CHAPTER 2

Scarcity, Choice, and Economic Systems

What does it cost you to go to the movies? If you answered nine or ten dollars, because that is the price of a movie ticket, then you are leaving out a lot. Most of us are used to thinking of “cost” as the money we must pay for something. A Big Mac costs $3.15, a new Toyota Corolla costs $16,000, and the baby-sitter costs $8.00 an hour. Certainly, the money we pay for a good or service is a part of its cost. But economics takes a broader view of costs, recognizing monetary as well as non-monetary components.

THE CONCEPT OF OPPORTUNITY COST

The total cost of any choice we make—buying a car, producing a computer, or even reading a book—is everything we must give up when we take that action. This cost is called the opportunity cost of the action, because we give up the opportunity to have other desirable things.

The opportunity cost of any choice is what we must forego when we make that choice.

Opportunity cost is the most accurate and complete concept of cost—the one we should use when making our own decisions or analyzing the decisions of others.

OPPORTUNITY COST FOR INDIVIDUALS

Virtually every action we take as individuals uses up scarce money, scarce time, or both. This money or time could have been used for other things that you value. Thus, the true cost of any choice you make—the opportunity cost—is everything you actually sacrifice in making the choice.

Suppose, for example, it’s 8 P.M. on a weeknight and you’re spending a couple of hours reading this chapter. As authors, that thought makes us very happy, especially because we know there are many other things you could be doing: going to a movie, having dinner with friends, playing ping pong, earning some extra money, watching TV... But, assuming you’re still reading—and you haven’t just run out the door to do something else—let’s relate this to opportunity cost.

What is the opportunity cost of reading this chapter? Is it all of those other possibilities we’ve listed? Not really, because if you weren’t reading for these two hours, you’d probably have time to do only one of them. And you’d no doubt choose...
whichever one among these alternatives you regarded as best. So, by reading, you sacrifice only the best choice among the alternatives that you could be doing instead.

When the alternatives to a choice are mutually exclusive, only the next best choice—the one that would actually be chosen—is used to determine the opportunity cost of the choice.

For many choices, a large part of the opportunity cost is the money sacrificed. If you spend $15 on a new DVD, you have to part with $15, which is money you could have spent on something else (whatever the best choice among the alternatives turned out to be). But for other choices, money may be only a small part, or no part, of what is sacrificed. If you walk your dog a few blocks, it will cost you time but not money. Still, economists often like to attach a monetary value even to the parts of opportunity cost that don’t involve money. By translating a sacrifice into a dollar value, we can express the opportunity cost of a choice as a single number, albeit a roughly estimated one. That, in turn, enables us to compare the cost of a choice with its benefits, which we also often express in dollars.

An Example: The Opportunity Cost of College

Let’s consider an important choice you’ve made for this year: to attend college. What is the opportunity cost of this choice? A good starting point is to look at the actual monetary costs—the annual out-of-pocket expenses borne by you or your family for a year of college. Table 1 shows the College Board’s estimates of these expenses for the average student (ignoring scholarships). For example, the third column of the table shows that the average in-state resident at a four-year state college pays $5,491 in tuition and fees, $894 for books and supplies, $6,636 for room and board, and $2,545 for transportation and other expenses, for a total of $15,566 per year.

So, is that dollar figure the opportunity cost of a year of college for the average student at a public institution? Not really. Even if the entries are what you or your family actually pays out for college, there are two problems with using these figures to calculate the opportunity cost.

<table>
<thead>
<tr>
<th>TYPE OF INSTITUTION</th>
<th>TWO-YEAR PUBLIC</th>
<th>FOUR-YEAR PUBLIC</th>
<th>FOUR-YEAR PRIVATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUITON AND FEES</td>
<td>$2,191</td>
<td>$5,491</td>
<td>$21,236</td>
</tr>
<tr>
<td>BOOKS AND SUPPLIES</td>
<td>$801</td>
<td>$894</td>
<td>$904</td>
</tr>
<tr>
<td>ROOM AND BOARD</td>
<td>$5,909</td>
<td>$6,636</td>
<td>$7,791</td>
</tr>
<tr>
<td>TRANSPORTATION AND OTHER EXPENSES</td>
<td>$2,791</td>
<td>$2,545</td>
<td>$1,986</td>
</tr>
<tr>
<td>TOTAL OUT-OF-POCKET COSTS</td>
<td>$11,692</td>
<td>$15,566</td>
<td>$31,917</td>
</tr>
</tbody>
</table>

Notes: Averages are enrollment-weighted by institution, to reflect the average experience among students across the United States. Average tuition and fees at public institutions are for in-state residents only. Room and board charges are for students living on campus at four-year institutions, and off-campus (but not with parents) at two-year institutions.
First, the table includes some expenses that are not part of the opportunity cost of college. For example, room and board is something you’d need no matter what your choice. That’s obvious if, as part of your best choice among the alternatives, you’d have lived in an apartment and paid rent. But even the alternative of living in your old room at home doesn’t eliminate this cost: Your family could have rented out the room to someone else, or used it for some other valuable purpose. Either way, something is sacrificed. Let’s suppose, for simplicity, that if you weren’t in college, you or your family would be paying the same amount for room and board as your college charges. Then, the $6,636 for room and board expense should be excluded from the opportunity cost of going to college. And the same applies to transportation and other expenses, at least the part that you would have spent anyway even if you weren’t in college.

Now we’re left with payments for tuition and fees, and for books and supplies. For an in-state resident going to a state college, this averages $5,491 + $894 = $6,385 per year. Since these dollars are paid only when you attend college, they represent something sacrificed for that choice and are part of its opportunity cost. Costs like these—for which dollars are actually paid out—are called explicit costs, and they are part of the opportunity cost.

But college also has implicit costs—sacrifices for which no money changes hands. The biggest sacrifice in this category is time. But what is that time worth? That depends on what you would be doing if you weren’t in school. For many students, the alternative would be working full-time at a job, something most students can’t manage while attending college. If you are one of these students, attending college requires the sacrifice of the income you could have earned at a job—a sacrifice we call foregone income.

How much income is foregone when you go to college for a year? In 2005, the average total of an 18- to 24-year-old high school graduate who worked full-time was about $22,000. If we assume that only nine months of work must be sacrificed to attend college, and that you could still work full-time in the summer, then foregone income is about 9/12 of $22,000, or $16,500.

Summing the explicit and implicit costs gives us a rough estimate of the opportunity cost of a year in college. For a public institution, we have $6,385 in explicit costs and $16,500 in implicit costs, giving us a total of $22,885 per year. Notice that this is significantly greater than the total charges estimated by the college board we calculated earlier. When you consider paying this opportunity cost for four years, its magnitude might surprise you. Without financial aid in the form of tuition grants or other fee reductions, the average in-state resident will sacrifice about $90,000 to get a bachelor’s degree at a state college and about $153,000 at a private one.

Our analysis of the opportunity cost of college is an example of a general, and important, principle:

*The opportunity cost of a choice includes both explicit costs and implicit costs.*

**A Brief Digression: Is College the Right Choice?**

Before you start questioning your choice to be in college, there are a few things to remember. First, for many students, scholarships reduce the costs of college below those in our example. Second, in addition to its high cost, college has substantial benefits, including financial ones. In fact, over a 40-year work life, the average
college graduate will make about $2.5 million, which is about a million dollars more than the average high school graduate.¹

True, much of that income is earned in the future, and a dollar gained years from now is worth less than a dollar spent today. Also, some of the higher earnings of college graduates result from the personal characteristics of people who are likely to attend college, rather than from the education or the degree itself. But even when we make reasonable adjustments for these facts, attending college appears to be one of the best financial investments you can make.²

Finally, remember that we’ve left out of our discussion many important aspects of this choice that would be harder to estimate in dollar terms, but could be very important to you. Do you enjoy being at college? If so, your enjoyment is an added benefit, even though it may be difficult to value that enjoyment in dollars. (Of course, if you hate college and are only doing it for the financial rewards or to satisfy your parents, that’s an implicit cost—which is part of your opportunity cost—that we haven’t included.)

**Time Is Money**

Our analysis of the opportunity cost of college points out a general principle, one understood by economists and noneconomists alike. It can be summed up in the expression, “Time is money.” Those three words contain a profound truth: The sacrifice of time often means the sacrifice of money—in particular, the money that could have been earned during that time.

As a rule, economists have a simple technique to estimate the dollar value of time. First, we assume that working additional hours for pay is the best among the alternatives to the choice being considered. Then, each hour sacrificed for the choice is multiplied by the individual’s hourly wage. (Even someone paid a monthly salary has an implied hourly wage: their total monthly income divided by the total monthly hours of work.)

For example, suppose Jessica is a freelance writer who decides to see a movie. The ticket price is $10, and the entire activity—including getting there and back—will take three hours out of her evening. What is the opportunity cost of seeing this movie? Let’s suppose that Jessica earns $20 per hour as a freelance writer. We’ll also assume that she can choose to take on additional work at that same wage rate. Therefore, each hour that Jessica chooses not to work causes her to give up $20 in earnings. Then for Jessica, the opportunity cost is the sum of the explicit costs ($10 for the ticket) and the implicit costs ($20 × 3 hrs = $60 in foregone income), giving her a total opportunity cost of $70.

The idea that a movie “costs” $70 might seem absurd to you. But if you think about it, $70 is a much better estimate than $10 of what the movie costs for Jessica. After all, she gives up three hours that could have been spent working on an article that, on average, would provide her with another $60. Thus, in a very real sense, Jessica sacrifices $70 for the movie.²

Our examples about the cost of college and the cost of a movie point out an important lesson about opportunity cost:

² If you are using the microeconomics or combined micro/macro version of this book, we’ll revisit the value of college as an investment in the Using the Theory section of Chapter 13. In that chapter, you’ll also learn the general technique economists use to compare future earnings with current costs.
Chapter 2: Scarcity, Choice, and Economic Systems

The explicit (direct money) cost of a choice may only be a part—and sometimes a small part—of the opportunity cost of a choice.

Indeed, the higher an individual’s income, the less important is the direct money cost, and the more important the time cost of an activity. For example, suppose that Samantha is an attorney who bills out her time at $100 per hour. For her, the opportunity cost of the same movie—which entails three hours and the ticket—would be $310 dollars!

You might wonder if Samantha would ever see a movie at such a high cost. The answer for Samantha is the same as for Jessica or anyone else: yes, as long as the benefits of the movie are greater than the explicit and implicit costs. It’s easy to see why Samantha might decide to see a movie. Imagine that she begins taking on more and more clients, working longer and longer hours, and earning more and more income. At some point, she will realize that leisure activities like movies are very important, while earning more income will seem less important. And taking time off to see a movie might be well worth sacrificing the $310 that she could have had.

The concept of opportunity cost also explains why you’ll never see a rebate coupon like the doctored one in Figure 1. For most of us, the opportunity cost—including the cost of the stamp and the value of the time sacrificed to follow the instructions—is greater than the $1 that is being offered.

**OPPORTUNITY COST AND SOCIETY**

For an individual, opportunity cost arises from the scarcity of time or money. But for society as a whole, opportunity cost arises from a different source: the scarcity of society’s *resources*. Our desire for goods is limitless, but we have limited resources to produce them. Therefore,
virtually all production carries an opportunity cost: To produce more of one thing, society must shift resources away from producing something else.

For example, we’d all agree that we’d like better health for our citizens. What would be needed to achieve this goal? Perhaps more frequent medical checkups for more people and greater access to top-flight medicine when necessary. These, in turn, would require more and better-trained doctors, more hospital buildings and laboratories, and more high-tech medical equipment. In order for us to produce these goods and services, we would have to pull resources—land, labor, capital, and entrepreneurship—out of producing other things that we also enjoy. The opportunity cost of improved health care, then, consists of those other goods and services we would have to do without.

An Example: Military versus Consumer Goods

Let’s build a simple model to help us understand the opportunity cost we must pay to have more of something. To be specific, we’ll look at a society’s choice between producing military goods (represented here by tanks) and producing consumer goods (represented by wheat).

Table 2 lists some possible combinations of yearly tank production and yearly wheat production this society could manage, given its available resources and the currently available production technology. For example, the first row of the table tells us what would happen if all available resources were devoted to wheat production and no resources at all to producing tanks. The resulting quantity of wheat—1 million bushels per year—is the most this society could possibly produce. In the second row, society moves enough resources into tank production to make 1,000 tanks per year. This leaves fewer resources for wheat production, which now declines to 950,000 bushels per year. As we go down the left column, tank production increases by increments of 1,000. The right column shows us the maximum quantity of wheat that can be produced for each given quantity of tanks. Finally, look at the last row. It shows us that when society throws all of its resources into tank production (with none for wheat), tank production is 5,000 while wheat production is zero.

The table gives us a quantitative measure of opportunity cost for this society. For example, suppose this society currently produces 1,000 tanks per year, along with

<table>
<thead>
<tr>
<th>Production of Tanks and Wheat</th>
<th>Tank Production (number per year)</th>
<th>Wheat Production (bushels per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
<td>950,000</td>
</tr>
<tr>
<td></td>
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<td>400,000</td>
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<tr>
<td></td>
<td>5,000</td>
<td>0</td>
</tr>
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</table>
950,000 bushels of wheat (the second row). What would be the opportunity cost of producing another 1,000 tanks? Moving down to the third row, we see that producing another 1,000 tanks (for a total of 2,000) would require wheat production to drop from 950,000 to 850,000 bushels, a decrease of 100,000 bushels. Thus, the opportunity cost of 1,000 more tanks is 100,000 bushels of wheat. In this simple model with just two goods, the opportunity cost of having more of one good is measured in the units of the other good that must be sacrificed.

**Production Possibilities Frontiers**

We can see opportunity cost even more clearly in Figure 2, where the data in Table 2 has been plotted on a graph. In the figure, tank production is measured along the horizontal axis, and wheat production along the vertical axis. Each of the six points labeled A through F corresponds to a combination of the two goods as given by one of the rows of the table. For example, point B represents the combination in the second row: 1,000 tanks and 950,000 bushels of wheat. When we connect these points with a smooth line, we get a curve called society’s production possibilities frontier (PPF). Specifically, this PPF tells us the maximum quantity of wheat that can be produced for each quantity of tanks produced. Alternatively, it tells us the maximum number of tanks that can be produced for each different quantity of wheat. Positions outside the frontier are unattainable with the technology and resources at the economy’s disposal. Society’s choices are limited to points on or inside the PPF.

Now recall our earlier example of a change in production in Table 2: When tank production increased from 1,000 to 2,000, wheat production decreased from 950,000 to 850,000. In the graph, this change would be represented by a movement along the PPF from point B to point C. We’re moving rightward (1,000 more tanks) and also downward (100,000 fewer bushels of wheat). Thus, the opportunity cost of 1,000 more tanks can be viewed as the vertical drop along the PPF as we move from point B to point C.
Increasing Opportunity Cost

Suppose we have arrived at point $C$ and society then decides to produce still more tanks. Once again, resources must be shifted into tank production to make an additional 1,000 of them, moving from point $C$ to point $D$. This time, however, there is an even greater opportunity cost: Production of wheat falls from 850,000 to 700,000 bushels, a sacrifice of 150,000 bushels. The opportunity cost of 1,000 more tanks has risen. Graphically, the vertical drop along the curve is greater for the same move rightward.

You can see that as we continue to increase tank production by increments of 1,000—moving from point $C$ to point $D$ to point $E$ to point $F$—the opportunity cost of producing an additional 1,000 tanks keeps rising, until the last 1,000 tanks costs us 400,000 bushels of wheat. (You can also see this in the table, by running down the numbers in the right column. Each time tank production rises by 1,000, wheat production falls by more and more.)

The behavior of opportunity cost described here—the more tanks we produce, the greater the opportunity cost of producing still more—applies to a wide range of choices facing society. It can be generalized as the law of increasing opportunity cost.

According to the law of increasing opportunity cost, the more of something we produce, the greater the opportunity cost of producing even more of it.

The law of increasing opportunity cost causes the PPF to have a concave (upside-down bowl) shape, becoming steeper as we move rightward and downward. That’s because the slope of the PPF—the change in the quantity of wheat divided by the change in the quantity of tanks—can be interpreted as the change in wheat per additional tank. If we remove the minus sign from this slope and consider just its absolute value, it tells us the opportunity cost of one more tank.

Now—as we’ve seen—this opportunity cost increases as we move rightward. Therefore, the absolute value of the PPF’s slope must rise as well. The PPF gets steeper and steeper, giving us the concave shape we see in Figure 2.3.

Why should there be a law of increasing opportunity cost? Why must it be that the more of something we produce, the greater the opportunity cost of producing still more? Because most resources—by their very nature—are better suited to some purposes than to others. If the economy were operating at point $A$, for example, we’d be using all of our resources for wheat, even those that are much better suited to make tanks. People who would be better at factory work than farming would nevertheless be pressed into working on farms. And we’d be growing wheat on all the land available, even land that would be fine for a tank factory but awful for growing crops.

Now, as we begin to move rightward along the PPF, say from $A$ to $B$, we would shift resources out of wheat production and into tank production. But we would first shift those resources best suited to tank production—and least suited for wheat. When these resources are shifted, an additional thousand tanks causes only a small

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1 You might be wondering if the law of increasing opportunity cost applies in both directions. That is, does the opportunity cost of producing more wheat increase as we produce more of it? The answer is yes, as you’ll be asked to find in an end-of-chapter problem.
drop in wheat production. This is why, at first, the PPF is very flat: a small vertical
drop for the rightward movement.

As we continue moving rightward, however, we are forced to shift away from
wheat production resources that are less and less suited to tanks and more and more
suited to wheat. As a result, the PPF becomes steeper. Finally, we arrive at point $F$,
where all resources—no matter how well suited for wheat—are used to make tanks.

The principle of increasing opportunity cost applies to most of society’s produc-
tion choices, not just that between wheat and tanks. If we look at society’s choice
between food and oil, we would find that some land is better suited to growing food
and other land is better suited to drilling for oil. As we continue to produce more
oil, we would find ourselves drilling on land that is less and less suited to produc-
ing oil, but better and better for producing food. The opportunity cost of produc-
ing additional oil will therefore increase. The same principle applies if we want to
produce more health care, more education, more automobiles, or more computers:
The more of something we produce, the greater the opportunity cost of producing
still more.

**THE SEARCH FOR A FREE LUNCH**

This chapter has argued that every decision to produce *more* of something requires us
to pay an opportunity cost by producing less of something else. Nobel Prize–winning
economist Milton Friedman summarized this idea in his famous remark, “There is
no such thing as a free lunch.” Friedman was saying that, even if a meal is provid-
ed free of charge to someone, society still uses up resources to provide it. Therefore,
a “free lunch” is not *really* free: Society pays an opportunity cost by not producing
other things with those resources. Therefore, some members of society will have to
make do with less.

The same logic applies to other supposedly “free” goods and services. From
society’s point of view, there is no such thing as free Internet service, free broadcast
TV, or free medical care, even if those who enjoy these things don’t pay for
them as individuals. Providing any of these things requires us to sacrifice other
things, as illustrated by a movement along society’s PPF.

But there are some situations that seem, at first glance, to violate Freidman’s dic-
tum. Let’s explore them.

**Productive Inefficiency**

What if an economy is not living up to its productive potential, but is instead oper-
ating *inside* its PPF? For example, in Figure 2, suppose we are currently operating
at point $W$, where we are producing 2,000 tanks and 400,000 bushels of wheat.
Then we could move from point $W$ to point $E$ and produce 2,000 more tanks, with
no sacrifice of wheat. Or, starting at point $W$, we could move to point $C$ (more
wheat with no sacrifice of tanks), or to a point like $D$ (more of *both* wheat and
tanks).

But why would an economy ever operate inside its PPF?

One possibility is that, although all of its resources are being used, they are not
being used in the most productive way. Suppose, for example, that many people
who could be outstanding wheat farmers are instead making tanks, and many who
would be great at tank production are instead stuck on farms. Then switching peo-
ple from one job to the other could enable us to have more of *both* tanks and wheat.
That is, because of the mismatch of workers and jobs, we would be *inside* the PPF at a point like $W$. Creating better job matches would then move us to a point *on* the PPF (such as point $E$).

Economists use the phrase *productive inefficiency* to describe this type of situation that puts us inside our PPF.

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**Productively inefficient** A situation in which more of at least one good can be produced without sacrificing the production of any other good.

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The phrase *productive efficiency* means the absence of any productive inefficiency. For example, if the computer industry is producing the maximum possible number of computers with the resources it is currently using, we would describe the computer industry as productively efficient. In that case, there would be no way to produce any more computers except to use more resources and shift them from the production of some other good. For an entire *economy* to be productively efficient, there must be no way to produce more of *any* good except by pulling resources from the production of some other good.

Although no firm, industry, or economy is ever 100 percent productively efficient, cases of gross inefficiency are not as common as you might think. When you study microeconomics, you’ll learn that business firms have strong incentives to identify and eliminate productive inefficiency, since any waste of resources increases their costs and decreases their profit. When one firm discovers a way to eliminate waste, others quickly follow.

For example, empty seats on an airline flight represent productive inefficiency. Since the plane is making the trip anyway, filling the empty seat would enable the airline to serve more people with the flight (produce more transportation services) without using any additional resources (other than the trivial resources of in-flight snacks). Therefore, more people could fly without sacrificing any other good or service. When American Airlines developed a computer model in the late 1980s to fill its empty seats by altering schedules and fares, the other airlines followed its example very rapidly. And when—in the late 1990s—Priceline.com enabled airlines to auction off empty seats on the Internet, several airlines jumped at the chance and others quickly followed. As a result of this—and similar efforts to eliminate waste in personnel, aircraft, and office space—many cases of productive inefficiency in the airline industry were eliminated.

Starbucks provides a recent example of reducing productive inefficiency. In 2000, it created a special department of “store operations engineering,” tasked with analyzing beverage preparation in order to identify and eliminate waste. Among the recommendations that were instituted: rearranging labor within each store, eliminating signatures on small credit-card purchases, and using larger scoops so that iced drinks can be made with one dip into the ice machine instead of two. These and other efforts—all using existing technologies—enabled more coffee drinks to be prepared each day with the same amount of labor and store space, thus eliminating a source of productive inefficiency. (For those in a hurry, the changes also reduced the average wait time from $3\frac{1}{2}$ minutes in 2000 to three minutes in 2006.)

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Economists, logistics experts, and engineers are continually working to identify and design policies to eliminate cases of productive inefficiency. But many instances remain. Does that mean we are freed from having to pay an opportunity cost when we want to produce more of something?

Not necessarily. Many sources of productive inefficiency create benefits for individuals or groups who will resist changes in the status quo. For example, the government currently requires every taxpayer to file a federal tax return. About 40 percent of these returns are so simple that they merely provide the Internal Revenue Service (IRS) with information it already has, and contain calculations that the IRS duplicates anyway, to check for mistakes. Yet each taxpayer in this 40 percent group must spend hours doing his or her own return, or else pay someone to do it. Why not have the IRS send these people filled-out returns, requiring only a signature if they approve?

One economist has estimated that this simple change would save a total of 250 million hours per year (for those who currently fill out their own returns), and $2 billion per year (for those who pay accountants). With resources freed up by this change, we could produce and enjoy more of all the things that we value. But if you reread this paragraph, you can probably guess who might lobby the government to oppose this change, if and when it is seriously considered.

Since political obstacles often make it difficult to reduce inefficiency, producing more of one thing we value typically results in taking resources away from something else we value, rather than getting “free” resources from greater efficiency. Productive inefficiency does create a theoretical possibility for a free lunch. But in practice, it does not offer as many hearty meals as you might think.

Recessions

Another reason an economy might operate inside its PPF is a recession—a slowdown in overall economic activity. During recessions, many resources are idle. For one thing, there is widespread unemployment—people want to work but are unable to find jobs. In addition, factories shut down, so we are not using all of our available capital. An end to the recession would move the economy from a point inside its PPF to a point on its PPF—using idle resources to produce more goods and services without sacrificing anything.

This simple observation can help us understand an otherwise confusing episode in U.S. economic history. During the early 1940s, after the United States entered World War II and began using massive amounts of resources to produce military goods and services, the standard of living in the United States did not decline as we might have expected but actually improved slightly. Why?

When the United States entered the war in 1941, it was still suffering from the Great Depression—the most serious and long-lasting economic downturn in modern history, which began in 1929 and hit most of the developed world. For reasons you will learn when you study macroeconomics, joining the allied war effort helped end the Depression in the United States. As shown in Figure 3, this moved our economy from a point like A, inside the PPF, to a point like B, on the frontier. Military production like tanks increased, but so did the production of civilian goods such as wheat. Although there were shortages of some consumer goods, the overall result

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Part I: Preliminaries

was a rise in total production and an increase in the material well-being of the average U.S. citizen.

An economic downturn, such as the Great Depression of the 1930s, does seem to offer the possibility of a free lunch. And a war is only one factor that can reverse a downturn. (In fact, no rational nation would ever choose war as an economic policy designed to cure a recession, since there are always economically superior alternatives to accomplish this goal.) Still, eliminating a recession is not entirely cost-free. When you study macroeconomics, you will learn that policies to cure or avoid recessions can have risks and costs of their own. Of course, we may feel it is worth the possible costs, but they are costs nonetheless. Once again, a truly free lunch is hard to find.

Economic Growth

If the economy is already operating on its PPF, we cannot exploit the opportunity to have more of everything by moving to it. But what if the PPF itself were to change? Couldn’t we then produce more of everything? This is exactly what happens when an economy’s productive capacity grows.

Jeff Merron, “Workus Interruptus,” Slate, posted March 16, 2006, 12:06pm ET.
Many factors contribute to economic growth, but they can be divided into two categories. First, the quantities of available resources can increase. An increase in physical capital—more factories, office buildings, tractors, or high-tech medical equipment—enables the economy to produce more of everything that uses these tools. The same is true for an increase in human capital—the skills of doctors, engineers, construction workers, software writers, and so on. In thinking about growth from greater resources, economists focus mostly on capital because, over time, increases in the capital stock have contributed more to higher living standards than increases in other resources (such as land or labor). The second main factor behind economic growth is technological change, which enables us to produce more from a given quantity of resources. For example, the development of the Internet has enabled people to retrieve information in a few seconds that used to require hours of searching in a library. As a result, teachers, writers, government officials, attorneys, and physicians can produce more of their services without working longer hours.

These two main causes of economic growth—increases in resources and technological change—often go hand in hand. In order for the Internet (a technological change) to be widely used, the economy had to produce and install servers, Internet-capable computers, and fiber-optic cable (increases in capital). In any case, both technological change and increases in the capital stock have the same type of effect on the PPF.

Figure 4 shows three examples of economic growth, and how they might affect the PPF. Panel (a) illustrates the case of a technological change in wheat farming—say, the discovery of a new type of seed that yields more wheat for any given amount of land, labor, and capital. First, look at point A, which shows maximum wheat production when all of our resources are used to grow wheat, but without the new seeds. The introduction of the new seeds would enable us to grow even more wheat with all of our resources than before. For that reason, the vertical intercept of the PPF rises from point A to a point like A’, where the economy could produce 1,200,000 bushels per year.

Now consider point F, where we assume that none of our resources would be used to grow wheat, and all would be used to make tanks. The new seeds have no impact on this maximum possible tank production, so introducing them would not change the horizontal intercept of the PPF.

As you can see, the impact of the new seeds is to stretch the PPF upward along the vertical axis. Society could then choose any point along the new PPF. For example, it could move from point D on the original PPF to point H on the new one. For this move, all of the benefits of the new seeds would be devoted to giving us more wheat, with unchanged production of tanks. Or society could choose to move from point D to point J where, as you can verify, more of both goods are produced. Indeed, a society could choose to take advantage of the new seeds in a surprising way: more tanks and the same quantity of wheat as before. (See if you can identify this point on the new PPF.)

You may be wondering: How does a new type of seed enable greater production of tanks? The answer is: After the new, more productive seeds are introduced, society can choose to shift resources out of farming without decreasing wheat production at all. (Although there are smaller quantities of resources in the wheat industry, the new seeds make up for that.) The shifted resources can be used to increase tank production.

One more thing about panel (a): It can also be used to illustrate the change in the PPF from an increase in resources that can be used only in wheat farming. For
example, an increase in the quantity of farm tractors would shift the vertical intercept of the PPF as in panel (a) but leave the horizontal intercept unchanged because tractors have no direct impact on tank production.

Panel (b) illustrates the opposite type of change in the PPF—from a technological change in producing tanks, or an increase in resources usable only in the tank industry. This time, the horizontal intercept of the PPF increases, while the vertical intercept remains unchanged. (Can you explain why?) As before, we could choose to produce more tanks, more wheat, or more of both. (See if you can identify points on the new PPF in panel (b) to illustrate all three cases.)

Finally, panel (c) illustrates the case where technological change occurs in both the wheat and the tank industries, or there is an increase in resources (such as workers or computers) that could be used in either. Now both the horizontal and the vertical intercepts of the PPF increase. But as before, society can choose to locate anywhere along the new PPF, producing more tanks, more wheat, or more of both.

Panels (a) and (b) can be generalized to an important principle about economic growth:

**Economic Growth and the PPF**

All three panels show economic growth from an increase in resources or a technological change. In panel (a), the additional resources or technological advance directly affect only wheat production. However, society can choose to have more wheat and more tanks if it desires, such as at point J. In panel (b), the additional resources or technological advance directly affect only tank production. But once again, society can choose to have more of both goods. In panel (c), the additional resources or technological advance directly affect production of both goods.
A technological change or an increase in the capital stock, even when the direct impact is to increase production of just one type of good, allows us to choose greater production of all types of goods.

This conclusion certainly seems like a free lunch. After all, if we can produce more of the things that we value, without having to produce less of anything else, haven’t we escaped from paying an opportunity cost?

Yes . . . and no. Figure 4 tells only part of the story because it leaves out the steps needed to create this shift in the PPF in the first place.

CONSUMPTION VERSUS GROWTH

In the previous section, you saw that increases in capital or technological advances can shift the economy’s PPF outward along one or both axes, enabling us to produce more of everything we desire. Clearly, economic growth gives us benefits. But in this section, we’ll see that it also entails an opportunity cost.

Consider the case of having more capital. First, note that capital plays a dual role in the economy. On the one hand, capital is a resource—a long-lasting tool that we use to produce goods and services. On the other hand, capital is itself a good and needs to be produced using . . . resources. A tractor, for example, is produced using land, labor, entrepreneurship, and other capital (a tractor factory and all of the manufacturing equipment inside the factory).

Each year, society must choose how much of its available resources to devote to producing capital. The more long-lasting capital we produce this year, the more we will have available in future years to help us produce the goods and services that we enjoy. But there is a tradeoff: Any resources used to produce capital this year are not being used to produce consumer goods—food, automobiles, movies, health care, books, and other things that we enjoy right now and that contribute to our current living standard. For example, food (a consumer good) that we produce this year contributes directly to this year’s standard of living. But the tractors (a capital good) that we produce this year contribute to our standard of living only indirectly, over time, as the tractors are used to produce more food.

The tradeoff in having more capital is illustrated in Figure 5. In each panel, the quantity of capital goods is measured on the horizontal axis, and consumption goods are measured on the vertical axis. (Notice that we’ve lumped all capital goods together into one broad category and all consumer goods into another. Our purpose is to illustrate the general tradeoff between one type of good and the other, rather than make statements or measurements involving specific goods.) In each panel, the solid curve shows the economy’s PPF this year—the maximum production of one type of good for any given production of the other type.

Now look at panel (a). Point A on the PPF shows one choice that society could make this year: relatively high production of consumer goods and little production of capital goods. This choice gives us a relatively high standard of living this year (lots of consumer goods) but adds little to our total stock of capital. As a result, next year’s PPF—shown by the dotted line—does shift outward (because we have more capital), but not by much.

Panel (b) illustrates a different choice. By locating at point A’ on this year’s PPF, we sacrifice considerably more consumption goods now, and shift even more resources toward capital than in panel (a). Living standards are lower this year. But next year, with considerably more capital, the PPF shifts outward even more. As a
result, we can choose a point on next year’s PPF, with much greater production of consumer goods than we could have chosen in panel (a). Panel (b), while requiring greater sacrifice this year, leads to a greater rise in living standards next year.

A similar tradeoff exists when we look at technological change as a cause of economic growth. Technological change doesn’t just “happen.” Rather, resources must be used to create it—mostly by the research and development (R&D) departments of large corporations. In 2003, corporations used about $200 billion worth of resources for R&D, and the federal government kicked in about another $100 billion. These resources could have been used to produce other things that we’d enjoy right now. For example, doctors who are working in the R&D departments of pharmaceutical companies trying to develop drugs for the future could instead be providing health care to patients right now.

We could illustrate the sacrifice needed for technological change using a pair of PPFs similar to those in Figure 5. The vertical axis would still measure consumer goods production. But on the horizontal axis, instead of capital goods, we’d have a measure of “Research and Development Production”—such as the expenditures made by corporations and government agencies to run scientific laboratories or design new products. And we would come to the same conclusion we came to earlier about economic growth from more capital.

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In order to produce more goods and services in the future, we must shift resources toward R&D and capital production, and away from the production of things we’d enjoy right now.

We must conclude that although economic growth—at first glance—appears to be a free lunch, someone ends up paying the check. In this case, the bill is paid by those members of society who will have to make do with less in the present.

ECONOMIC SYSTEMS

As you read these words—perhaps sitting at home or in the library—you are experiencing a very private moment. It is just you and this book; the rest of the world might as well not exist. Or so it seems. . . .

Actually, even in this supposedly private moment, you are connected to the rest of the world in ways you may not have thought about. In order for you to be reading this book, the authors had to write it. Someone had to edit it, to help make sure that all necessary material was covered and explained as clearly as possible. Someone else had to prepare the graphics. Others had to run the printing presses and the binding machines, and still others had to pack the book, ship it, unpack it, put it on a store shelf, and then sell it to you.

And there’s more. People had to manufacture all kinds of goods: paper and ink, the boxes used for shipping, the computers used to keep track of inventory, and so on. It is no exaggeration to say that thousands of people were involved in putting this book in your hands.

And there is still more. The chair or couch on which you are sitting, the light shining on the page, the heat or the air conditioning in the room, the clothes you are wearing—all these things that you are using right now were produced by somebody else. So even now, as you sit alone reading this book, you are economically linked to others in hundreds—even thousands—of different ways.

Take a walk in your town or city, and you will see even more evidence of our economic interdependence: People are collecting garbage, helping schoolchildren cross the street, transporting furniture across town, constructing buildings, repairing roads, painting houses. Everyone is producing goods and services for other people.

Why is it that so much of what we consume is produced by other people? Why are we all so heavily dependent on each other for our material well-being? Why don’t we all—like Robinson Crusoe on his island—produce our own food, clothing, housing, and anything else we desire? And how did it come about that you—who did not produce any of these things yourself—are able to consume them?

These are all questions about our economic system—the way our economy is organized. Ordinarily, we take our economic system for granted, like the water that runs out of our faucets. But now it’s time to begin looking at the plumbing—to learn how our economy serves so many millions of people, enabling them to survive and prosper.

SPECIALIZATION AND EXCHANGE

If we were forced to, many of us could become economically self-sufficient. We could stake out a plot of land, grow our own food, make our own clothing, and
build our own homes. But in no society is there such extreme self-sufficiency. On the contrary, every economic system has been characterized by two features: (1) specialization, in which each of us concentrates on a limited number of productive activities, and (2) exchange, in which most of what we desire is obtained by trading with others rather than producing for ourselves.

There are three reasons why specialization and exchange enable us to enjoy greater production.

1. **Human Capabilities:** Each of us can learn only so much in a lifetime. By limiting ourselves to a narrow set of tasks—fixing plumbing, managing workers, writing music, or designing Web pages—we are each able to hone our skills and become experts at one or two things instead of remaining amateurs at a lot of things. It is easy to see that an economy of experts will produce more than an economy of amateurs.

2. **Switching Costs:** When people specialize, and thus spend more time doing one task, there is less unproductive “downtime” from switching activities.

3. **Individual Differences:** Even in a society where initially everyone is identical to everyone else, specialization would still yield gains for the two reasons we’ve discussed: People would develop expertise over time, and there would be less downtime from switching tasks.

Of course, in the real world, workers are not identically suited to different kinds of work. Nor are all plots of land, all natural resources, or all types of capital equipment identically suited for different tasks. This observation brings us to the third source of gains from specialization—one based on individual differences.

### Further Gains to Specialization: Comparative Advantage

Imagine a shipwreck in which there are only two survivors—let’s call them Maryanne and Gilligan—who wash up on opposite shores of a deserted island.
Initially they are unaware of each other, so each is forced to become completely self-sufficient. And there are only two kinds of food on the island: fish and berries.

Table 3 shows how much time it takes for each castaway to pick a cup of berries or catch one fish. For simplicity, we’ll assume that the time requirement remains constant no matter how much time is devoted to these activities.

On one side of the island, Maryanne finds that it takes her 1 hour to catch a fish and 1 hour to pick one cup of berries, as shown in the first row of the table. On the other side of the island, Gilligan—who is less adept at both tasks—requires 3 hours to catch a fish and 1 hour to pick a cup of berries, as listed in the second row of the table. Since both castaways would want some variety in their diets, we can assume that each would spend part of the week catching fish and part picking berries.

Suppose that, one day, Maryanne and Gilligan discover each other. After rejoicing at the prospect of human companionship, they decide to develop a system of production that will work to their mutual benefit. Let’s rule out any of the gains from specialization that we discussed earlier (minimizing downtime or developing expertise). Will it still pay for these two to specialize? The answer is yes, as you will see after a small detour.

Absolute Advantage: A Detour

When Gilligan and Maryanne sit down to figure out who should do what, they might fall victim to a common mistake: basing their decision on absolute advantage.

An individual has an absolute advantage in the production of some good when he or she can produce it using fewer resources than another individual can.

On the island, the only resource being used is labor time, so the reasoning might go as follows: Maryanne can catch a fish more quickly than Gilligan (see Table 3), so she has an absolute advantage in fishing. It seems logical, then, that Maryanne should be the one to catch fish.

But wait! Maryanne can also pick berries more quickly than Gilligan, so she has an absolute advantage in that as well. If absolute advantage is the criterion for assigning work, then Maryanne should do both tasks. This, however, would leave Gilligan doing nothing, which is certainly not in the pair’s best interests. What can we conclude from this example? That absolute advantage is an unreliable guide for allocating tasks to different workers.

Comparative Advantage

The correct principle to guide the division of labor on the island is comparative advantage:
Notice the important difference between absolute advantage and comparative advantage: You have an absolute advantage in producing a good if you can produce it using fewer resources than someone else can. But you have a comparative advantage if you can produce it with a smaller opportunity cost. As you’ll see, these are not necessarily the same thing.

Let’s see who has a comparative advantage in fishing, by calculating—for each of the castaways—the opportunity cost of catching one fish. For Maryanne, catching a fish takes an hour. This is time that could instead be used to pick one cup of berries. Thus, for Maryanne, the opportunity cost of one more fish is one cup of berries. It takes Gilligan three hours to catch a fish, time which he could use to pick two cups of berries instead. Thus, for Gilligan, the opportunity cost of one more fish is two cups of berries. These opportunity costs are listed in the first column of Table 4. As you can see by comparing the entries, the opportunity cost for one more fish is lower for Maryanne than for Gilligan. Therefore, Maryanne has a comparative advantage in fishing.

Now let’s determine who has a comparative advantage in berries. From Table 3, Maryanne needs an hour to pick a cup of berries, time that could be used to catch one fish. Thus, for Maryanne, the opportunity cost of one more cup of berries is one fish. For Gilligan, it takes 1 1/2 hours to pick a cup of berries, time that could be used instead to catch one-half of a fish. Thus, for Gilligan the opportunity cost of one cup of berries is one-half fish. (Of course, no one would ever catch half a fish unless they were using a machete. The number just tells us the rate of tradeoff of one good for the other.)

These opportunity costs are listed in the second column of Table 4. As you can see, when it comes to berries, it is Gilligan who has the lower opportunity cost. Therefore, Gilligan—who has an absolute advantage in nothing—has a comparative advantage in berries.

What happens when the two decide to produce more of the good in which they have a comparative advantage? The results are shown in Table 5. In the first row, we have Maryanne catching one more fish each day. This requires an additional hour, which she shifts out of picking berries. So Maryanne produces one more fish (+1) and one fewer cup of berries (−1). In the second row, we have Gilligan producing one fewer fish (−1). This frees up three hours. Since it takes Gilligan 1 1/2 hours to produce a cup of berries, he can use those three hours to produce two cups of berries (+2).

Now look at the last row. It shows what has happened to production of both goods on the island as a result of this little shift between the two. While fish

<table>
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<th>Opportunity Costs for Fish and Berries</th>
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<td>Opportunity Cost of:</td>
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<tr>
<td></td>
</tr>
<tr>
<td>One More Fish</td>
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<tr>
<td>One More Cup of Berries</td>
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<td></td>
</tr>
<tr>
<td>Maryanne</td>
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<tr>
<td>1 cup berries</td>
</tr>
<tr>
<td>1 fish</td>
</tr>
<tr>
<td>Gilligan</td>
</tr>
<tr>
<td>2 cups berries</td>
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<td>1/2 fish</td>
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production remains unchanged, berry production has risen by one cup. And because total production has increased, so does total consumption. If the castaways can find some way of trading with each other, they can both come out ahead: consuming the same quantity of fish as before, but more berries.

As you can see in Table 5, when each castaway moves toward producing more of the good in which he or she has a comparative advantage, total production rises. Now, let’s think about this. Because the castaways gain when they make this small shift toward their comparative advantage goods, why not make the change again? And again after that? In fact, why not keep repeating it until the opportunities for increasing total island production are exhausted, which occurs when one or both of them is devoting all of their time to producing just their comparative advantage good, and none of the other? In the end, the castaways enjoy a higher standard of living when they try to specialize and exchange goods with each other, compared to the level they’d enjoy under self-sufficiency.8

What is true for our shipwrecked island dwellers is also true for the entire economy:

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<tr>
<th></th>
<th>Change in Fish Production</th>
<th>Change in Berry Production</th>
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<tbody>
<tr>
<td>Maryanne</td>
<td>+1</td>
<td>−1</td>
</tr>
<tr>
<td>Gilligan</td>
<td>−1</td>
<td>+2</td>
</tr>
<tr>
<td>Total Island</td>
<td>+0</td>
<td>+1</td>
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A Beneficial Change in Production

Total production of every good or service will be greatest when individuals specialize according to their comparative advantage. This is another reason why specialization and exchange lead to higher living standards than does self-sufficiency.

When we turn from our fictional island to the real world, is production, in fact, consistent with the principle of comparative advantage? Indeed, it is. A journalist may be able to paint her house more quickly than a house painter, giving her an absolute advantage in painting her home. Will she paint her own home? Except in unusual circumstances, no, because the journalist has a comparative advantage in writing news articles. Indeed, most journalists—like most college professors, attorneys, architects, and other professionals—hire house painters, leaving themselves more time to practice the professions in which they enjoy a comparative advantage.

Even comic book superheroes seem to behave consistently with comparative advantage. Superman can no doubt cook a meal, fix a car, chop wood, and do virtually anything faster than anyone else on the earth. Using our new vocabulary, we’d say that Superman has an absolute advantage in everything. But he has a clear comparative advantage in catching criminals and saving the universe from destruction, which is exactly what he spends his time doing.

8 In this example, production of berries rises while fish production remains unchanged. But the castaways could instead choose to produce more fish and the same quantity of berries, or even more of both goods. Some end-of-chapter problems will guide you to these other outcomes.
Specialization in Perspective

The gains from specialization, whether they arise from developing expertise, minimizing downtime, or exploiting comparative advantage, can explain many features of our economy. For example, college students need to select a major and then, upon graduating, to decide on a specific career. Those who follow this path are often rewarded with higher incomes than those who dally. This is an encouragement to specialize. Society is better off if you specialize, since you will help the economy produce more, and society rewards you for this contribution with a higher income.

The gains from specialization can also explain why most of us end up working for business firms that employ dozens, or even hundreds or thousands, of other employees. Why do these business firms exist? Why isn’t each of us a self-employed expert, exchanging our production with other self-employed experts? Part of the answer is that organizing production into business firms pushes the gains from specialization still further. Within a firm, some people can specialize in working with their hands, others in managing people, others in marketing, and still others in keeping the books. Each firm is a kind of minisociety within which specialization occurs. The result is greater production and a higher standard of living than we would achieve if we were all self-employed.

Resource Allocation

Ten thousand years ago, the Neolithic revolution began, and human society switched from hunting and gathering to farming and simple manufacturing. At the same time, human wants grew beyond mere food and shelter to the infinite variety of things that can be made. Ever since, all societies have been confronted with three important questions:

1. Which goods and services should be produced with society’s resources?
2. How should they be produced?
3. Who should get them?

Together, these three questions constitute the problem of resource allocation.

Let’s first consider the which question. Should we produce more health care or more movies, more goods for consumers or more capital goods for businesses? Where on its production possibilities frontier should the economy operate? As you will see, there are different methods societies can use to answer these questions.

The how question is more complicated. Most goods and services can be produced in a variety of different ways, each method using more of some resources and less of others. For example, there are many ways to dig a ditch. We could use no capital at all and have dozens of workers digging with their bare hands. We could use a small amount of capital by giving each worker a shovel and thereby use less labor, since each worker would now be more productive. Or we could use even more capital—a power trencher—and dig the ditch with just one or two workers.

In every economic system, there must always be some mechanism that determines how goods and services will be produced from the infinite variety of ways available.

Finally, the who question. Here is where economics interacts most strongly with politics. There are so many ways to divide ourselves into groups: men and women, rich and poor, skilled and unskilled, workers and owners, families and single people, young and old . . . the list is endless. How should the products of our economy be distributed among these different groups and among individuals within each group?
Determining who gets the economy's output is always the most controversial aspect of resource allocation. Over the last half-century, our society has become more sensitized to the way goods and services are distributed, and we increasingly ask whether that distribution is fair. For example, men get a disproportionately larger share of our national output than women do, whites get more than African-Americans and Hispanics, and middle-aged workers get more than the very old and the very young. As a society, we want to know why we observe these patterns (a positive economic question) and what we should do about them (a normative economic question).

The Three Methods of Resource Allocation

Throughout history, every society has relied primarily on one of three mechanisms for allocating resources. In a traditional economy, resources are allocated according to the long-lived practices of the past. Tradition was the dominant method of resource allocation for most of human history and remains strong in many tribal societies and small villages in parts of Africa, South America, Asia, and the Pacific. Typically, traditional methods of production are handed down by the village elders, and traditional principles of fairness govern the distribution of goods and services.

Economies in which resources are allocated mostly by tradition tend to be stable and predictable. But these economies have one serious drawback: They don’t grow. With everyone locked into the traditional patterns of production, there is little room for innovation and technological change. Traditional economies are therefore likely to be stagnant economies.

In a command economy, resources are allocated mostly by explicit instructions from some higher authority. Which goods and services should we produce? The ones we’re ordered to produce. How should we produce them? The way we’re told to produce them. Who will get the goods and services? Whoever the authority tells us should get them.

In a command economy, a government body plans how resources will be allocated. That is why command economies are also called centrally planned economies. But command economies are disappearing fast. Until about 20 years ago, examples would have included the former Soviet Union, Poland, Rumania, Bulgaria, Albania, China, and many others. Beginning in the late 1980s, all of these nations began abandoning central planning. The only examples left today are Cuba and North Korea, and even these economies—though still dominated by central planning—occasionally take steps away from it.

The third method of allocating resources—and the one with which you are no doubt most familiar—is “the market.” In a market economy, neither long-held traditions nor commands from above guide most economic behavior. Instead, people are largely free to do what they want with the resources at their disposal. In the end, resources are allocated as a result of individual decision making. Which goods and services are produced? The ones that producers choose to produce. How are they produced? However producers choose to produce them. Who gets these goods and services? Anyone who chooses to buy them.

Of course, in a market system, freedom of choice is constrained by the resources one controls. And in this respect, we do not all start in the same place in the economic race. Some of us have inherited great intelligence, talent, or beauty; and some, such as the children of successful professionals, are born into a world of helpful personal contacts. Others, unfortunately, will inherit none of these advantages. In a market system, those who control more resources will have more choices available
to them than those who control fewer resources. Nevertheless, given these different starting points, individual choice plays the major role in allocating resources in a market economy.

But wait . . . isn’t there a problem here? People acting according to their own desires, without command or tradition to control them? This sounds like a recipe for chaos! How, in such a free-for-all, could resources possibly be allocated?

The answer is contained in two words: markets and prices.

The Nature of Markets

The market economy gets its name from something that nearly always happens when people are free to do what they want with the resources they possess. Inevitably, people decide to specialize in the production of one or a few things—often organizing themselves into business firms—and then sellers and buyers come together to trade. A market is a collection of buyers and sellers who have the potential to trade with one another.

In some cases, the market is global; that is, the market consists of buyers and sellers who are spread across the globe. The market for oil is an example of a global market, since buyers in any country can buy from sellers in any country. In other cases, the market is local. Markets for restaurant meals, haircuts, and taxi service are examples of local markets.

Markets play a major role in allocating resources by forcing individual decision makers to consider very carefully their decisions about buying and selling. They do so because of an important feature of every market: the price at which a good is bought and sold.

The Importance of Prices

A price is the amount of money a buyer must pay to a seller for a good or service. Price is not always the same as cost. In economics, as you’ve learned in this chapter, cost means opportunity cost—the total sacrifice needed to buy the good. While the price of a good is a part of its opportunity cost, it is not the only cost. For example, the price does not include the value of the time sacrificed to buy something. Buying a new jacket will require you to spend time traveling to and from the store, trying on different styles and sizes, and waiting in line at the cash register.

Still, in most cases, the price of a good is a significant part of its opportunity cost. For large purchases such as a home or automobile, the price will be most of the opportunity cost. And this is why prices are so important to the overall working of the economy: They confront individual decision makers with the costs of their choices.

Consider the example of purchasing a car. Because you must pay the price, you know that buying a new car will require you to cut back on purchases of other things. In this way, the opportunity cost to society of making another car is converted to an opportunity cost for you. If you value a new car more highly than the other things you must sacrifice for it, you will buy it. If not, you won’t buy it.

Why is it so important that people face the opportunity costs of their actions? The following thought experiment can answer this question.

A Thought Experiment: Free Cars

Imagine that the government passes a new law: When anyone buys a new car, the government will reimburse that person for it immediately. The consequences would
be easy to predict. First, on the day the law was passed, everyone would rush out to buy new cars. Why not, if cars are free? The entire stock of existing automobiles would be gone within days—maybe even hours. Many people who didn’t value cars much at all, and who hardly ever used them, would find themselves owning several—one for each day of the week or to match the different colors in their wardrobe. Others who weren’t able to act in time—including some who desperately needed a new car for their work or to run their households—would be unable to find one at all.

Over time, automobile companies would drastically increase production to meet the surge in demand for cars. So much of our available labor, capital, land, and entrepreneurial talent would be diverted to the automobile industry that we’d have to sacrifice huge quantities of all other goods and services. Thus, we’d end up paying for those additional cars in the end, by making do with less education, less medical care, perhaps even less food—all to support the widespread, frivolous use of cars. Almost everyone would conclude that society had been made worse off with the new “free-car” policy. By eliminating a price for automobiles, and severing the connection between the opportunity cost of producing a car and the individual’s decision to get one, we would have created quite a mess for ourselves.

When resources are allocated by the market, and people must pay for their purchases, they are forced to consider the opportunity cost to society of their individual actions. In this way, markets are able to create a sensible allocation of resources.

Resource Allocation in the United States

The United States has always been considered the leading example of a market economy. Each day, millions of distinct items are produced and sold in markets. Our grocery stores are always stocked with broccoli and tomato soup, and the drugstore always has Kleenex and aspirin—all due to the choices of individual producers and consumers. The goods that are traded, the way they are traded, and the price at which they trade are determined by the traders themselves. No direction from above is needed to keep markets working.

But even in the United States, there are numerous cases of resource allocation outside the market. For example, families are important institutions in the United States, and many economic decisions are made within them. Families tend to operate like traditional villages, not like market economies. For example, few parents make their children pay for goods and services provided inside the home.

Our economy also allocates some resources by command. Various levels of government collect, in total, about one-third of our incomes as taxes. We are told how much tax we must pay, and those who don’t comply suffer serious penalties, including imprisonment. Government—rather than individual decision makers—spends the tax revenue. In this way, the government plays a major role in allocating resources—especially in determining which goods are produced and who gets them.

There are also other ways, aside from strict commands, that the government limits our market freedoms. Regulations designed to protect the environment, maintain safe workplaces, and ensure the safety of our food supply are just a few examples of government-imposed constraints on our individual choice.

What are we to make, then, of resource allocation in the United States? Markets are, indeed, constrained. But for each example we can find where resources are
allocated by tradition or command, or where government restrictions seriously limit some market freedom, we can find hundreds of examples where individuals make choices according to their own desires. The things we buy, the jobs at which we work, the homes in which we live—in almost all cases, these result from market choices. The market, though not pure, is certainly the dominant method of resource allocation in the United States.

**RESOURCE OWNERSHIP**

So far, we’ve been concerned with how resources are allocated. Another important feature of an economic system is how resources are *owned*. The owner of a resource—a parcel of land, a factory, or one’s own labor time—determines how it can be used and receives income when others use it. And there have been three primary modes of resource ownership in human history.

Under *communal* ownership, resources are owned by everyone—or by no one, depending on your point of view. They are simply there for the taking; no person or organization imposes any restrictions on their use or charges any fees. It is hard to find economies with significant communal ownership of resources. Karl Marx believed that, in time, all economies would evolve toward communal ownership, and he named this predicted system *communism*. In fact, none of the economies that called themselves communist (such as the former Soviet Union) ever achieved Marx’s vision. This is not surprising: Communal ownership on a broad scale can work only when individuals have no conflicts over how resources are used. Therefore, communism requires the end of *scarcity*—an unlikely prospect in the foreseeable future.

Nevertheless, there are examples of communal ownership on a smaller scale. Traditional villages maintain communal ownership of land and sometimes cattle. Closer to home, most families operate on the principle of communal ownership. The house, television, telephone, and food in the refrigerator are treated as if owned jointly. More broadly, who “owns” our sidewalks, streets, and public beaches? No one does, really. In practice, all citizens are free to use them as much and as often as they would like. This is essentially communal ownership.

Under *socialism*, the *state* owns most of the resources. The prime example is the former Soviet Union, where the state owned all of the land and capital equipment in the country. In many ways, it also owned the labor of individual households, since it was virtually the only employer in the nation and unemployment was considered a crime.

State ownership also occurs in nonsocialist economies. In the United States, national parks, state highway systems, military bases, public colleges and universities, and government buildings are all state-owned resources. Over a third of the land in the country is owned by the federal government. The military, even under our current volunteer system, is an example in which the state owns the labor of soldiers—albeit for a limited period of time.

Finally, the third system. When most resources are owned *privately*—as in the United States—we have *capitalism*. Take the book you are reading right now. If you turn to the title page, you will see the imprint of the company that published this book. This is a corporation owned by thousands of individual stockholders. These individuals own the buildings, the land under them, the office furniture and computer equipment, and even the reputation of the company. When these facilities are used to produce and sell a book, the company’s profits belong to these stockholders.
Similarly, the employees of the company are private individuals. They are selling a resource they own—their labor time—to the company, and they receive income—wages and salaries—in return.

The United States is one of the most capitalistic countries in the world. True, there are examples of state and communal ownership, as we’ve seen. But the dominant mode of resource ownership in the United States is *private* ownership. Resource owners keep most of the income they earn from supplying their resources, and they have broad freedom in deciding how their resources are used.

**TYPES OF ECONOMIC SYSTEMS**

We’ve used the phrase *economic system* a few times already in this book. But now it’s time for a formal definition.

> An economic system is composed of two features: a mechanism for allocating resources and a mode of resource ownership.

Let’s leave aside the rare economies in which communal ownership is dominant and those in which resources are allocated primarily by tradition. That leaves us with four basic types of economic systems, indicated by the four quadrants in Figure 6. In the upper left quadrant, we have *market capitalism*. In this system, resources are allocated primarily by the market and owned primarily by private individuals. Today, most nations have market capitalist economies, including all of the countries of North America and Western Europe, and most of those in Asia, Latin America, and Africa.

<table>
<thead>
<tr>
<th>Resource Ownership</th>
<th>Resource Allocation</th>
</tr>
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<tbody>
<tr>
<td>State</td>
<td>Market Socialism</td>
</tr>
<tr>
<td>Private</td>
<td>Market Capitalism</td>
</tr>
<tr>
<td></td>
<td>Centrally Planned Capitalism</td>
</tr>
</tbody>
</table>

**FIGURE 6**

Types of Economic Systems
In the lower right quadrant is centrally planned socialism, under which resources are mostly allocated by command and mostly owned by the state. This was the system in the former Soviet Union and the nations of Eastern Europe until the late 1980s. But since then, these countries’ economies have gone through cataclysmic change by moving from the lower right quadrant to the upper left. That is, these nations have simultaneously changed both their method of resource allocation and their systems of resource ownership.

Although market capitalism and centrally planned socialism have been the two paramount economic systems in modern history, there have been others. The upper right quadrant represents a system of centrally planned capitalism, in which resources are owned by private individuals yet allocated by command. In the recent past, countries such as Sweden and Japan—where the government has been more heavily involved in allocating resources than in the United States—have flirted with this type of system. Nations at war—like the United States during World War II—also move in this direction, as governments find it necessary to direct resources by command in order to ensure sufficient military production.

Finally, in the lower left quadrant is market socialism, in which resources are owned by the state yet allocated by the market mechanism. The possibility of market socialism has fascinated many social scientists, who believed it promised the best of both worlds: the freedom and efficiency of the market mechanism and the fairness and equity of socialism. There are, however, serious problems—many would say “unresolvable contradictions”—in trying to mix the two. The chief examples of market socialism in modern history were short-lived experiments—in Hungary and the former Yugoslavia in the 1950s and 1960s—in which the results were mixed at best.

**Economic Systems and This Book**

Over the past two decades, the world has changed dramatically: About 300 million people in Europe have come under the sway of the market as their nations abandoned centrally planned socialism; more than a billion have been added as China has changed course. The study of modern economies is now, more than ever, the study of market capitalism, and that will be the focus of our text.

**Understanding the Market**

The market is simultaneously the most simple and the most complex way to allocate resources. For individual buyers and sellers, the market is simple. There are no traditions or commands to be memorized and obeyed. Instead, we enter the markets we wish to trade in, and we respond to prices there as we wish to, unconcerned about the overall process of resource allocation.

But from the economist’s point of view, the market is quite complex. Resources are allocated indirectly, as a by-product of individual decision making, rather than through easily identified traditions or commands. As a result, it often takes some skillful economic detective work to determine just how individuals are behaving and how resources are being allocated as a consequence.

How can we make sense of all of this apparent chaos and complexity? That is what economics is all about. And you will begin your detective work in Chapter 3, where you will learn about the most widely used model in the field of economics: the model of supply and demand.
Are We Saving Lives Efficiently?

Earlier in this chapter, you learned that instances of gross productive inefficiency are not as easy to find in our economy as one might imagine. But many economists argue that our allocation of resources to lifesaving efforts is a glaring exception. In this section, we’ll use some of the tools and concepts you’ve learned in this chapter to ask whether we are saving lives efficiently.

We can view “saving lives” as the output—a service—produced by the “lifesaving industry.” This industry consists of private firms (such as medical practices and hospitals), as well as government agencies (such as the Department of Health and Human Services or the Environmental Protection Agency). In a productively efficient economy, we must pay an opportunity cost whenever we choose to save additional lives. That’s because any lifesaving action we might take—building another emergency surgery center, running an advertising campaign to encourage healthier living, or requiring the substitution of costly but safe materials for less costly but toxic ones—would require us to use additional land, labor, capital, and entrepreneurship. And these resources could be used to produce other goods and services that we value.

Figure 7 illustrates this opportunity cost with a production possibilities frontier. The number of lives saved per year is measured along the horizontal axis, and the quantity of all other goods (lumped together into a single category) is measured on the vertical axis. A productively efficient economy would be on the frontier, producing the maximum quantity of all other goods for any given number of lives saved. Equivalently, productive efficiency would mean saving the maximum possible number of lives for any given quantity of other goods.

Efficiency and Inefficiency in Saving Lives

This PPF shows society’s choice between saving lives (measured along the horizontal axis) and all other production (on the vertical axis). Operating on the curve (at a point like A) would be productively efficient. But if the life-saving industry is not efficient, then society is operating inside the PPF (at a point like B). Eliminating the inefficiency would enable us to save more lives, or have more of other goods, or both.
produced. Point $A$ on the PPF is one such productively efficient point, where we would save $Q_1$ lives per year, and produce the quantity $Q_2$ of all other goods. Once we are on the frontier, we can only save more lives by pulling resources away from producing other goods, and paying an opportunity cost in other goods foregone.

But what if there is productive inefficiency in the economy? And what if the source of the inefficiency is in the lifesaving industry itself? More specifically, what if more lives could be saved with the current quantity of resources used by the industry simply by reallocating those resources among different types of lifesaving activities? In that case, the economy would be operating at a point like $B$, inside the PPF. By eliminating the inefficiency, we could move to the frontier. For example, we could save more lives with no sacrifice of other goods (a move from point $B$ to point $A$) or have more of other goods while saving the same number of lives (a move vertically upward from point $B$ to a new, unmarked point on the PPF) or have more of both (upward and rightward from point $B$).

Economists argue that the United States and most other countries do, in fact, operate at a point like $B$ because of productive inefficiency in saving lives. How have they come to such a conclusion?

The first step in the analysis is to remember that, in a market economy, resources sell at a price. This allows us to use the dollar cost of a lifesaving method to measure the value of the resources used up by that method.

Moreover, we can compare the “cost per year of life saved” of different methods. For example, in the United States we currently spend about $253 million on heart transplants each year and thereby add about 1,600 years to the lives of heart patients. Thus, the cost per year of life saved from heart transplants is $253,000,000/1,600 = $158,000 (rounded to the nearest thousand).

Table 6 lists several of the methods we currently use to save lives in the United States. Some of these methods reflect legal or regulatory decisions (such as the ban on asbestos) and others reflect standard medical practices (such as annual mammograms for women over 50). Other methods effectively save lives only sporadically (such as seat belts in school buses). You can see that the cost per life saved ranges widely—from $150 per year of life saved for a physician warning a patient to quit smoking, to over $66,000,000 per year of life saved from the ban on asbestos in automatic transmissions.

The table indicates that some lifesaving methods are highly cost effective. For example, our society probably exhausts the potential to save lives from brief physician antismoking intervention. Most doctors do warn their smoking patients to quit.

But the table also indicates some serious productive inefficiency in lifesaving. For example, screening and treating African-American newborns for sickle cell anemia is one of the least costly ways of saving a year of life in the United States—only $236 per year of life saved. Nevertheless, 20 percent of African-American newborns do not get this screening at all. Similarly, intensive intervention to discourage smoking is far from universal in the U.S. health care system, even though it has the relatively low cost of $2,587 per year of life saved.

Why is the less than universal use of these lower cost methods productively inefficient? To answer, let’s do some thought experiments. First, let’s imagine that we shift resources from heart transplants to intensive antismoking efforts. Then for each year of life we decided not to save with heart transplants, we would free up $157,821 in medical resources. If we applied those resources toward intensive antismoking efforts, at a cost of $2,587 per year of life saved, we could then save an additional $157,821/$2,587 = 61 life-years. In other words, we could increase the
number of life-years saved without any increase in resources flowing to the health care sector, and therefore, without any sacrifice in other goods and services. If you look back at the definition of productive inefficiency given earlier in this chapter, you’ll see why this is an example of it.

But why pick on heart transplants? Our ban on asbestos in automobile transmissions—which requires the purchase of more costly materials with greater quantities of scarce resources—costs us about $66 million for each life-year saved. Suppose these funds were spent instead to buy the resources needed to provide women aged 40 to 49 with annual mammograms (currently not part of most physicians’ recommendations). Then for each life-year lost to asbestos, we’d save $66 million/186,635 = 354 life-years from earlier detection of breast cancer.

Of course, allocating lifesaving resources is much more complicated than our discussion so far has implied. For one thing, the benefits of lifesaving efforts are not fully captured by “life-years saved” (or even by an alternative measure, which accounts for improvement in quality of life). The cost per life-year saved from mandating seat belts on school buses is extremely high—almost $3 million. This is mostly because very few children die in school bus accidents—about 11 per year in the entire United States—and, according to the National Traffic Safety Board, few of these deaths
One of the most fundamental concepts in economics is **opportunity cost**. The opportunity cost of any choice is what we give up when we make that choice. At the individual level, opportunity cost arises from the scarcity of time or money; for society as a whole, it arises from the scarcity of resources—land, labor, capital, and entrepreneurship. To produce and enjoy more of one thing, we must shift resources away from producing something else. The correct measure of cost is not just the money price we pay, but the opportunity cost: what we must give up when we make a choice. The **law of increasing opportunity cost** tells us that the more of something we produce, the greater the opportunity cost of producing still more.

In a world of scarce resources, each society must have an economic system—its way of organizing economic activity. All **economic systems** feature specialization, where each person and firm concentrates on a limited number of productive activities, and exchange, through which we obtain most of what we desire by trading with others. Specialization and exchange enable us to enjoy higher living standards than would be possible under self-sufficiency. One way that specialization increases living standards is by allowing each of us to concentrate on tasks in which we have a comparative advantage.

Every economic system determines how resources are owned and how they are allocated. In a market capitalist economy, resources are owned primarily by private individuals and allocated primarily through markets. Prices play an important role in markets by forcing decision makers to take account of society’s opportunity cost when they make choices.
as you move leftward and upward along this PPF. Does the law of increasing opportunity cost apply to the production of wheat? Explain briefly.

2. Suppose that you are considering what to do with an upcoming weekend. Here are your options, from least to most preferred: (1) Study for upcoming midterms; (2) fly to Colorado for a quick ski trip; (3) go into seclusion in your dorm room and try to improve your score on a computer game. What is the opportunity cost of a decision to play the computer game all weekend?

3. How would a technological innovation in lifesaving—say, the discovery of a cure for cancer—affect the PPF in Figure 7?

4. How would a technological innovation in the production of other goods—say, the invention of a new kind of robot that speeds up assembly-line manufacturing—affect the PPF in Figure 7?

5. Suppose that one day, Gilligan (the castaway) eats a magical island plant that turns him into an expert at everything. In particular, it now takes him just half an hour to pick a quart of berries, and 15 minutes to catch a fish.
   a. Redo Table 3 in the chapter.
   b. Who—Gilligan or Maryanne—has a comparative advantage in picking berries? In fishing? When the castaways discover each other, which of the two should specialize in which task?
   c. Can both castaways benefit from Gilligan’s new abilities? How?

6. Suppose that two different castaways, Mr. and Mrs. Howell, end up on a different island. Mr. Howell can pick 1 pineapple per hour, or 1 coconut. Mrs. Howell can pick 2 pineapples per hour, but it takes her two hours to pick a coconut.
   a. Construct a table like Table 3 showing Mr. and Mrs. Howell’s labor requirements.
   b. Who—Mr. or Mrs. Howell—has a comparative advantage in picking pineapples? In picking coconuts? Which of the two should specialize in which task?
   c. Assume that Mr. and Mrs. Howell had originally washed ashore on different parts of the island, and that they originally each spent 12 hours per day working, spending 6 hours picking pineapples and 6 hours picking coconuts. How will their total production change if they find each other and begin to specialize?

7. You and a friend have decided to work jointly on a course project. Frankly, your friend is a less than ideal partner. His skills as a researcher are such that he can review and outline only two articles a day. Moreover, his hunt-and-peck style limits him to only 10 pages of typing a day. On the other hand, in a day you can produce six outlines or type 20 pages.
   a. Who has an absolute advantage in outlining, you or your friend? What about typing?
   b. Who has a comparative advantage in outlining? In typing?
   c. According to the principle of comparative advantage, who should specialize in which task?

8. One might think that performing a mammogram once each year—as opposed to once every three years—would triple the cost per life saved. But according to Table 6, performing the exam annually raises the cost per life-year saved by about 40 times. Does this make sense? Explain.

9. Use the information in Table 1 as well as the assumption about foregone income made in the chapter to calculate the average opportunity cost of a year in college for a student at a four-year private institution under each of the following assumptions:
   a. The student receives free room and board at home at no opportunity cost to the parents.
   b. The student receives an academic scholarship covering all tuition and fees (in the form of a grant, not a loan or a work study aid).
   c. The student works half time while at school at no additional emotional cost.

10. Use the information in Table 1 as well as the assumption about foregone income made in the chapter to compare the opportunity cost of attending a year of college for a student at a two-year public college under each of the following assumptions.
   a. The student receives free room and board at home at no opportunity cost to the parents.
   b. The student receives an academic scholarship covering all tuition and fees (in the form of a grant, not a loan or a work study aid).
   c. The student works half time while at school at no additional emotional cost.

11. Consider Kylie, who has been awarded academic scholarships covering all tuition and fees at three different colleges. College #1 is a two-year public college. College #2 is a four-year public college, and College #3 is a four-year private college. Explain why, if the decision is based solely on opportunity cost, Kylie will turn down her largest scholarship offers. (Use Table 1 in the chapter.)

12. Suppose the Internet enables more production of other goods and helps to save lives (for simplicity, assume proportional increases).
   a. Show how the PPF in Figure 7 would be affected.
   b. Does this affect any of the general conclusions about economic growth?

13. Suppose that an economy’s PPF is a straight line, rather than a bowed out, concave curve. What would this say about the nature of opportunity cost as production is shifted from one good to the other?