PART I: Foundations of Economics
We'll start our adventure by introducing you to the four core principles that provide the foundation of all economic analysis. Taken together, they form a decision-making framework that you can apply to make better decisions. Your goal here is to develop your economic intuition so that you can apply these principles to real decisions that you'll face in your personal and professional life.

Next, we’ll put that economic intuition to work by applying the core principles to understand how people decide what to buy and what to sell. We’ll build your understanding of the building blocks of economic analysis: demand and supply. You’ll learn to analyze how these market forces lead to an equilibrium that determines the price and quantity of nearly everything.

As you progress through these four chapters, you’ll begin to sense the supply and demand forces at play in your everyday life—from the things you buy to the attention you supply to different endeavors. Building a solid foundation in economics will provide you with an economic toolkit that will serve you well long after you have finished this course.

### The Core Principles of Economics
Learn the four core principles that provide the foundation of all economic analysis, and use them to analyze choices and make better decisions.

- Why is it useful to learn to think like an economist?
- How do you evaluate costs and benefits?
- Which costs should you look at when evaluating a choice?
- Why should you learn to think on the margin?
- How do all our decisions interact?

### Demand: Thinking Like a Buyer
Understand people's buying (or demand) decisions.

- What is the shape of your individual demand curve?
- How can you apply the core principles of economics to make good buying decisions?
- How does individual demand add up to market demand?
- Which factors shift demand curves?

### Supply: Thinking Like a Seller
Learn how businesses make supply decisions.

- What is the shape of your individual supply curve?
- How can you apply the core principles to make good supply decisions?
- How does individual supply add up to market supply?
- Which factors shift supply curves?
- What's the difference between movement along a supply?

### Equilibrium: Where Supply Meets Demand
Analyze how supply and demand determine the equilibrium price and quantity.

- How do markets determine what is produced, and how it is allocated?
- How do markets bring supply and demand into balance?
- What happens when demand and supply shift?
- What do changes in prices and quantity reveal?
Chapter Objective

Learn the four core principles that provide the foundation of all economic analysis, and use them to analyze choices and make better decisions.

1.1 A Principled Approach to Economics
Understand economics as a way of thinking, grounded in a set of broadly applicable principles that you’ll find useful “in the ordinary business of life.”

1.2 The Cost-Benefit Principle
The Cost-Benefit Principle: Costs and benefits are the incentives that shape decisions. You should evaluate the full set of costs and benefits of any choice, and only pursue those whose benefits are at least as large as their costs.

1.3 The Opportunity Cost Principle
The Opportunity Cost Principle: The true cost of something is the next best alternative you must give up to get it. Your decisions should reflect this opportunity cost, rather than just the out-of-pocket financial costs.

1.4 The Marginal Principle
The Marginal Principle: Decisions about quantities are best made incrementally. You should break “how many” decisions down into a series of smaller, or marginal, decisions.

1.5 The Interdependence Principle
The Interdependence Principle: Your best choice depends on your other choices, the choices others make, developments in other markets, and expectations about the future. When any of these factors change, your best choice might change.

I remember sitting where you’re sitting—in an introductory economics class—a few years back. (OK, quite a few.) I didn’t exactly know what to think about the subject, or where it would lead me. I felt one part excitement, and two parts trepidation. Ultimately that class changed my life. It provided me with an approach to thinking that is both broad and powerful. It gave me a new lens through which I could understand the world. It provided clarity and insight. And above all, it was useful. I’m not exaggerating when I say that not a day goes by when I don’t use the tools I learned in that introductory class. Learning economics was the best investment I ever made.

While some parts of that class came naturally, other parts seemed unnecessarily complicated. And so I kept studying economics in order to master these complexities. But a funny thing happened along the way: The more I studied the subject, the more I came to understand that, in fact, economics isn’t all that complicated. Sometimes economists just make it sound complicated.

I learned that economics is just a small set of ideas—or principles—that you can apply over and over. It took me a decade to fully understand the power and reach of these principles. But it needn’t take you that long. That’s why I wrote the book that you’re reading right now: I want to teach you these powerful principles, and I want you to learn how to use them. I believe that everyone can benefit from the clarity that economic tools bring. And I hope that by the end of this chapter, you’ll have mastered what it took me so long to learn: That economics is built upon four core principles that can be used to provide insight into just about any problem that’s worth thinking about.

I invested much of my adult life learning this, and I still reckon it was worth it. For you, it’s just one chapter, so it’s a much better investment. So let’s dig in.
1.1 A Principled Approach to Economics

Learning Objective  Understand economics as a way of thinking, grounded in a set of broadly applicable principles that you’ll find useful “in the ordinary business of life.”

Economics is not just about money, nor is it just about business or even government policy—though it can be helpful for understanding each of these. Rather, it’s a way of thinking, and the economic approach can also help you understand politics, families, careers, and just about every aspect of your life. The economic toolkit that will help you better manage your money, your employees, and your business will also help you better manage your time, your energy, and your relationships. It’ll provide you with guidance as you make both small decisions such as whether to walk out of a bad movie (you should), and the big ones, such as whether to buy a new car (it depends). Once you learn to think like an economist, you’ll find yourself constantly discovering new ways in which it can be useful.

Ultimately all of economics is built on a small set of principles that together define what it means to “think like an economist.” If you learn these core principles, you’ll be able to do this too. Following this principled approach means that rather than memorizing facts about the economy, you’ll learn a systematic approach to thinking about the world.

The Economic Approach

One famous definition of economics describes it as the study of people “in the ordinary business of life.” I like this definition because it hints at the idea that the same principles that you might use to analyze business decisions will also be useful for analyzing the decisions that arise in everyday life. But rather than memorizing this specific definition, I want you to learn to do economics. That’s what this chapter is all about. Think about economics as a toolkit, and this chapter as an introduction to actively using these tools.

We’re going to start with the four core principles that comprise the foundation upon which all economic reasoning is based. They aren’t about any specific market or any particular decision. Rather, they define an approach to analyzing individual decisions and how they interact. Wrap your head around these ideas and connect them to the difficult choices you confront, and you’ll be doing economics. You’ll be translating basic economic principles into carefully considered actions. As you learn to employ the tools of the economist’s trade, you’ll quickly see how these principles can help you make better choices in both your personal life and your professional life. Internalize these principles, and you’ll find yourself doing economics every single day.

Think of the task ahead this way: In this chapter, you’ll learn the four core principles of economics. The rest of your study of economics will be about applying them. It’s an approach that’ll guide you through both microeconomics, in which you’ll study individual decisions and their implications for specific markets, as well as macroeconomics, in which you’ll trace through their broader implications across the whole economy.

A Systematic Framework for Making Decisions

The atom is the basic unit of matter, and so physicists begin by trying to understand the atom, and from that, build their insights into the functioning of our physical world. Biologists start with the cell, the basic building block of all living things, and build from there to understand how different organisms live. And for economists, individual decisions—choices—are the foundation of all economic forces. Your decisions, and those of others, collectively determine what’s made, who gets it, and whether it yields fair outcomes. Because these broad economic outcomes are the product of many individual choices, economic analysis always begins by focusing on individual decisions.
This is where the four core principles come in. Together, they provide a systematic framework for analyzing individual decisions. In particular, through the rest of this chapter, we’ll see that whenever economists evaluate a decision:

- We consider the costs and benefits of a choice. (The cost-benefit principle.)
- Before making a choice, we consider the alternatives, asking: “Or what?” (The opportunity cost principle.)
- We think at the margin, always asking whether a bit more or a bit less of something would be an improvement. (The marginal principle.)
- And we are particularly attuned to understanding how different decisions depend on each other. (The interdependence principle.)

Sounds straightforward, right? The challenge is going to be applying these ideas—which we’ll analyze through the rest of this chapter—to the wide array of decisions you’ll face in your life.

This systematic approach provides insight into just about every decision you face. Going shopping? Apply the core principles of economics, and you’ll likely make better choices about what to buy. Trying to decide whether to do further study? We’ll see that the core principles can help you sort out whether that’s a good idea. Thinking of starting your own business? Apply these principles to figure out whether that’s your best choice. Settling down, and trying to decide how many children you should have? Again, apply these principles.

If you get in the habit of thinking about economics through the core principles, you’ll develop a sharper understanding and make better decisions. Speaking of which, you now face an important decision: You have to decide whether to keep reading, or not. Thousands of my past students can attest that the benefit of learning to think like an economist far exceeds the cost. And as you’re about to discover, when the benefits exceed the costs, the first of these principles tells you that it’s a choice worth making.

### 1.2 The Cost-Benefit Principle

**Learning Objective** The Cost-Benefit Principle: Costs and benefits are the incentives that shape decisions. You should evaluate the full set of costs and benefits of any choice, and only pursue those whose benefits are at least as large as their costs.

Nerida Kyle is a 23-year-old economics graduate who is about to start her first full-time job, working as a human resources manager in Houston. She likes her new apartment, but there’s no metro rail station nearby, buses only come rarely, and she’s too far from work to bike or walk. Nerida figures that she’ll need to buy a car to get to work because the only other alternative is a costly Uber ride each way. But before she heads out car shopping, she finds herself wondering: Is buying a car really my best choice?

The **cost-benefit principle** says that costs and benefits are the *incentives* that shape decisions. This principle suggests that before you make any decision, you should:

- Evaluate the full set of costs and benefits associated with that choice.
- Pursue that choice, only if the benefits are at least as large as the costs.

This principle says that Nerida should buy a car only if it yields benefits that are at least as large as the cost. Because the balance of costs and benefits define Nerida’s incentive to buy the car, this principle is sometimes best remembered by its conclusion: *incentives matter.*

The **cost-benefit principle** isn’t just relevant when deciding whether to purchase a car—it is relevant for literally any choice that you might consider. Look around, and you’ll...
see that decisions people make—where to go to lunch, whether to study economics, and what career to pursue—reflect their incentives, as they weigh the balance of costs and benefits.

Although it may seem obvious to do something only if the benefits exceed the costs, following the cost-benefit principle can be more challenging than it sounds. The trick is to think broadly about what constitutes a cost or benefit.

**Quantifying Costs and Benefits**

The hardest part of analyzing costs and benefits can be figuring out how to compare very different aspects of a decision. Let’s think about a simpler choice: You walk into a coffee shop and have to decide whether to buy a coffee. The chalkboard above the counter says that the price of coffee is $3.

The cost-benefit principle says that you should buy the coffee if the benefit is at least as large as the cost. The cost is pretty easy to quantify: It’s the $3 you’ll have to fork over. The benefits, however, are harder to measure. After all, how do you quantify the rich aroma of freshly ground coffee, the earthy richness of the first sip, and the caffeine-fueled jolt that follows?

How do you compare these benefits with three dollar bills? It may seem like that old expression—that you can’t compare apples and oranges. But actually, you can.

Convert costs and benefits into dollars by evaluating your willingness to pay. There’s a simple trick that economists use: We convert each cost and benefit into its money equivalent. And that’s easier than you may think: Simply assess your willingness to pay. That is, ask yourself: What is the most that you would be willing to pay in order to obtain a particular benefit or to avoid a particular cost?

Let’s use this approach to quantify the benefits of coffee. Are you willing to pay $5 for it? If not, how about $4? Maybe $3? How about just $2? Maybe only $1? If you don’t like coffee, you probably aren’t willing to pay anything. If the most you are willing to pay is $4, then this is the dollar value of the benefits you receive from that coffee. You should always ask yourself about your willingness to pay before you look at the price. After all, you are simply trying to quantify the benefit you get from buying a cup of coffee, and that benefit depends on how delicious it is to you, not the price on the menu.

Money is just a tool for measuring value. pixabay/Allie Drozda

Let’s say that, like me, you are willing to pay up to $4 for a good cup of coffee. This doesn’t mean that you actually want to pay $4—of course you would prefer to pay a lower price, and you’re happy to see that it only costs $3. Now that you’ve answered the willingness-to-pay question, you have now quantified both the benefit ($4) and the cost ($3) of coffee in the same units (money). With costs and benefits in the same unit, it’s easy to apply the cost-benefit principle. In this case, the benefit exceeds the cost, so you should buy that coffee. Yum.

Money is the measuring stick, not the objective. Some people worry that converting costs and benefits into their monetary equivalents reflects an unhealthy obsession among economists with money, or a belief that money is the only thing that matters. But that’s dead wrong. Money is simply a common measuring stick that allows you to compare a wide variety of costs and benefits, taking account of both financial and nonfinancial aspects of a decision. Economists are no more obsessed with money than architects are obsessed with inches; these are just how we take our measurements.

This simple trick, of converting costs and benefits into their monetary equivalents, will allow you to take account of a wide variety of nonfinancial issues. For example, you can factor in the degree of satisfaction you get from a cup of coffee, and the value of your time or effort in getting to the café. Any consequence of your choices can be a cost or benefit, as long as it has meaning to you.
Interpreting the Data

What’s the benefit you get from Google?

What is the benefit to you from having access to Google? Even though the price of using Google is $0, the benefit from having all of the world’s information at your fingertips is much larger.

One way of answering this is to think about living without Google. Instead of Googling for answers, you would have to head to the library to answer most questions. Researchers have found that students can answer a typical question (“What scholarships are offered in the state of Washington?”) in about 7 minutes if they use Google, but it takes about 22 minutes to find the answer at the library. Once you factor in the number of searches people do, and put a value on the time saved, Google’s chief economist reckons these benefits from using Google add up to around $500 per year for the average American. Google illustrates an important point: The benefit you get from something can be unrelated to the price you pay.

The cost-benefit principle isn’t selfish—if you aren’t.

At first glance, it may seem like the cost-benefit principle says you should make selfish decisions. By this view, doing something nice—such as buying your friend a coffee—is all cost and no benefit. But this reasoning is wrong, and it comes from defining costs and benefits too narrowly. A careful cost-benefit analysis takes into account both the financial and nonfinancial aspects of a decision. Your innate generosity is an important nonfinancial aspect to consider. If you enjoy buying your friend a coffee—perhaps you like seeing them happy, or maybe you enjoy their company—then this is an important benefit that you need to account for.

How can you quantify this benefit? As with other nonfinancial benefits, you should think in terms of your willingness to pay: How much are you willing to pay so that your friend can enjoy a coffee? The more you enjoy doing nice things like this, the more you are willing to pay for it. Similarly, the benefit of donating time or money to a nonprofit will be high if the cause means a lot to you. You need to include these unselfish motivations in your cost-benefit calculations.

The key to using the cost-benefit principle properly is to think broadly about the full set of costs and benefits involved in your choices. When you account for your unselfish motivations, the cost-benefit principle will lead you to make unselfish choices.

Maximize Your Economic Surplus

When you follow the cost-benefit principle, every decision you make will yield larger benefits than costs. The difference between the benefits you enjoy and the costs you incur is called your economic surplus, and it is a measure of how much your decision has improved your well-being. Making good decisions is all about maximizing your economic surplus.

Follow the cost-benefit principle, and your choices will increase your economic surplus. In fact, you generate economic surplus every time you make a
decision in accord with the *cost-benefit principle*. Consider again what happened when you bought a cup of coffee: As a buyer, you gained something worth $4 to you (remember, that’s your willingness to pay for it), and in exchange, you transferred something worth only $3 (your money). This simple act of exchange generated an extra $1 worth of benefits to you! That’s your economic surplus.

Now think about the same transaction from the perspective of the seller—the entrepreneur who owns the café. If a cup of coffee costs $1 to make, then she has exchanged something worth $1 to her (some coffee beans, perhaps some milk and sugar, and a few minutes of a barista’s time) for something worth $3 (your money), generating $2 of economic surplus for her. Both buyer and seller are better off.

Let’s consider a more important example: Sony Music might offer you a job paying $45,000 per year, but you love the music industry so much that you would have accepted the job even if it paid only $35,000. If so, your new job yields you an economic surplus of $10,000. Of course, if Sony’s managers are following the *cost-benefit principle*, they offered you the job because they believe that you will generate benefits for them that exceed the $45,000 per year that they are offering to pay you. Perhaps by finding some great new bands, you are expected to generate an extra $75,000 per year in new revenue, generating $30,000 in economic surplus for them. The *cost-benefit principle* ensures that both you and Sony Music make choices that generate additional economic surplus, and avoid those that reduce your economic surplus.

**Both buyers and sellers benefit from voluntary exchange.** In each of the above examples, both the buyer and seller benefited from the transaction, with each earning an economic surplus. If buyers and sellers always follow the *cost-benefit principle*, then each will choose to trade only if the benefits to them are at least as large as their costs. This ensures that all transactions will yield economic surplus. This idea of both sides benefiting from a voluntary exchange lies at the heart of all economic transactions.

This insight should shape how you think about economic transactions. Often non-economists think about the economy like a sporting competition—that if you gain, I lose. It’s a colorful analogy—but it is false. It’s often more useful to think of economic transactions as being more like cooperation than competition. The café owner has something you really want (coffee), and you have something they really want (money). By cooperating, you can make each other better off. Similarly, you may have something Sony Music really wants (the ability to identify great bands, and in doing so you might generate $75,000 in new revenue for them) and they have something you want (a fun job and a good salary). Both buyers and sellers benefit from voluntary exchange, as long as they each follow the *cost-benefit principle*.

**Focus on Costs and Benefits, Not How They’re Framed**

The *cost-benefit principle* says that you should make choices based on the underlying costs and benefits of the choice you face, rather than how they are described, or *framed*. But sellers will often try to make this difficult.

For instance, whenever a shirt is on sale, the price tag will show both the sale price and the original price. However, the amount of money you “save” is irrelevant. Instead, you need to ask yourself a simple question: Do the benefits of this shirt outweigh the cost (the sale price)? Similarly, many restaurants include one outrageously expensive item on the menu, even though no one orders it. (Lobster, anyone?) This overpriced
lobster makes everything else on the menu look cheap by comparison. The restaurant hopes that with the money you “saved” by not ordering lobster, you’ll be tempted to order an appetizer, drink, or dessert. And some people do succumb to this temptation. This is a mistake: Your choice of food should depend on costs and benefits, and not something irrelevant, such as whether there’s an overpriced lobster on the menu.

Following the advice of the \textit{cost-benefit principle} can be harder than it sounds. For instance, how would you respond to the following scenario:

\begin{center}
\textbf{Do the Economics}
\end{center}

You’re the CEO of a large but struggling insurance company. Sales have fallen, and you need to cut costs in order to avoid losing money this year. You anticipate needing to fire 6,000 of your employees. Your management team has been exploring alternatives to this drastic action. During your Monday morning meeting, they suggest two possible plans:

- \textbf{Plan A:} Saves 2,000 jobs.
- \textbf{Plan B:} Has a one-in-three chance of saving all 6,000 jobs, but a two-in-three chance of saving no jobs at all.

Which plan would you choose?

\begin{itemize}
  \item Plan A \quad \square
  \item Plan B \quad \square
\end{itemize}

You arrive back at work on Tuesday, and your management team tells you that they have figured out a new set of alternatives to consider. They present the following two different alternatives:

- \textbf{Plan 1:} Will result in the certain loss of 4,000 jobs.
- \textbf{Plan 2:} Has a two-in-three chance of losing all 6,000 jobs, but a one-in-three chance of losing no jobs.

Which plan would you choose?

\begin{itemize}
  \item Plan 1 \quad \square
  \item Plan 2 \quad \square
\end{itemize}

As the manager of your own life, you are going to confront high-stakes decisions just like this one.

Let’s now turn from using your gut to make decisions, to rigorously applying the \textit{cost-benefit principle}. If you compare the choices you were offered on Monday with those offered on Tuesday, you will soon realize: They are identical! They were simply framed differently. That’s right: Since the total number of jobs at stake is 6,000, Plan A, which saves 2,000 jobs, is the same as Plan 1, which loses 4,000 jobs. Similarly, a one-in-three chance of saving 6,000 jobs in Plan B is the same as a one-in-three chance of losing no jobs in Plan 2.

So, if you chose Plan A on Monday, you also should have chosen Plan 1 on Tuesday, and if you chose Plan B on Monday, you also should have chosen Plan 2 on Tuesday. However, it’s possible that your choices between Monday and Tuesday were not consistent. If so, you’re not alone.

In fact, around 80% of people choose Plan A when offered a choice between Plans A and B, and about 80% of people choose Plan 2 when offered a choice between Plans 1 and 2. This means that most people change their decision depending on how it is described. And that’s a mistake.

\begin{center}
\textbf{Framing effects can lead you astray.} This is an example of a broader problem. Psychologists have documented that small differences in how alternatives are described, or framed, can lead people to make different choices. This phenomenon is
\end{center}
facing effect: When a decision is affected by how a choice is described, or framed. You should avoid framing effects altering your own decisions.

known as the framing effect. But while the framing effect is common, it is not rational, and you don’t want your decision making to be this arbitrary. If you want to make good decisions that aren’t affected by how your choices are described, you should follow the cost-benefit principle. That is, you should evaluate the full set of costs and benefits of each alternative and only pursue those whose benefits are at least as large as their costs.

If you rigorously followed the cost-benefit principle, laying out the pros and cons of each plan, you would’ve ended up with an analysis like that in Figure 1.

**Figure 1 | Costs and Benefits of Each Plan**

<table>
<thead>
<tr>
<th>Monday’s alternatives</th>
<th>Tuesday’s alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plan A</td>
</tr>
<tr>
<td>Benefit</td>
<td>Save 2,000 jobs</td>
</tr>
<tr>
<td>Cost</td>
<td>Lose 4,000 jobs*</td>
</tr>
</tbody>
</table>

*Remember: If you do nothing, your firm will lose 6,000 jobs.

When you articulate your costs and benefits this clearly, you’re less likely to fall prey to framing effects.

**Applying the Cost-Benefit Principle**

Let’s return to the decision we started with: Should Nerida buy a car or simply take an Uber to work every day? Since she’s trying to decide what to do over the next year, she should consider the costs and benefits that accrue over that year. Here are the costs she came up with:

- She can buy a 5-year-old Ford Focus for $10,000, however, she can sell it for $8,000 after using it for the year.
- She expects to drive 5 miles to and from work, 5 days a week, for 50 weeks per year (she takes 2 weeks off for vacation), and she anticipates getting 25 miles per gallon. Gas currently sells for $3 per gallon.
- Insurance costs $1,500 per year.
- She anticipates spending another $500 per year on repairs.
- Parking costs $5 per day.

The benefit of buying a car will be the Uber fares that she doesn’t have to pay. Each time she avoids taking an Uber to or from work, she’ll save $10 in fares. Over the course of a year, this will add up to $5,000. (For now, let’s say that this is the only benefit she gets from owning a car, because she can borrow her roommate’s car on the weekends.)

Figure 2 tallies up the costs and benefits. This is a useful exercise, highlighting just how expensive the total costs of driving are. Once Nerida considers all the hidden costs, the total cost of having her own car for one year adds up to $5,550! This annual cost is larger than the $5,000 benefit of not having to pay for an Uber each day. So while it feels decadent, Nerida takes an Uber to and from work every day. And this earns $550 worth of economic surplus—not a bad return for doing a few quick calculations!
The true cost of car ownership

Are you surprised by how expensive car ownership is? In fact, for many people, it’s even more costly than this. You won’t make the right decision about whether to buy a car unless you account for the full set of costs and benefits associated with owning a car. To help you, the American Automobile Association (AAA) publishes a worksheet to help people figure out the true cost of car ownership. A typical family car costs $9,887 per year to run. Click through to https://exchange.aaa.com/automotive/driving-costs and calculate what it’ll cost you. The results might surprise you.

Calculate costs and benefits, relative to your next best alternative. Let’s pause to notice something important about how Nerida calculated her costs and benefits. She’s comparing buying a car with taking an Uber to work instead. That is, she’s comparing one possibility—driving to work—with its next best alternative, which is taking an Uber. In fact, this is exactly the type of thinking that lies at the heart of our next principle: the opportunity cost principle. It’s an important principle because it’ll help you count your costs and benefits properly.

1.3 The Opportunity Cost Principle

Learning Objective The Opportunity Cost Principle: The true cost of something is the next best alternative you must give up to get it. Your decisions should reflect this opportunity cost, rather than just the out-of-pocket financial costs.

Nerida has enjoyed a fair bit of success in her first three years of work. She has also noticed that many of the executives she admires have advanced degrees. In the long run, she
might be even more successful if she studied for a Master of Business Administration (MBA). But is it worth it? The cost-benefit principle tells her that a good decision requires comparing the relevant benefits and costs. The benefits of an MBA are better career prospects. Indeed, careful studies show that MBAs earn around 10% more than comparable college graduates. But what are the costs?

**Opportunity Costs Reflect Scarcity**

The most obvious cost of an MBA is tuition, which is about $60,000 per year. But this isn’t the only cost. For instance, if Nerida pursues an MBA full time, she’ll have to quit her job. The more Nerida thinks about it, the more she realizes that some costs aren’t always obvious. And so she is left wondering: How can you be sure that your decisions reflect your true costs and benefits?

The opportunity cost of something is the next best alternative you have to give up to get it. Your decisions should reflect your opportunity cost, rather than just out-of-pocket costs, because the true cost of something is what you must give up to get it. This principle reminds you that whether you are deciding how to spend your money, your time, or anything else, you should think about its alternative uses. It tells you to assess the consequences of your choice relative to the best of your alternatives. The principle forces you to focus on the real trade-offs you face, and in doing so you will make better decisions. The opportunity cost principle is such a fundamental part of economic thinking that when economists say “costs,” we really mean opportunity costs.

Let’s now see how thinking about opportunity costs might lead you to assess your decisions differently.

People who haven’t studied economics tend to think about the cost of something as the out-of-pocket financial cost—how much money they have to take out of their back pocket to pay for it. But this can be very misleading. For instance, studying economics in the library until closing time every day doesn’t lead to any extra out-of-pocket costs. If this were the right way to think about costs, then you would be in the library studying economics whenever it’s open, since the benefit (learning more economics, which helps you make better decisions) surely offsets the out-of-pocket cost of zero. But this ignores other important costs. Your time is scarce, and so each hour spent studying economics has an opportunity cost, because it’s an hour that you can’t spend studying psychology, marketing, history, or math. It’s also an hour you can’t spend sleeping, working, or just enjoying life. You should only study another hour of economics if it yields benefits that are at least as large as those of the best of these alternatives.

The opportunity cost principle leads you to focus on the true trade-offs you face. If you make one choice (studying economics until 3 a.m.), what is the best alternative that you’re forced to give up? Just as the opportunity cost principle can help you better allocate your time (as in this example), it can help you better allocate your scarce money, attention, and resources.

The opportunity cost principle highlights the problem of scarcity. If you ever think that a choice involves no costs, think again. Even if there’s no out-of-pocket cost, there’s always an opportunity cost. The logic is simple: Whenever you choose to do something, you are implicitly choosing not to do something else. Deciding to go to the movies? That’s a decision not to spend two hours preparing for class. The forgone opportunity to pursue an activity is the opportunity cost that you need to consider.

This opportunity cost arises because of a fundamental economic problem: scarcity. Your resources are limited—that is, they’re scarce. It’s not just that you have limited income, but you also have limited time (only 24 hours in a day), limited attention, and limited willpower. Any resources you spend pursuing one activity leaves fewer resources to pursue others. Scarcity implies that you always face a trade-off. Whenever you use any scarce resource—your time, money, attention, willpower, or other resources—there’s an opportunity cost.
EVERYDAY Economics

The opportunity cost is the road not taken

The opportunity cost principle even informs some poetry. Consider the last stanza of the poem “The Road Not Taken,” by the great American poet Robert Frost:

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.

Frost’s traveler has come to a fork in the road, and faces a stark choice: which path to take. What is the opportunity cost of taking one path? The opportunity cost is the road not taken. Frost’s traveler takes “the one less traveled by,” and when he says that this “has made all the difference,” he is comparing it to his next best alternative. You can think of the opportunity cost principle as asking you to consider “the road not taken.”

Calculating Your Opportunity Costs

Remember, the opportunity cost of something is what you give up to get it. So, if you want to make sure that you are evaluating your opportunity cost correctly, you should ask yourself just two questions:

1. What happens if you pursue your choice?
2. What happens under your next best alternative?

That’s it. Now, let’s apply this principle to figuring out the true opportunity cost of pursuing an MBA.

1. What happens if Nerida pursues an MBA?
   If Nerida pursues an MBA, she’ll quit her job, pay tuition, pay for room and board, and spend a lot of time studying. These consequences are listed in the first column of Figure 3.

2. What happens if Nerida pursues her next best alternative?
   Nerida’s next best alternative is to keep working in her current job. If she chooses this route, she won’t have to pay tuition, she’ll earn $70,000 per year, she’ll still have to pay for rent and meals, and she’ll spend her days working. These consequences are listed in the second column of Figure 3.

Figure 3 | The Opportunity Costs of Pursuing an MBA (per year)

<table>
<thead>
<tr>
<th>Costs of her choice</th>
<th>Costs of her next best alternative</th>
<th>Opportunity cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Nerida pursues an MBA</td>
<td>If she continues to work full time instead</td>
<td>The cost of an MBA, relative to working full time</td>
</tr>
<tr>
<td>Tuition costs $60,000</td>
<td>She won’t pay tuition</td>
<td>$60,000 tuition</td>
</tr>
<tr>
<td>She quits her job</td>
<td>She earns $70,000 from her job</td>
<td>$70,000 in forgone income</td>
</tr>
<tr>
<td>Room and board cost $24,000</td>
<td>Rent and meals cost $24,000</td>
<td>No opportunity cost</td>
</tr>
<tr>
<td>10 hours per day studying</td>
<td>10 hours per day at work</td>
<td>No opportunity cost (She works 10 hours per day either way)</td>
</tr>
</tbody>
</table>

= $130,000 per year in total opportunity cost
If the opportunity cost of something is what you must give up to get it, then it's the difference between the consequences of making that choice and the consequences of the next best alternative. And so the opportunity cost of pursuing an MBA—shown in the final column of Figure 3—is equal to the first column minus the second column. We’ve found that the opportunity cost of pursuing an MBA is $130,000 per year, and so a two-year program comes at a cost of $260,000. This analysis reveals that Nerida should pursue an MBA only if the benefit exceeds the total opportunity cost of $260,000.

Your analysis has revealed four important lessons about opportunity costs:

**Lesson one: Some out-of-pockets costs are opportunity costs.** The first cost that Nerida thought about was the $60,000 per year cost of tuition. Obviously this is an out-of-pocket cost. It is also an opportunity cost—she has to pay tuition if she pursues an MBA, but she wouldn’t incur this expense if she pursued her next best alternative, which is continuing in her current job.

**Lesson two: Opportunity costs need not involve out-of-pocket financial costs.** But focusing too much on out-of-pocket financial costs might lead you to miss important opportunity costs. For instance, one of the biggest costs of pursuing an MBA is the salary that you forgo when you leave your job. Nerida is currently earning $70,000 per year, so going without this paycheck is a substantial opportunity cost!

**Lesson three: Not all out-of-pocket costs are real opportunity costs.** Paying too much attention to out-of-pocket financial costs can also lead you to think about factors that aren’t actually relevant opportunity costs. For instance, if Nerida pursues an MBA, she’ll have to pay $24,000 per year for room and board. But room and board isn’t a cost that should be associated with getting your MBA, since even if you didn’t pursue an MBA, you would still have to pay for food and housing. If the expense is the same, and if you have to pay for it under either alternative, then it’s not an opportunity cost.

**Lesson four: Some nonfinancial costs are not opportunity costs.** There are also nonfinancial costs of pursuing an MBA. For instance, Nerida will have to work hard, studying 10 hours per day. But in her current job, Nerida also works hard for 10 hours per day. Thus, relative to her next best alternative, the hard work demanded by an MBA program isn’t an opportunity cost.

**EVERYDAY Economics**

**The true cost of college**

You now have the tools you need to assess the true cost of your own college experience. I bet you thought about the cost of college before applying, and you probably looked up the numbers on your college’s website. But you were probably thinking about it wrong. That website probably listed the cost of things such as tuition, housing, meals, books, and health insurance—a list that is surprisingly unhelpful for evaluating the true opportunity cost of attending college.

For that, you need to know: If you weren’t attending college, what would be different? It’s true that you wouldn’t be paying tuition, so that’s an opportunity cost. But you would surely continue to eat, so the cost of food isn’t an opportunity cost. The same goes for the cost of rent and health insurance. College websites always manage to omit the biggest cost of going to college, which is that if you weren’t studying, you would probably be working and earning tens of thousands of dollars. Those forgone earnings are an important opportunity cost that you need to consider.
Yes, going to college involves a large opportunity cost. But hopefully applying the opportunity cost principle to your decisions while you’re in college will help you make sure that the benefit of your college education exceeds the cost.

The “Or What?” Trick

Here’s a simple trick to ensure that you are always applying the opportunity cost principle correctly: Whenever you pose a question, the word “OR” should be in the middle of your sentence. That is, when Nerida asks, “Should I get an MBA?” she is only asking half the question. She needs to add: “OR keep working?” The “OR” part of this sentence forces you to consider your alternatives, which is at the heart of the opportunity cost principle. So remember, always ask: “Or what?” Sometimes you’ll find that you can list more than one alternative. When this happens, just remember that the opportunity cost is the best of these alternatives. So you have a choice: Use this simple trick, OR sometimes make bad choices.

Do the Economics

What are the opportunity costs of each of the following choices?

- Should you hang out with your friends on Saturday afternoon?
  Or what? Or should you study for Tuesday’s exam?
- Should you devote a lot of time to an extracurricular activity and aim for a top leadership position?
  Or what? Or should you study a lot more and aim for straight A’s?
- Should you do an unpaid internship this summer?
  Or what? Or should you continue waiting tables?
- Should you hire your best friend to work in your family business?
  Or what? Or should you hire someone else?
- Should you invest your savings in the stock market, where your savings can grow a lot in value over the long run, but where they can also fall in value?
  Or what? Or should you invest your savings in the bank, where the value of your savings will stay roughly the same?
- Should your online store export its goods, selling them to people overseas?
  Or what? Or sell them only to people domestically instead?
- Should you spend all of your income?
  Or what? Or should you save some of your income, to spend it in the future?

Your actual answers to these questions are unique to you, but they still make up some of the biggest costs you’ll face. That’s why you’re learning the tools of economics, so that you can make better decisions for your own unique life.

How Entrepreneurs Think About Opportunity Cost

The opportunity cost principle is also critical to how entrepreneurs evaluate whether or not to start a business. Just as you shouldn’t be overly focused on out-of-pocket costs, entrepreneurs know to look beyond their business revenues and financial costs. They also understand that starting a new business imposes some hard-to-see opportunity costs. The “or what” approach makes these costs clearer. Starting a new business requires confronting the following two questions:

- Should you start a new business or stay in your current job?
  Starting a new business means quitting your job and, thus, giving up your regular paycheck. These forgone earnings are the opportunity cost of an entrepreneur’s time.
• **Should you invest your money in the new business or leave it in the bank?**

   Investing your money in your business means not investing it in the bank, and so not earning interest. This *forgone interest* is the opportunity cost of an entrepreneur’s capital.

So when you are thinking about starting a new business, it isn’t enough just to figure out whether you’ll earn a financial profit. Starting a business is only a good idea if the benefit it yields—those financial profits—are large enough to offset the opportunity cost of the income you forgo by investing both your time and your money into this business, rather than your next best alternatives.

**You Should Ignore Sunk Costs**

Sometimes when you’ve spent a lot of time or money on a project, you may think: “I can’t stop now; I’ve already put so much into this project.” But this is a mistake. When the time, effort, and other costs you put into the project cannot be reversed, they are referred to as *sunk costs*. And good decision makers ignore sunk costs. Why? The *opportunity cost principle* asks you to compare the consequences of your choice with the consequences of the next best alternative. Since sunk costs can’t be reversed, you’ll incur those costs under either scenario, which means that they are not opportunity costs. Thus, you should ignore sunk costs. There’s another way to say this: Let bygones be bygones.

Unfortunately, many of us find it hard to ignore sunk costs in our everyday lives. Have you ever seen anyone stay in an unhappy relationship because they’ve already spent so much time working on it? Or perhaps you’ve seen someone stay in a college major, job, or career that they hate, figuring that it’s the right thing to do, given how much time and effort they have put into it. Sometimes corporate executives make similar mistakes, throwing good money after bad, in the hope that an investment project will eventually pay off.

**Do the Economics**

It is easy to fall for the sunk-cost fallacy. Think about the following scenarios:

a. *Yesterday you bought a Halloween costume for $35 to wear to a friend’s Halloween party. But today you’re feeling sick, and as you’re getting dressed to go to the party, you realize that you won’t enjoy it. Do you head to the party?*

b. *You paid $13 for movie tickets. But 30 minutes into the film, you’ve seen enough: The acting is terrible, the plot is predictable, and the jokes are cringe-worthy. Do you stay for the last hour?*

c. *You found a great deal for spring break: a $700 package deal to Puerto Rico. You immediately buy the package and tell your friends about it. Unfortunately, by the time they call, tickets are sold out. Instead, your friends decide to drive to Miami, where you can all stay for free with your best friend’s uncle. You would prefer to be with your friends, but the $700 ticket is nonrefundable. Do you go to Puerto Rico?*

**Applying the Opportunity Cost Principle**

The *opportunity cost principle* is an incredibly powerful tool that can help you better understand all sorts of decisions. The following examples illustrate just how important it is in explaining the decisions that people make.

**Why do more people go to the movies during an economic downturn?**

During the recent economic downturn, the major film studios braced themselves for a major decline in business. But they shouldn’t have. Why? The most important cost of seeing a movie isn’t the $13 price of the ticket. Instead, it’s the opportunity cost of your
time. The movie takes two hours, and you could spend this time doing something else. Perhaps you could be working instead of seeing the movie. But when the economy is weak, there are fewer jobs, and there is often less work to do, and so the opportunity cost of your time is lower. Or perhaps the alternative to the movie is going to a party. But fewer people throw parties when the economy is weak, so your alternative may be a night watching television. Because the opportunity cost of time is lower during an economic downturn, people choose to see more movies. In fact, a weak economy is often good news for the movie industry.

**Why not get married as soon as you turn 16?** Many high school students get involved in romantic relationships, but very few get married at age 16. Why? The choice you face is: Should I get married or keep searching for a better match? At age 16, you may have had only a couple of romantic entanglements, and so the possibility that later on you’ll meet someone who’s an even better match is pretty high. That is, the opportunity cost of marriage—the opportunity to search for an even better partner—is high. By your twenties and thirties, you have more life experience and have met people from many spheres of life. While there’s always the possibility that you’ll find someone even better later on, the opportunity cost of getting married is likely to be much lower.

**Why do the terminally ill want unproven experimental drugs?** Most people are unwilling to take unproven experimental drugs, because they fear that the drugs will do more harm than good. But people with terminal illnesses sometimes plead with their doctors to be allowed to be part of a new medical trial. Why? For healthy people, the choice they face is between taking part in a risky experiment and continuing with their healthy, happy lives. For those with terminal illnesses, the alternative to the risky experiment is continued illness and probable death. Due to this lower opportunity cost, people with severe illnesses are willing to take risks that others are not.

**Why I don’t eat free doughnuts.** Early-morning business meetings often include a tray of doughnuts on the conference table. These donuts are delicious, and they’re free, but I never eat them. Why? In order to stay healthy, I try to limit myself to only one indulgence each day. So I face a choice: should I eat the donut or enjoy a bowl of ice cream tonight? And I love ice cream. So while the financial cost of the donut is $0, it’s still too expensive, because the opportunity cost of a donut is an even more delicious bowl of ice cream.

**Why are there fewer stay-at-home moms?** In 1975, more than half of all mothers stayed out of the labor force. Since then, things have changed, and the most recent data suggest that only 30% of moms stay at home. Why? Most mothers face a choice between staying at home and working for pay. Over recent decades, there has been a sharp rise in women’s wages, and since 1975, the annual earnings of a typical full-time female worker rose by around $10,000 (after adjusting for inflation), even as male earnings barely changed. Consequently, the opportunity cost of being a stay-at-home mom has risen. As this opportunity cost has risen, fewer women have chosen to stay at home. Instead, more women are now choosing to combine motherhood and working for increasingly better pay.
The Production Possibility Frontier

Sometimes you’ll find it useful to visualize your opportunity costs. That’s what the production possibility frontier is for—it maps out the different sets of output that are attainable with your scarce resources. It illustrates the trade-offs—that is, the opportunity costs—you confront when deciding how best to allocate scarce resources like your time, money, raw inputs, or production capacity.

The production possibility frontier illustrates your alternative outputs. Let’s see how this applies to your study time. If you have three hours per night to study, you can allocate that time between studying economics and studying psychology. Perhaps each extra hour per night you devote to studying economics will raise your econ grade by 8 points, while allocating that time to studying psychology instead will boost your psych grade by only 4 points.

Effectively you’re the CEO of a grades-producing factory whose inputs are study time and whose outputs are grades. You can devote your factory’s resources to boosting your econ or psych scores to varying degrees. At one extreme, you could spend all three hours studying economics, which would raise your econ grade by 24 points (and psych by nothing). At the other extreme, you could spend all three hours studying psychology, which would boost your psych grade by 12 points (and econ by nothing). In between there’s a bunch of other possibilities for allocating your study time, each of which corresponds to a point on your production possibility frontier. Together, these points form a frontier, shown in Figure 4 as a straight line (although in many other cases, your production possibilities frontier may be a bowed-out curve). We call this a frontier, because it describes the most that you can produce given your current circumstances. If you waste your resources, or use them inefficiently, you won’t even hit this frontier, and you’ll end up producing less of each output than you otherwise could.

**Figure 4** The Production Possibility Frontier

You have 3 hours per night to devote to studying either economics (where each hour will boost your grade by 8 points) or psychology (where each hour will boost your grade by 4 points). The production possibility frontier shows what you can produce with alternative allocations of your time.

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**production possibility frontier** Shows the different sets of output that are attainable with your scarce resources.

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Moving along your production possibility frontier reveals your opportunity costs. When you’re on your production possibility frontier, you can’t produce more of one output unless you produce less of the other. Moving along your production possibility frontier highlights this opportunity cost: Every hour you devote to studying psychology (which boosts your psych grade by 4 points) is one less hour you can devote to economics (which would have boosted your econ grade by 8 points). As a result, the opportunity cost of adding 4 more points to your psych grade is earning 8 fewer points on econ.

Productivity gains shift your production possibility frontier outward. So, what if you want to produce more than is possible with your production possibility frontier? Well, you’ll have to change something. One way to do that is to discover new production techniques that allow you to do more with the same amount of inputs. For example, if you uncover more effective study habits (my advice: reading the text before class is much more productive than cramming weeks later) you might be able to increase the grade boost that comes from each hour you spend studying. This increase in productivity shifts out your production possibility frontier (or PPF for short). But even if you get better at studying psych and econ, your resources are still limited; and so there’s still an opportunity cost to your time.

Recap: Evaluating Either/Or Decisions

Let’s take a breath, and take stock. The two principles that we have studied so far provide useful guidance whenever you are trying to decide whether or not to do something—such as whether to get an MBA, whether to get married, whether to go to a movie, and whether to look for a job. Since you either choose to do these things or not, we call these “either/or” choices. The cost-benefit principle says: Do it if the benefits are at least as large as the costs. But what are the costs? The opportunity cost principle says that the true cost of something is the best alternative you give up to get it. Taken together, these principles say: You should pursue your choice if it yields benefits that are at least as large as the opportunity cost, which is your next best alternative.

But many choices are “how many” rather than “either/or” choices. Consider some examples: How many classes should you take? How many workers should you hire? How many children should you have? When you face “how many” questions, you’ll need to use one more core principle, the marginal principle, which will allow you to simplify even incredibly complicated “how many” choices into a series of much simpler “either/or” choices. This will help you answer a much wider range of questions, since you’ve already figured out how to make good “either/or” choices.
1.4 The Marginal Principle

Learning Objective The Marginal Principle: Decisions about quantities are best made incrementally. You should break “how many” decisions down into a series of smaller, or marginal, decisions.

Let’s revisit Nerida, a few years after business school. She has decided to combine her entrepreneurial savvy with her love of food by opening an Italian restaurant. She has already chosen a location and remodeled it. Next she needs to decide how many workers to hire. The benefit of hiring a larger staff is that she’ll serve more meals leading to higher revenue. But this also means higher costs—because more staff means a higher wage bill and selling more meals means buying more fresh produce. As with so many things, there’s a trade-off. So, Nerida wonders just how many workers she should hire.

The marginal principle says that decisions about quantities are best made incrementally. Whenever you face a decision about how many of something to choose (such as, “How many workers should I hire?”), it is always easier to break it into a series of smaller, or marginal, decisions (such as, “Should I hire one more worker?”).

The marginal principle suggests that you evaluate whether the extra benefit from hiring one more worker exceeds the extra cost of that extra worker. We call the extra benefit you get from one more worker the marginal benefit; the extra cost of that worker is called the marginal cost. Applying the cost-benefit principle to this marginal choice, you should hire one more worker only if the marginal benefit exceeds the marginal cost.

As Figure 5 illustrates, this is a process that you should apply iteratively: After you’ve decided to hire that extra worker, you should compare the marginal cost and benefit of hiring another worker. Again, if the marginal benefit exceeds the marginal cost, you should hire that person, too. Then you should ask whether it is worth hiring yet another worker. And so it continues, as you work your way through a series of straightforward “either/or” choices, until eventually you decide against hiring any more workers.

When Is the Marginal Principle Useful?

Whenever you have to decide “how many” of something to choose, you should use the marginal principle to break your decision into a series of smaller marginal choices. However, there are some decisions that are not “how many” questions, but rather “either/or” questions. For instance, when Nerida was deciding whether to open her restaurant, she faced an “either/or” decision, so the marginal principle was not relevant. But sometimes we’ll find that even choices that seem like “either/or” choices have “how many” questions lurking within. For instance, Nerida wasn’t just deciding whether to open a restaurant, but also how big it should be, and so she found the marginal principle useful when she decided how many square feet of retail space to lease.

The bottom line: First determine what type of choice you face. If you face a “how many” choice, you should break it down into a series of smaller marginal decisions. You know that you have broken a decision into its smallest components when you are left with only “either/or” choices to make. Then, apply the cost-benefit principle and the opportunity cost principle to each of these simpler “either/or” choices.
Do the Economics

Can you apply the *marginal principle* to simplify the following decisions?

- **How many workers should I hire?**
  Simplifies to: Should I hire one more worker?

- **How many pairs of shoes should I buy?**
  Simplifies to: Should I buy one more pair of shoes?

- **How many classes should I take?**
  Simplifies to: Should I take one more class this semester?

- **How many children should I have?**
  Simplifies to: Should I have one more child?

- **Should I marry my current boyfriend/girlfriend?**
  This is an either-or question, and so can’t be further simplified.

- **How many hours per week should I work?**
  If you are in a job where you can change your hours of work, then you should ask: Should I work one more hour?
  If you can’t change the number of hours you work, then this is an either-or question (should I get a second job?), and can’t be further simplified.

Now we have figured out how to restate any “how many” choice as an “either/or” marginal choice. But remember, deciding “how many” actually requires answering a series of these marginal “either/or” questions. Every time you ask one of these marginal questions and the answer is yes, you should ask it again. And if the answer is yes, ask it yet again. You should keep asking until the answer is no. In fact, that is the essence of the most powerful application of the *marginal principle*, called the Rational Rule.

Using the Rational Rule to Maximize Your Economic Surplus

The *marginal principle* provides a simple rule of thumb that will help you maximize your economic surplus (the difference between your total benefits and total costs). Here’s the rule:

**The Rational Rule:** *If something is worth doing, keep doing it until your marginal benefits equal your marginal costs.*

The logic of this rule is straightforward. You know from the *cost-benefit principle* that whenever the benefits of a choice exceed the costs, it is a good choice. And when you apply the *marginal principle*, you don’t analyze the “how many” choice all at once (“How many workers should I hire?”). Instead, you analyze a series of simpler “either/or” choices (“Should I hire one more worker?”). And so the *marginal principle* tells you to keep hiring, as long as the marginal benefit of each worker exceeds the marginal cost. But you should stop hiring just before the marginal cost becomes larger than the marginal benefit. When does this occur? In most cases, this crossing point occurs right when the marginal benefit is equal to the marginal cost. (In the remaining cases—when the marginal benefit and marginal cost are never exactly equal—you should keep hiring as long as the marginal benefit exceeds the marginal cost.)

**The Rational Rule says to keep going until marginal benefit equals marginal cost.** Let’s apply this reasoning to a decision you face at the start of each semester: how many classes to take. The *marginal principle* says to break up this “how many” choice into a series of “either/or” choices. Should you take one class? The benefit
of the first class is surely greater than the cost. So you should definitely take that class. Given that you are taking one class this semester, should you take a second? If the marginal benefit of this extra class exceeds the marginal cost, you should. And the same logic holds for a third class and a fourth (and possibly more). In fact, you should keep increasing your course load as long as the marginal benefit of each extra class is at least as large as the marginal cost. But at some point—usually when you are thinking about whether to take a fifth or a sixth class—the marginal benefit of an extra class will be too low or the marginal cost is just too high (perhaps because the opportunity cost of one more class is constant sleep deprivation). And if the marginal cost of that extra class is greater than the marginal benefit, you shouldn’t take that extra class.

**Following the Rational Rule leads to good decisions.** Some people find the **Rational Rule** confusing—why would you want to set your marginal benefits equal to your marginal costs? After all, don’t you simply want to maximize your economic surplus—the difference between the benefits you enjoy and the costs you incur? It turns out that if you follow the **Rational Rule**, your choices will maximize your economic surplus. Why? Let’s try to provide Nerida with some insight as she tries to figure out how many workers to hire.

If the marginal benefit of hiring one more worker exceeds the marginal cost, then **hiring an additional worker will increase your economic surplus**. Since the marginal benefit of this extra worker exceeds their marginal cost, hiring them will boost your total benefit by more than it boosts your total cost. Thus, hiring this extra worker will raise your economic surplus (which is the difference between the total benefits you enjoy and the total costs you incur). If you always hire more workers when the marginal benefits are greater than the marginal costs, you will increase your economic surplus, which moves you ever closer to the point at which your economic surplus is at its highest possible level.

If the marginal benefit of hiring one more worker is less than the marginal cost, then **hiring an additional worker will lower your economic surplus**. If you did hire this worker, they would raise your total costs by more than they would raise your total benefits, and so hiring them would lower your economic surplus. Hiring (or keeping) a worker whose marginal benefit is less than their marginal cost will move you further away from the point at which your economic surplus is maximized.

You maximize your economic surplus right at the point where the marginal cost of hiring the last worker equals the marginal benefit. So, hiring more workers will increase your economic surplus as long as the marginal benefit exceeds the marginal cost. But at some point, the marginal benefit of an additional worker will be less than the marginal cost. When this happens, hiring that worker would reduce your economic surplus. So, at what point do you stop hiring? Right when the marginal benefit equals the marginal cost. At this point, you have increased your economic surplus as much as possible, right up to the point where hiring another worker would reduce your economic surplus.

**Do the Economics**

Let’s now apply the **Rational Rule** to helping Nerida figure out the number of workers to hire. In each row of Figure 6, she has written down her projections of her total costs and total benefits, according to the different staffing levels she is considering. She considers as few as two staff (in the first row), to as many as seven (in the final row). Each staffing level is noted in the first column. The second column shows the number of meals that Nerida anticipates selling, and this increases as she hires more staff.

What are the implications of this? On the benefit side, the more meals she sells each week, the greater the revenue she earns. On average, each meal sells for about $25, and so her weekly revenue will be $25, multiplied by the number of meals served.
This total revenue, which is her total benefit, is shown in the third column. On the cost side, running a restaurant is an expensive business. She pays $500 per week in rent. Also, as an entrepreneur, she has to consider the opportunity cost of her own time, which is $1,000 per week. Each waiter she hires costs $300 per week, and each extra meal that is prepared costs $10 in raw ingredients. The sum of these costs is her total cost, and the total costs associated with each staffing level are shown in the fifth column.

While Nerida has worked out her total costs and benefits, the marginal principle suggests that we focus on her marginal benefits, rather than her total benefits. The marginal benefit to Nerida of hiring an additional worker, shown in the fourth column, is the extra revenue that she will earn from that worker. For example, the marginal benefit of hiring the third worker is simply the total benefit from hiring three workers, minus the total benefit from hiring two workers, or $5,250 – $4,000 = $1,250 per week. We can do similar calculations for each extra staff member, and these marginal benefit calculations are shown in the fourth column. We also need to work out Nerida’s marginal costs, which are the extra costs that come with hiring each extra worker (and from making the extra meals they serve). For instance, adding a third worker and increasing the number of meals Nerida serves causes her total costs to rise from $3,700 per week in the first row, to $4,500 per week in the next row, for a marginal cost of $800. When we do similar marginal cost calculations for each additional staff member, we arrive at the numbers shown in the sixth column.

Now, let’s apply the Rational Rule. Notice that hiring that third worker brings an additional (or marginal) benefit of $1,250 per week, and an additional (or marginal) cost of $800 per week. Because the marginal benefits exceed the marginal costs, Nerida is definitely better off hiring that third worker. But should she also hire a fourth worker? And what about a fifth worker after that? The Rational Rule is useful: Keep hiring workers until the marginal benefits are equal to the marginal costs. In this case, Nerida’s marginal benefits and costs are equal when she hires six workers. And so the rule says: Hire six workers.

Does this make sense? You can check the final column, which calculates her economic surplus, which in this case is her economic profit—her total benefits less total costs. Looking down this column, the highest profit Nerida can earn is $1,200. She can earn this profit if she hires either five or six workers. The Rational Rule led Nerida to hire six workers, which is the choice that yields the (equal) highest profits. Great news!

You might notice that the Rational Rule recommends that you keep hiring until the marginal benefit is equal to the marginal cost, which occurred when she hired six
workers. But hiring that sixth worker whose marginal benefit was exactly equal to their marginal cost neither raised nor lowered her economic surplus. So while the rule told Nerida to hire six workers, she would have earned the same profit had she hired only five people. In practice, the important point is to stop hiring just before your marginal cost becomes larger than your marginal benefit.

**Applying the Rational Rule**

The *marginal principle* is particularly useful precisely because it is so practical. As you study economics, you will see that the *Rational Rule* is applicable to just about every choice you make. Indeed, it describes how people like Nerida actually run their businesses. The problem is that most people don’t know in advance exactly what the costs and benefits will be for each alternative they face. So how do they make decisions?

**Businesses experiment at the margin to learn their marginal costs and benefits.** Nerida needs to decide how many workers to hire, but in reality, she isn’t sure whether she would be better off hiring two workers or three. So she experiments with different business decisions. She starts by hiring two workers. And then, as an experiment, she tries hiring one more person, to figure out whether that boosts her benefits by more than it boosts her costs. If it does—that is, if the marginal benefit exceeds the marginal cost—she’ll declare that experiment a success, and keep that extra person on payroll permanently. If the costs exceed the benefits, she’ll eventually let that person go or fail to replace a worker who quits.

For Nerida, hiring the third worker yields $1,250 extra revenue, which more than offsets the $800 in extra costs. She then continues her experimenting, hiring a fourth person; when that also raises her profits, she’ll experiment further, hiring a fifth and sixth person, and then a seventh. With each experiment, she focuses on the changes in costs and benefits that occur; these are her marginal costs and marginal benefits. When she tries adding a seventh worker, she finds that her costs rise by $400, but her revenue only rises by $250. Because this experiment reveals that her marginal cost exceeds the marginal benefit (and hence that the seventh person reduces her total profit), she declares that experiment a failure, and won’t keep a seventh worker on permanently.

Notice that in this process of judging her experiments as successes or failures, Nerida is following the *Rational Rule*: If hiring additional staff is worth doing, she’ll keep doing it until her marginal benefits equal her marginal costs. And by using this rule, she experiments her way to the point where her profits are maximized.

**Do the Economics**

Now, it’s your turn to apply the *Rational Rule* to make decisions. Remember to think about the relevant marginal costs and marginal benefits. Consider yourself in the following roles:

- **As a consumer: How many cups of coffee should you buy today?**
  
  Keep buying coffee until the marginal benefit (your willingness to pay for that last cup of coffee) is equal to the marginal cost (the price and, if it’s late, how much it would stand in the way of getting a good night’s rest).

- **As a producer: How many tons of coffee should you produce?**
  
  Keep producing coffee until the marginal benefit of producing an extra ton (the wholesale price you can sell it for) is equal to the marginal cost of producing another ton.

- **As a worker: How many hours should you work as a barista?**
  
  Keep working until the marginal benefit (your hourly wage) is equal to the marginal cost of working (the value of the marginal hour of leisure time that you are missing).
• **As an investor:** How much should you invest in a new chain of specialty coffee shops?  
  Keep investing until the marginal benefit (your return on the last dollar invested) is equal to the marginal cost. (This includes the opportunity cost of that last dollar: How else could you invest that dollar, and how could you spend it now?)

• **As an export company:** How many tons of coffee should you export?  
  Keep exporting until the marginal benefit (the price you can get for the coffee overseas) is equal to the marginal cost (the price at which domestic producers will sell you one more ton, plus the price of shipping it overseas).

• **As a job-seeker:** How many coffee shops should you send your résumé to?  
  Keep sending job applications until the marginal benefit (the value of the increased chance of finding a job) is equal to the marginal cost of an application (the time and hassle of filling out one more application).

• **As an employer:** How many workers should you hire?  
  Keep hiring until the marginal benefit of an extra worker (the rise in revenues you get from selling more coffee) is equal to the marginal cost (the wages of that last worker and the cost of that extra coffee).

**Recap:** The marginal principle creates a structure to simplify complicated “how many” questions. Each of these examples involves thinking about making decisions in very different economic roles. Yet all of the answers follow a parallel structure. The power of the marginal principle is that it creates a common structure in all decisions in which you choose “how many,” and it simplifies an otherwise complicated decision. The best choices—the ones that maximize your economic surplus—all follow the same pattern, as described by the **Rational Rule**: Choose the quantity where the marginal benefit equals the marginal cost. That way, you will maximize your economic surplus.

By now, we’ve come a long way in developing the skills you need to think like an economist. It’s all about learning to identify the key issues underpinning any choice. The cost-benefit principle asks you to identify the relevant costs and benefits of a decision. The opportunity cost principle asks you to identify your true opportunity costs. And the marginal principle asks you to identify the marginal choices that make up any “how many” decision. Now, let’s turn to the final principle, which is all about identifying the many different ways that your decisions affect and are affected by other decisions.

### 1.5 The Interdependence Principle

**Learning Objective**  
**The Interdependence Principle:** Your best choice depends on your other choices, the choices others make, developments in other markets, and expectations about the future. When any of these factors change, your best choice might change.

Nerida’s restaurant is doing well, and she’s thinking about opening earlier so that she can also serve lunch. She’s aware that the likely success of the lunch shift—and hence whether it’s worth pursuing—depends on a range of other factors. First of all, it depends on her other decisions. Nerida has also been thinking about offering cooking classes, but she doesn’t have enough bandwidth to succeed at both new projects. Second, it depends on the decisions made by others within her market. If the other Italian restaurant in town opens for lunch, it’s unlikely that there will be enough customers for her to break even serving lunch. As such, her best choice depends on the choices of her rivals. On the flip
side, if more people eat out rather than bringing lunch from home, then perhaps it will be profitable. And so her best choice also depends on the choices her potential customers make. Third, it depends on developments in other markets. If Amazon opens a new regional headquarters nearby, that will mean more foot traffic, and more potential lunchtime customers. On the flip side, she’ll have to compete with Amazon for workers, and so it might also mean that she’ll have to pay higher wages. Fourth, it depends on her expectations about the future. She expects the economy to expand next year, and that means more customers with more money in their pockets, which could potentially make her lunch service very profitable.

As Nerida thinks harder about all of this, she sees that the economy—and indeed, her life—is rife with interdependencies. Her best decision depends on many factors, and as these other factors change, so does her best course of action. Indeed, all choices are interdependent, and they both shape—and are shaped by—the choices that you and others make, both now and in the future.

This is the interdependence principle, which recognizes that your best choice depends on your other choices, the choices others make, developments in other markets, and expectations about the future. When any of these factors changes, your best choice might change. There are four types of interdependencies you’ll need to think about:

1. Dependencies between each of your individual choices
2. Dependencies between people or businesses in the same market
3. Dependencies between markets
4. Dependencies through time

These four different types of interdependencies can be illustrated by thinking about how you choose your classes. First, if you take an economics class, you won’t be able to take some other class that is scheduled at the same time—perhaps it means that you can’t take “The Simpsons and Philosophy.” (Don’t laugh; it was an actual class at U.C. Berkeley!)

Second, if another student takes the last spot in a popular class, then you will have to take a different class. That is, your decisions about which classes to take also depend on the choices of others in the same “market.”

Third, if you believe (as I do!) that the falling cost and increasing capacity of data-crunching computers means that the skills you learn in introductory economics—which include how to interpret those data—have become more valuable, then your best decision in one market (which class to take) depends on outcomes in other markets (the growing availability of data).

And fourth, your decision to study economics today changes the set of classes you have met the prerequisites for, affecting the courses you can take next year. For example, completing introductory economics will enable you to take more advanced economics courses in the future, whereas those classes wouldn’t be an option if you didn’t take this class. Thus, the best course to take this year depends on what classes you expect to take in the future.

The broader point is that the best choice for you—such as which classes you take this semester—will depend on many other factors. If any of these other factors change, then your best choice might change, too. Let’s explore these four different types of dependencies in greater detail.

**Interdependency One: Dependencies Between Your Own Choices**

Since you have limited resources, every choice you make affects the resources available for every other decision. This interdependence follows from the many different constraints you face. Consider the following examples:

- You have a budget constraint due to limited income, and so the amount of money available to spend on entertainment depends on how much you spend on food.
• You have limited time because there are only 24 hours in a day, and so the amount of time available to study for economics depends on how much time you spend studying psychology.

• You have limited attention, so the amount of attention you give your economics lecture depends on whether you allow yourself to be distracted by your smartphone.

• You have limited production capacity because you only have one factory, and so the number of production lines available to produce hybrid cars depends on how many are producing minivans.

• You have limited wealth to invest, and so the amount you invest in a new startup depends on how much you invest in stocks and bonds.

In these cases, the interdependence follows from limited income, time, attention, production capacity, and wealth. Before moving on, ponder how other constraints, such as limited energy, limited cognitive capacity, and limited willpower will create other interdependencies between your choices.

Interdependency Two: Dependencies Between People (or Businesses)

The choices made by other economic actors—people, businesses, governments, or other groups—shape the choices available to you. In many cases, this arises because you’re competing for society’s scarce resources. The more others get, the less that’s left over for you. Consequently, your best choice depends on the choices that others make.

When people compete for scarce resources, they typically do so in a market. And so you’ll more easily see these interdependencies by focusing on how buyers or sellers compete. For instance, if Microsoft hires the best computer programmers in Seattle, it will be hard for a Seattle-based startup to find talented employees. And so a startup’s hiring outcomes depend on those made by Microsoft, because they’re competing buyers in the labor market. Alternatively, if your classmate is hired by Microsoft, that’s one less job for you to get. In this case, your outcome depends on your classmate’s because you’re competing sellers in the labor market.

To get a sense of these interdependencies, it’s useful to start by identifying the relevant market. It’s an approach that applies well beyond traditional markets, as the following examples show:

• Your ability to date the most interesting person in your class depends on the other people they might date in your class. You’re competing “buyers” in the dating market.

• Whether your vote sways the next election depends on whether my vote offsets yours. We’re competing “sellers” in the market for votes.

• Whether your parents attend your younger brother’s Tuesday evening choir recital depends on whether they’re attending your sister’s Tuesday evening soccer game. Your siblings are competing “buyers” in the market for parental attention.

• Whether the school board adopts your new policy proposal depends on whether they prefer my alternative proposal. We’re competing “sellers” in the marketplace of ideas.

Understanding these interdependencies between competitors in a market is a critical first step. In the next chapter, we’ll push these ideas further, analyzing the forces of supply and demand in greater detail.
Interdependency Three: Dependencies Between Markets

Choices are also interdependent across different markets. In particular, changes in prices and opportunities in one market affect the choices you might make in other markets. For instance:

- **Rising interest rates in the credit market** make it more expensive to get a mortgage, which might lead you not to buy a home.

Your choice in the housing market depends on the credit market.

- **When demand for housing falls**, entrepreneurs often convert existing homes into something else, such as child-care centers, making it easier for you to find child care.

Your choice in the child-care market depends on the housing market.

- **If you live in an area with many high-quality, low-cost child-care options**, you may be more likely to return to work soon after becoming a parent.

Your choice in the labor market depends on the market for child care.

- **When both spouses work**, households are more likely to need two cars.

Your choice in the car market depends on the labor market.

So you can see that there are dependencies running all the way from the credit market to the housing market, to the child-care market, to the labor market. If you ignore the interdependence principle, you could be tempted to just consider each market in isolation. But as these examples demonstrate, this can risk missing a large part of the story, because changes in these other markets shape your costs and benefits, and can thereby change which option is your best choice.

Interdependency Four: Dependencies Over Time

As a consumer, you always face the option of buying something tomorrow, rather than buying it today. And similarly, as an executive, you get to choose when to produce goods and when to bring them to market. Likewise, investors, employers, and workers all get to decide when to invest, hire, and work. These alternatives mean that your choices always reflect a trade-off across time: Is it better to act today or tomorrow? As expectations about the future change, the terms of this trade-off change, and so your best choice might change.

Your choices are also linked through time by the investments you make. For instance, if you invest in a new factory, in your education, or in getting fit, this expands your choices in the future, as these investments give you the opportunity to produce more, get a better job, or enjoy better health, respectively. Because your future depends so heavily on the choices you make today, you need to be sure to take account of these connections. And so the investment choices you’ll want to make today depend on your expectations about the future.

What Else?

The big idea behind the interdependence principle is to ask, “What else?” And this leads to two types of “what else?” questions. The first asks: What else might my decision affect? Every decision has ripple effects, and you’ll need to assess them all in order to count the full set of costs and benefits that’ll follow. The second “what else?” question asks: What else might affect my decision? The answer will help you figure out all the ways in which your costs and benefits—and hence your best choice—might change if other factors change.
Tying It Together

OK, that’s it. The economic method, boiled down to four core principles. Think I’m kidding? I’m not. Really. Thinking like an economist is simply a matter of applying the core principles to the world around you. And that’s why it is so important that you understand these core principles. As you read the rest of this book, don’t be afraid to come back to this chapter for a refresher.

Using the Core Principles in Practice

It’s time to ‘fess up: I presented the four core principles of economics in the order that is easiest to learn. But when you confront a problem, you need to think through the principles in a different order. Here’s the four-step process you should work through:

**Step one:** First, use the *marginal principle* by breaking “how many” choices down into simpler marginal choices. Ask yourself whether you would be better off doing a bit more of something, or a bit less.

**Step two:** Then apply the *cost-benefit principle* by assessing the relevant costs and benefits. Since you’re analyzing a marginal question, this says you need to assess whether the marginal benefit exceeds the marginal cost.

**Step three:** To evaluate all the relevant costs and benefits, you’ll need to apply the *opportunity cost principle* and ask, “Or what?” This ensures that you take full account of what you give up when you make a choice. You should focus on the relevant opportunity costs, not just financial out-of-pocket costs.

**Step four:** The *interdependence principle* helps you identify how changes in other factors—in your own choices, other people, other markets, and expectations about the future—might lead you to make a different decision.

Want to remember this order? Just think “MCOI,” which stands for Marginal, then Cost-benefit, Opportunity cost, and Interdependence. It’s a recipe worth remembering, because you’ll see it again and again throughout this book, so it is best to learn it now. The rest of your study of economics is really about applying this recipe to a range of interesting social and economic contexts. As you proceed through each chapter in this book, we’ll study the decisions that you’ll make in your various roles as an economic actor—as a buyer, a seller, a worker, a boss, an entrepreneur, an investor, an importer, or an exporter. The value of our systematic approach is that in each chapter the method will be the same, and it will quickly become familiar: I’ll ask you to put yourself in the shoes of that economic actor and apply the core principles of economics so that you can figure out how to make the best decisions possible. With some practice, you’ll be able to use the core principles to ensure that you make good decisions in every sphere of your life.

**To predict what others will do, put yourself in their shoes.** The core principles of economics that we’ve outlined in this chapter aren’t just useful for helping you make good decisions. They can also be used for the equally important task of understanding and even predicting the decisions of others: your customers, competitors, employees, suppliers, and even friends and family.

The key to forecasting how they’ll respond is the **someone else’s shoes technique**. The idea behind putting yourself in someone else’s shoes is to allow yourself to have an empathetic understanding of how someone else views the world. In movies like *Freaky Friday*, mother and daughter have to switch bodies to learn to understand each other, but you can do it by mentally putting yourself in someone else’s shoes.

That’s the essence of the someone else’s shoes technique. If you want to forecast the decisions that someone else will make, then you should mentally put yourself in
their shoes, and try to figure out what decision you would make, if you face their incentives. Putting yourself in someone else’s shoes is all about empathy, and it’s important to account for that person’s preferences and the constraints that they face. It’s likely that they are trying to make good decisions. And so these four core principles can help you better understand and predict the decisions that they will make.

**Principles in short.** And finally, a memory trick. If you find it hard to remember all the detail that you’ve read in this chapter, relax. It all boils down to asking four questions that are so simple you need just a few words. Always ask:

- One more? (*The marginal principle*)
- Benefit beat cost? (*The cost-benefit principle*)
- Or what? (*The opportunity cost principle*)
- What else? (*The interdependence principle*)

Now that you’re at the end of your first chapter, let me give you a study tip that you can use throughout this book. If you’ve only got ten minutes and want to review the key ideas from a chapter, go back, quickly flip through it, and you’ll discover that the bold headings that look like this are a built-in study guide. If you re-read only those headings, you’ll get all the key points. Or if you want my “cheat sheet,” turn the page.
Chapter at a Glance

The Cost-Benefit Principle

Costs and benefits are the incentives that shape decisions. You should evaluate the full set of costs and benefits of any choice you face, and only pursue those whose benefits are at least as large as their costs.

That is, incentives matter!

The difference between benefits and costs is your economic surplus. If your costs and benefits cannot be directly compared, evaluate them in terms of your willingness to pay for them.

Don’t let the framing of a choice—that is, how it’s described—affect your cost-benefit analysis.

The Opportunity Cost Principle

The true cost of something is the next best alternative you must give up to get it. Your decisions should reflect this opportunity cost, rather than just the out-of-pocket financial costs.

Good decisions focus on opportunity cost, rather than direct financial costs.

Make sure that whenever you consider a decision, you ask, “Or what?” For example, “Should I get an MBA? Or what?” Or stay in my current job? The “or” part highlights your opportunity cost.

Sunk costs are not opportunity costs, and so they should be ignored.

The Marginal Principle

Decisions about quantities are best made incrementally.

Break “how many” decisions down into a series of smaller, or marginal, decisions.

For example, instead of asking: “How many workers should I hire?” ask: “Should I hire one more person?” Answering this requires comparing the “extra” or marginal benefits of that extra person with the “extra” or marginal costs incurred.

Following the Rational Rule will maximize your economic surplus. If something is worth doing keep doing it until your marginal benefits equal your marginal costs.

The Interdependence Principle

Your best choice depends on your other choices, the choices others make, developments in other markets, and expectations about the future. When any of these factors change, your best choice might change.

Consider four kinds of interdependence:

1. Dependencies between your own choices
2. Dependencies between people/businesses in a market
3. Dependencies between markets
4. Dependencies over time

Apply the core principles, in this order:

The marginal principle
Address “marginal” questions, instead of “how many” questions

The cost-benefit principle
Assess the marginal costs and benefits

The opportunity cost principle
Which costs? The opportunity costs

The interdependence principle
Take account of broader effects of your decisions

To forecast the decisions others make, put yourself in someone else’s shoes. If you had their objectives and constraints, what decision would you make?
Key Concepts

cost-benefit principle, 5       marginal cost, 20       scarcity, 12
economic surplus, 7           production possibility frontier, 18   sunk cost, 16
framing effect, 10             marginal principle, 20      someone else’s shoes technique, 29
interdependence principle, 26  opportunity cost, 12       willingness to pay, 6
marginal benefit, 20           Rational Rule, 21

Discussion and Review Questions

Learning Objective 1.2  The Cost-Benefit Principle

1. Consider the following statement: “Economists always put things into monetary terms; as a result, economics can most appropriately be called the study of money.” Is this true or false? Briefly explain your reasoning.

2. Use the cost-benefit principle to evaluate the following:
   a. You are about to buy a calculator for $10, and the salesperson tells you that the model you want to buy is on sale for $5 at the store’s other branch, which is a 20 minute drive away. Would you make the trip?
   b. You are about to buy a laptop for $1,000 and the salesperson tells you that the model you want to buy is on sale for $995 at the store’s other branch, which is a 20 minute drive away. Would you make the trip?
   c. Did you make the same choice in both cases? Should you have? Do you think this is how people actually choose?

Learning Objective 1.3  The Opportunity Cost Principle

3. During the economic downturn of 2008–2009, the unemployment rate increased to nearly 10%. At the same time, the price of college tuition and the number of college enrollees increased. Using the opportunity cost principle, explain why more people would enroll in college during this time period even as the price of college increased.

4. A friend once remarked that longer movies were a better deal than shorter movies because the ticket price was the same in both cases. Therefore, the longer movie provided more benefit for the same cost as a shorter movie. Using the opportunity cost principle, evaluate your friend’s statement.

Learning Objective 1.4  The Marginal Principle

5. In 2016, the top-selling pharmaceutical drug in the world was AbbVie’s Humira, which is used for the treatment of several common, chronic conditions. The majority of its profits are derived from treatment of the most common diseases, so why does AbbVie develop drugs for rare diseases instead of investing all of its resources toward drugs for common diseases? Use the marginal principle to briefly explain your answer.

Learning Objective 1.5  The Interdependence Principle

6. You are a preschool teacher working at a public school, but are considering quitting your job to start a day-care facility of your own. Describe four types of dependencies that will affect your decision, with at least one example for each.

Study Problems

Learning Objective 1.2  The Cost-Benefit Principle

1. Ivan has inherited his grandmother’s 1963 Chevrolet Corvette, which he values at $45,000. He decides that he might be willing to sell it so he posts it on Craigslist for $55,000. Samantha is interested and willing to pay up to $72,000. Would Ivan and Samantha want to voluntarily engage in trade? How much economic surplus is created for both of them as a result of this exchange? What is the total economic surplus?

2. You are considering whether you should go out to dinner at a restaurant with your friend. The meal is expected to cost you $40, you typically leave a 20% tip, and an Uber will cost you $5 to get there. You value the restaurant meal at $20. You enjoy your friend’s company and are willing to pay $30 just to spend an evening with her. If you did not go out to the restaurant, you would eat at home using groceries that cost you $8. How much are the benefits and costs associated with going out to dinner with your friend? Should you go out to dinner with your friend?

Learning Objective 1.3  The Opportunity Cost Principle

3. It is a beautiful afternoon and you are considering taking a leisurely stroll through the park. There are several other activities you had considered doing instead. The value you would have received from each of the activities is provided in the table below.

<table>
<thead>
<tr>
<th>Alternative activities</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streaming a movie</td>
<td>$5</td>
</tr>
<tr>
<td>Taking a nap</td>
<td>$8</td>
</tr>
<tr>
<td>Chatting with your best friend</td>
<td>$13</td>
</tr>
<tr>
<td>Reading a new book</td>
<td>$15</td>
</tr>
</tbody>
</table>
What is the opportunity cost to you of taking the stroll through the park?

4. Suppose you have midterms in economics and astronomy tomorrow, and you only have four hours left to study. The accompanying table provides the combinations of time spent studying economics and astronomy and your expected exam scores.

<table>
<thead>
<tr>
<th>Hours spent studying economics</th>
<th>Economics exam score</th>
<th>Hours spent studying astronomy</th>
<th>Astronomy exam score</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>60</td>
<td>0</td>
<td>70</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>1</td>
<td>83</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>2</td>
<td>87</td>
</tr>
<tr>
<td>3</td>
<td>95</td>
<td>3</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>98</td>
<td>4</td>
<td>92</td>
</tr>
</tbody>
</table>

a. Draw a production possibilities frontier to illustrate your study options. What is the opportunity cost, in terms of your grades, of studying one extra hour for economics or one extra hour for astronomy?

b. If your goal is to maximize your combined exam scores, how many hours should you spend studying each subject?

c. Your laptop dies and refuses to start up. All your notes and class materials are saved on its hard drive. How do your production possibilities change? Illustrate in your graph from part (a).

5. Your niece is deciding whether or not to open a lemonade stand. She expects to sell 20 cups of lemonade for $1 per cup. She already made a sign that cost her $10 and will have $15 worth of additional costs for cups and lemonade mix if she decides to open the stand. If your niece decides to open the lemonade stand, how much profit will she earn? Should she open the lemonade stand? What kind of cost is the $10 spent on the lemonade stand sign?

6. Aliyah is preparing to expand her IT consulting company. The current market rate for IT professionals is $58,000 per year. Each employee she hires will also require a computer and equipment that costs $6,000 per employee annually. Hiring more employees means that Aliyah can provide consulting services to more clients each year. Each client Aliyah has will pay her $15,000 per year.

The number of clients Aliyah can take on depends on the number of workers she hires as shown in the accompanying table. What is the marginal cost and marginal benefit of hiring each worker? Using the Rational Rule to maximize her economic surplus, how many workers should Aliyah hire?

<table>
<thead>
<tr>
<th>Number of workers</th>
<th>Clients per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
</tr>
</tbody>
</table>

7. Neal is a coffee drinker. At the local coffee shop, the price of a cup of coffee is $3. Neal’s total benefits from drinking coffee is provided in the accompanying table. What is Neal’s marginal benefit of consuming each cup of coffee? How many cups should he consume each day?

<table>
<thead>
<tr>
<th>Quantity of coffee</th>
<th>Total benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$8</td>
</tr>
<tr>
<td>2</td>
<td>$14</td>
</tr>
<tr>
<td>3</td>
<td>$18</td>
</tr>
<tr>
<td>4</td>
<td>$20</td>
</tr>
<tr>
<td>5</td>
<td>$21</td>
</tr>
</tbody>
</table>

Learning Objective 1.4 The Marginal Principle

6. Aliyah is preparing to expand her IT consulting company. The current market rate for IT professionals is $58,000 per year. Each employee she hires will also require a computer and equipment that costs $6,000 per employee annually. Hiring more employees means that Aliyah can provide consulting services to more clients each year. Each client Aliyah has will pay her $15,000 per year.

The number of clients Aliyah can take on depends on the number of workers she hires as shown in the accompanying table. What is the marginal cost and marginal benefit of hiring each worker? Using the Rational Rule to maximize her economic surplus, how many workers should Aliyah hire?

Learning Objective 1.5 The Interdependence Principle

8. Consider your decision to read this textbook on economics. Identify which of the four core principles of economics is most relevant for the following aspects of that decision.

a. Reading this textbook will help establish a solid foundation for understanding concepts you will learn in more advanced economics courses.

b. Reading this textbook will require time and effort, but doing so will help you improve your grade in this course.

c. The time you will spend reading this textbook could instead be used to study for your chemistry exam.

d. Each extra page that you read and each practice problem that you complete will help you increase your understanding of the material.

9. For each of the following, indicate how you might apply the four core principles of economics.

a. You are considering whether you should vote in the next election.

b. You watch a beautiful sunset from the back porch of your home.

c. Should you major in economics or philosophy?

d. Should you and your spouse purchase a second vehicle?