolute advantage.
 - d. other nations have a comparative advantage.
7. Suppose that in the United States, producing an aircraft takes 10,000 hours of labor and producing a shirt takes 2 hours of labor. In China, producing an aircraft takes 40,000 hours of labor and producing a shirt takes 4 hours of labor. What will these nations trade?
 - a. China will export aircraft, and the United States will export shirts.
 - b. China will export shirts, and the United States will export aircraft.
8. Kayla can cook dinner in 30 minutes and wash the laundry in 20 minutes. Her roommate takes twice as long to do each task. How should the roommates allocate the work?
 - a. Kayla should do more of the cooking based on her comparative advantage.
 - b. Kayla should do more of the washing based on her comparative advantage.
 - c. Kayla should do more of the washing based on her absolute advantage.
 - d. There are no gains from trade in this situation.

Answers at end of chapter.


**IN THE
NEWS**

Economics within a Marriage

An economist argues that you shouldn't always unload the dishwasher just because you're better at it than your partner.

You're Dividing the Chores Wrong

By Emily Oster

No one likes doing chores. In happiness surveys, housework is ranked down there with commuting as activities that people enjoy the least. Maybe that's why figuring out who does which chores usually prompts, at best, tense discussion in a household and, at worst, outright fighting.

If everyone is good at something different, assigning chores is easy. If your partner is great at grocery shopping and you are great at the laundry, you're set. But this isn't always—or even usually—the case. Often one person is better at everything. (And let's be honest, often that person is the woman.) Better at the laundry, the grocery shopping, the cleaning, the cooking. But does that mean she should have to do everything?

Before my daughter was born, I both cooked and did the dishes. It wasn't a big deal,

it didn't take too much time, and honestly I was a lot better at both than my husband. His cooking repertoire extended only to eggs and chili, and when I left him in charge of the dishwasher, I'd often find he had run it "full" with one pot and eight forks.

After we had a kid, we had more to do and less time to do it in. It seemed like it was time for some reassessments. But, of course, I was still better at doing both things. Did that mean I should do them both?

I could have appealed to the principle of fairness: We should each do half. I could have appealed to feminism—surveys show that women more often than not get the short end of the chore stick. In time-use data, women do about 44 minutes more housework than men (2 hours and 11 minutes versus 1 hour and 27 minutes). Men outwork women only in the areas of "lawn" and "exterior maintenance." I could have suggested he do more chores to rectify this imbalance, to show our daughter, in the *Free to Be You and Me* style, that Mom and Dad are equal and that housework is fun if we do it together! I could have simply smashed around the pans in the dishwasher while sighing loudly in the hopes he would notice and offer to do it himself.

But luckily for me and my husband, I'm an economist, so I have more effective tools than passive aggression. And some basic economic

principles provided the answer. We needed to divide the chores because it is simply not *efficient* for the best cook and dishwasher to do all the cooking and dishwashing. The economic principle at play here is increasing marginal cost. Basically, people get worse when they are tired. When I teach my students at the University of Chicago this principle, I explain it in the context of managing their employees. Imagine you have a good employee and a not-so-good one. Should you make the good employee do literally everything?

Usually, the answer is no. Why not? It's likely that the not-so-good employee is better at 9 a.m. after a full night of sleep than the good employee is at 2 a.m. after a 17-hour workday. So you want to give at least a few tasks to your worse guy. The same principle applies in your household. Yes, you (or your spouse) might be better at everything. But anyone doing the laundry at 4 a.m. is likely to put the red towels in with the white T-shirts. Some task splitting is a good idea. How much depends on how fast people's skills decay.

To "optimize" your family efficiency (every economist's ultimate goal—and yours, too), you want to equalize effectiveness on the final task each person is doing. Your partner does the dishes, mows the lawn, and makes the grocery list. You do the cooking, laundry, shopping,

CHAPTER IN A NUTSHELL

- Each person consumes goods and services produced by many other people both in the United States and around the world. Interdependence and trade are desirable because they allow everyone to enjoy a greater quantity and variety of goods and services.
- There are two ways to compare the abilities of two people to produce a good. The person who can produce the good with the smaller quantity of inputs is said to have an *absolute advantage* in producing the good. The person who has the lower opportunity cost of producing the good is said to have a *comparative advantage*. The gains from trade are based on comparative advantage, not absolute advantage.
- Trade makes everyone better off because it allows people to specialize in those activities in which they have a comparative advantage.
- The principle of comparative advantage applies to countries as well as to people. Economists use the principle of comparative advantage to advocate free trade among countries.

cleaning, and paying the bills. This may seem imbalanced, but when you look at it, you see that by the time your partner gets to the grocery-list task, he is wearing thin and starting to nod off. It's all he can do to figure out how much milk you need. In fact, he is just about as good at that as you are when you get around to paying the bills, even though that's your fifth task.

If you then made your partner also do the cleaning—so it was an even four and four—the house would be a disaster, since he is already exhausted by his third chore while you are still doing fine. This system may well end up meaning one person does more, but it is unlikely to result in one person doing everything.

Once you've decided you need to divide up the chores in this way, how should you decide who does what? One option would be randomly assigning tasks; another would be having each person do some of everything. One spousal-advice website I read suggested you should divide tasks based on which ones you like the best. None of these are quite right. (In the last case, how would anyone ever end up with the job of cleaning the bathroom?)

To decide who does what, we need more economics. Specifically, the principle of comparative advantage. Economists usually talk about this in the context of trade. Imagine Finland is better than Sweden at making both reindeer hats and snowshoes. But they are much, much better at the hats and only a

little better at the snowshoes. The overall world production is maximized when Finland makes hats and Sweden makes snowshoes.

We say that Finland has an *absolute advantage* in both things but a *comparative advantage* only in hats. This principle is part of the reason economists value free trade, but that's for another column (and probably another author). But it's also a guideline for how to trade tasks in your house. You want to assign each person the tasks on which he or she has a comparative advantage. It doesn't matter that you have an absolute advantage in everything. If you are much, much better at the laundry and only a little better at cleaning the toilet, you should do the laundry and have your

spouse get out the scrub brush. Just explain that it's efficient!

In our case, it was easy. Other than using the grill—which I freely admit is the husband domain—I'm much, much better at cooking. And I was only moderately better at the dishes. So he got the job of cleaning up after meals, even though his dishwasher loading habits had already come under scrutiny. The good news is another economic principle I hadn't even counted on was soon in play: *learning by doing*. As people do a task, they improve at it. Eighteen months into this new arrangement the dishwasher is almost a work of art: neat rows of dishes and everything carefully screened for "top-rack only" status. I, meanwhile, am forbidden from getting near the dishwasher. Apparently, there is a risk that I'll "ruin it." ■



Questions to Discuss

1. In your family, do you think tasks are divided among family members according to comparative advantage? If so, how? If not, how might the allocation of tasks be improved?
2. Do you think being married to an economist would facilitate family harmony or just the opposite?

Ms. Oster is a professor of economics at Brown University.

Source: *Slate*, November 21, 2012.

KEY CONCEPTS

absolute advantage, p. 50
opportunity cost, p. 50

comparative advantage, p. 51
imports, p. 54

exports, p. 54

QUESTIONS FOR REVIEW

1. Under what conditions is the production possibilities frontier linear rather than bowed out?
2. Explain how absolute advantage and comparative advantage differ.

3. Give an example in which one person has an absolute advantage in doing something but another person has a comparative advantage.
4. Is absolute advantage or comparative advantage more important for trade? Explain your reasoning using the example in your answer to question 3.
5. If two parties trade based on comparative advantage and both gain, in what range must the price of the trade lie?
6. Why do economists oppose policies that restrict trade among nations?

PROBLEMS AND APPLICATIONS

1. Maria can read 20 pages of economics in an hour. She can also read 50 pages of sociology in an hour. She spends 5 hours per day studying.
 - a. Draw Maria's production possibilities frontier for reading economics and sociology.
 - b. What is Maria's opportunity cost of reading 100 pages of sociology?
2. American and Japanese workers can each produce 4 cars per year. An American worker can produce 10 tons of grain per year, whereas a Japanese worker can produce 5 tons of grain per year. To keep things simple, assume that each country has 100 million workers.
 - a. For this situation, construct a table analogous to the table in Figure 1.
 - b. Graph the production possibilities frontiers for the American and Japanese economies.
 - c. For the United States, what is the opportunity cost of a car? Of grain? For Japan, what is the opportunity cost of a car? Of grain? Put this information in a table analogous to Table 1.
 - d. Which country has an absolute advantage in producing cars? In producing grain?
 - e. Which country has a comparative advantage in producing cars? In producing grain?
 - f. Without trade, half of each country's workers produce cars and half produce grain. What quantities of cars and grain does each country produce?
 - g. Starting from a position without trade, give an example in which trade makes each country better off.
3. Diego and Darnell are roommates. They spend most of their time studying (of course), but they leave some time for their favorite activities: making pizza and brewing root beer. Diego takes 4 hours to brew a gallon of root beer and 2 hours to make a pizza. Darnell takes 6 hours to brew a gallon of root beer and 4 hours to make a pizza.
 - a. What is each roommate's opportunity cost of making a pizza? Who has the absolute advantage in making pizza? Who has the comparative advantage in making pizza?
 - b. If Diego and Darnell trade foods with each other, who will trade away pizza in exchange for root beer?
 - c. The price of pizza can be expressed in terms of gallons of root beer. What is the highest price at which pizza can be traded that would make both roommates better off? What is the lowest price? Explain.
4. Suppose that there are 10 million workers in Canada and that each of these workers can produce either 2 cars or 30 bushels of wheat in a year.
 - a. What is the opportunity cost of producing a car in Canada? What is the opportunity cost of producing a bushel of wheat in Canada? Explain the relationship between the opportunity costs of the two goods.
 - b. Draw Canada's production possibilities frontier. If Canada chooses to consume 10 million cars, how much wheat can it consume without trade? Label this point on the production possibilities frontier.
 - c. Now suppose that the United States offers to buy 10 million cars from Canada in exchange for 20 bushels of wheat per car. If Canada continues to consume 10 million cars, how much wheat does this deal allow Canada to consume? Label this point on your diagram. Should Canada accept the deal?
5. England and Scotland both produce scones and sweaters. Suppose that an English worker can produce 50 scones per hour or 1 sweater per hour. Suppose that a Scottish worker can produce 40 scones per hour or 2 sweaters per hour.
 - a. Which country has the absolute advantage in the production of each good? Which country has the comparative advantage?
 - b. If England and Scotland decide to trade, which commodity will Scotland export to England? Explain.
 - c. If a Scottish worker could produce only 1 sweater per hour, would Scotland still gain from trade? Would England still gain from trade? Explain.

6. The following table describes the production possibilities of two cities in the country of Baseballlia:

	Pairs of Red Socks per Worker per Hour	Pairs of White Socks per Worker per Hour
Boston	3	3
Chicago	2	1

- a. Without trade, what is the price of white socks (in terms of red socks) in Boston? What is the price in Chicago?
 - b. Which city has an absolute advantage in the production of each color sock? Which city has a comparative advantage in the production of each color sock?
 - c. If the cities trade with each other, which color sock will each export?
 - d. What is the range of prices at which mutually beneficial trade can occur?
7. A German worker takes 400 hours to produce a car and 2 hours to produce a case of wine. A French worker takes 600 hours to produce a car and X hours to produce a case of wine.
- a. For what values of X will gains from trade be possible? Explain.
 - b. For what values of X will Germany export cars and import wine? Explain.
8. Suppose that in a year an American worker can produce 100 shirts or 20 computers and a Chinese worker can produce 100 shirts or 10 computers.

- a. For each country, graph the production possibilities frontier. Suppose that without trade the workers in each country spend half their time producing each good. Identify this point in your graphs.
 - b. If these countries were open to trade, which country would export shirts? Give a specific numerical example and show it on your graphs. Which country would benefit from trade? Explain.
 - c. Explain at what price of computers (in terms of shirts) the two countries might trade.
 - d. Suppose that China catches up with American productivity so that a Chinese worker can produce 100 shirts or 20 computers in a year. What pattern of trade would you predict now? How does this advance in Chinese productivity affect the economic well-being of the two countries' citizens?
9. Are the following statements true or false? Explain in each case.
- a. "Two countries can achieve gains from trade even if one of the countries has an absolute advantage in the production of all goods."
 - b. "Certain talented people have a comparative advantage in everything they do."
 - c. "If a certain trade is good for one person, it can't be good for the other one."
 - d. "If a certain trade is good for one person, it is always good for the other one."
 - e. "If trade is good for a country, it must be good for everyone in the country."

QuickQuiz Answers

1. b 2. c 3. d 4. b 5. a 6. d 7. b 8. d