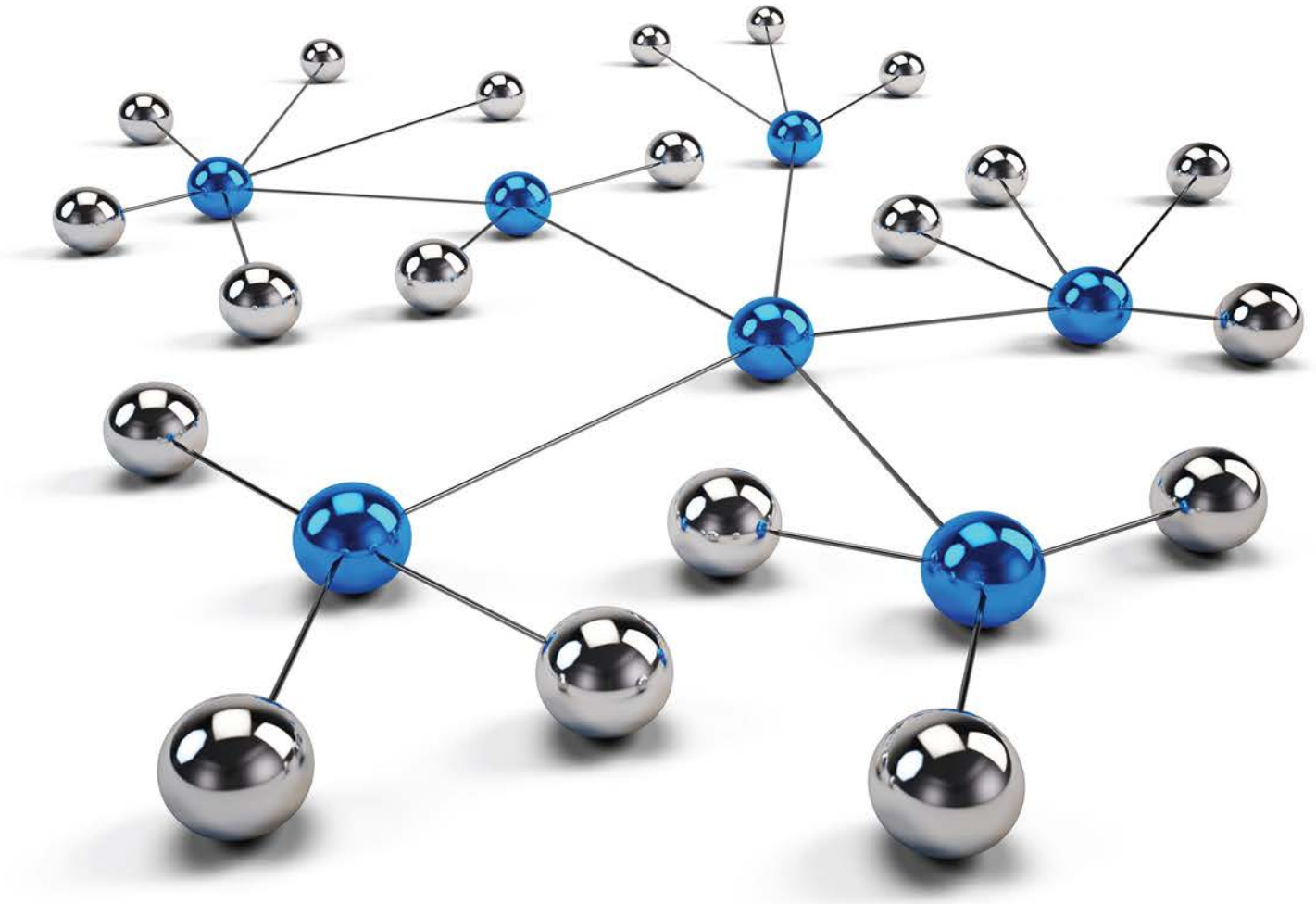


ECONOMICS

ROGER A. ARNOLD

Thirteenth Edition

Dear Student,

Economics has a way of opening up our eyes to what we couldn't see before.

Although other subjects are capable of providing an understanding of the world, economics is special because so much of the everyday world in which you live, which includes buying and selling; getting a job and an income; paying your rent; taking out a mortgage; getting an education; and understanding economic growth, inflation, unemployment, and the ups and downs of the economy, becomes more clear once you know economics. Economics helps us to understand the everyday world. If there is such a thing as the "real world," then it is the real world to which economics addresses itself.

Economics also has the ability to answer many of our questions: What causes some nations to be rich and others poor? Why is a car's price $35,000 instead of $25,000? What is the efficient time to read, play tennis, or sleep? How do firms decide what quantity of a good to produce and what price to charge? What causes interest rates to rise or fall? What determines the prices you pay, the income you earn, or whether you are employed or unemployed?

Is it worth learning economics? Yes, without a doubt. But learning economics doesn't come without effort. First, you can't read an economics textbook the way you read a novel. You have to think and study while you read the text. To aid you in this endeavor, let's take a moment to tell you how this book is set up.

There are three major parts of the book that you should be aware of before you start to read and study. First, there is the main content of the book that includes the words and diagrams in each chapter. It is the "meat and potatoes" of the economics course. You need to read this material more than once. When it comes to learning the economics contained in the diagrams, go slowly. Look at a curve in the diagram and tell yourself what it says; each diagram tells a story. Learn to tell yourself this story as you go through each diagram.

Second, there are various boxed and stand-alone features in each chapter, such as *Economics 24/7, Thinking Like an Economist, Office Hours, Finding Economics, Hear What and How the Economist Thinks,* and *Does It Matter to You?* The features step away from the meat and potatoes of the text, and apply what has been learned. Applying what you know is an extremely important part of learning economics. Therefore, the boxed and stand-alone features are not peripheral to the main material and should not be ignored. The features are the material in different form.

Third, there are numerous instructional videos that go with this book. *Video Office Hours* takes the material in each chapter and goes over key topics, much the way your instructor might do in class. *Video Questions and Problems* addresses questions and solves problems step-by-step, and can be a valuable resource for you when working through similar assignments. *Working with Diagrams* builds, explains, and works with many of the exhibits in the text and can help you learn to tell the story of the diagram, frame by frame. *What Is Wrong With This Diagram?* helps you to learn the language of diagrams by asking you if you can figure out what is wrong with the way a particular diagram is specified.

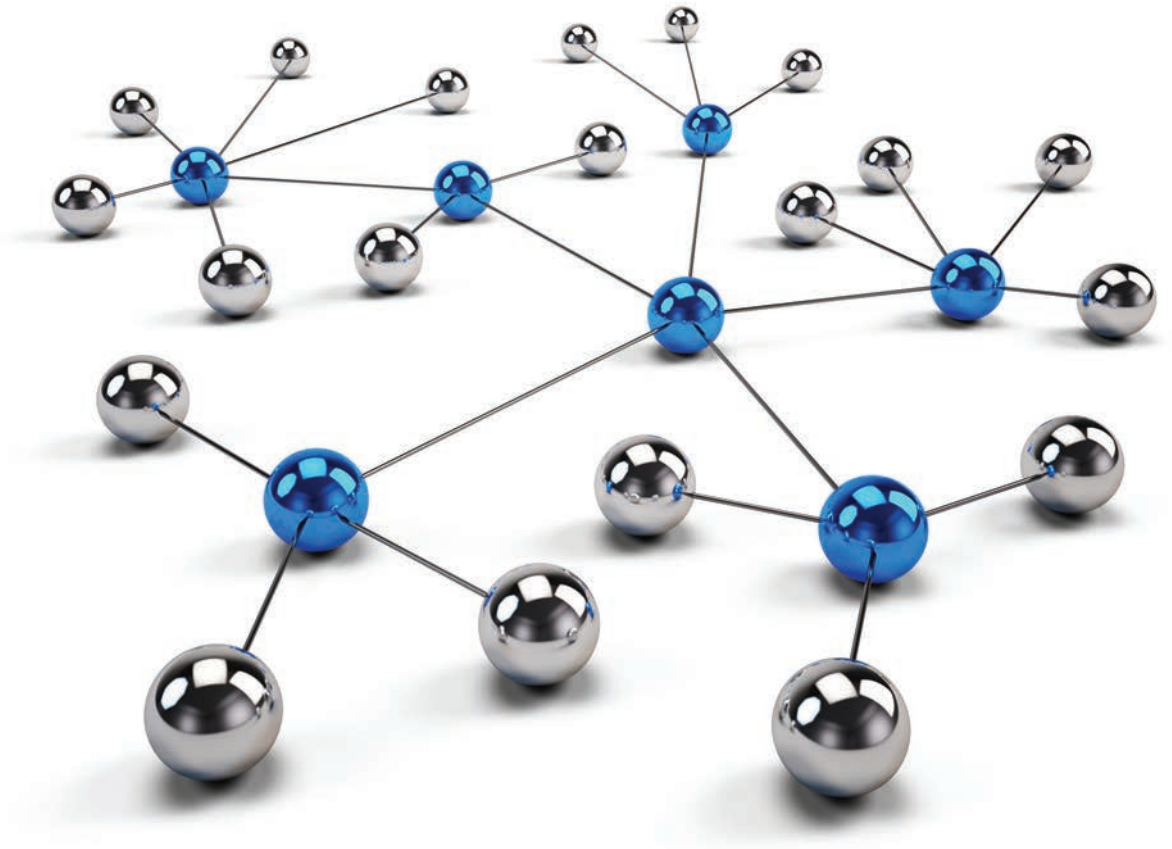
As you proceed on your economics journey, keep in mind that it takes sustained effort—and some dedicated patience—to learn economics. As you will soon find out, the effort is well worth it. The best of luck to you as you begin your study of economics.

Best Wishes,

Roger A. Arnold

Roger A. Arnold

ECONOMICS



ECONOMICS

Thirteenth Edition

Roger A. Arnold

California State University
San Marcos

CENGAGE

Australia • Brazil • Mexico • Singapore • United Kingdom • United States

***Economics,* Thirteenth Edition**
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Sr. Art Director: Michelle Kunkler

Cover and Internal Designer: Tippy McIntosh

Cover Image: Sashkin/Shutterstock.com

Internal design images: Igor Shikov/Shutterstock.com (Office Hours feature); Nobelus/Shutterstock.com (Does it Matter feature); PictureStudio/Shutterstock.com (Hear What and How feature); Sashkin/Shutterstock.com

Intellectual Property

Analyst: Jennifer Bowes

Project Manager: Carly B. Belcher

Library of Congress Control Number: 2017952159

ISBN: 978-1-337-61738-3

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Printed in the United States of America
Print Number: 01 Print Year: 2017

To Sheila, Daniel, and David

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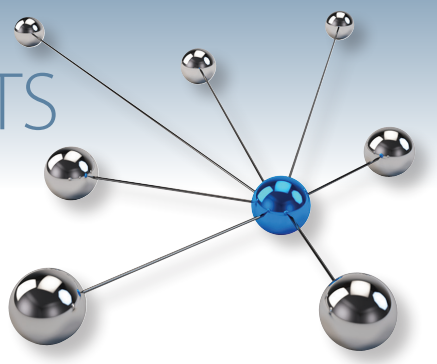


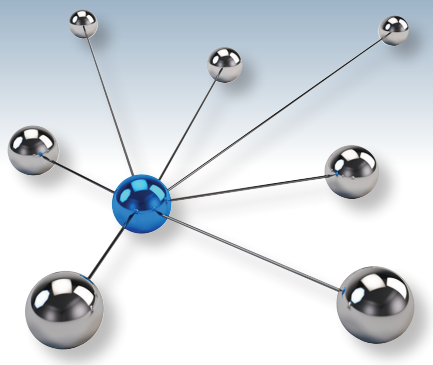
AN INTRODUCTION TO ECONOMICS

MACROECONOMICS

MICROECONOMICS

THE GLOBAL ECONOMY

WEB CHAPTERS



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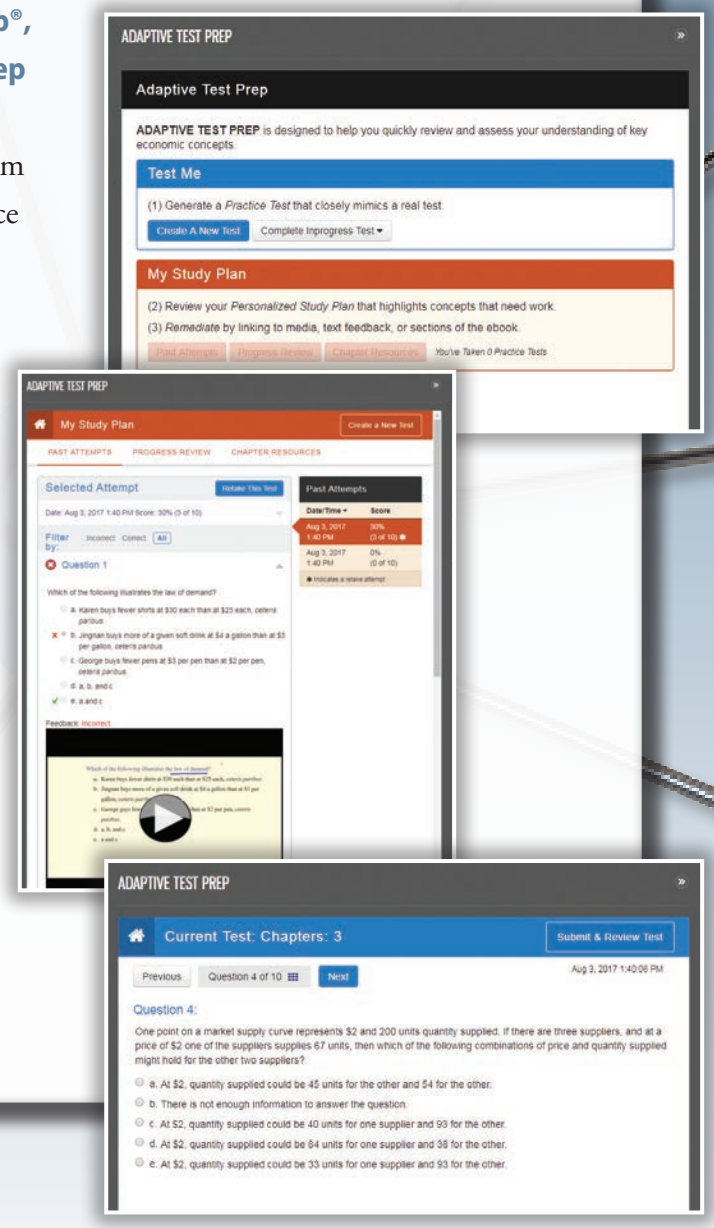
WEB CHAPTERS

Roger Arnold's ***ECONOMICS*** opens up the world of economic analysis. Substantive content, detailed diagrams, popular economic features, and innovative pedagogy are just the beginning. ***ECONOMICS*** continues to blaze the trail for constantly updated content and applications balanced with unequaled media and study assets, including the new Adaptive Test Prep app.

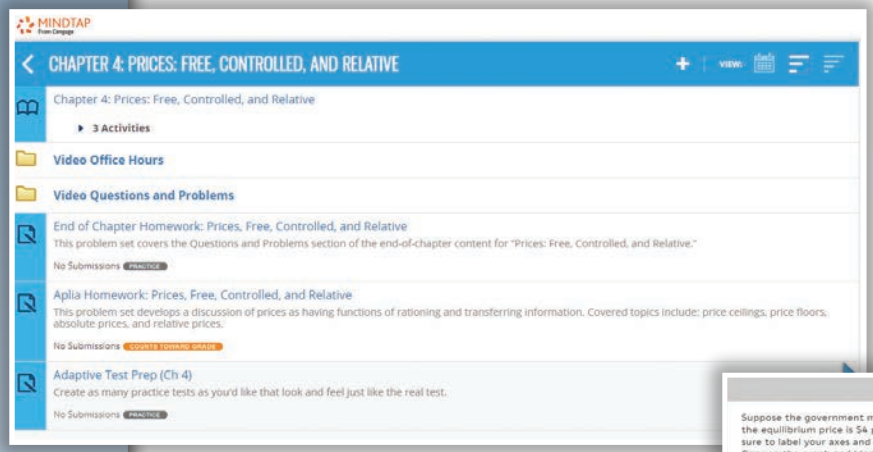
Only available in MindTap®, the new Adaptive Test Prep helps students prepare for test success by allowing them to generate multiple practice tests across chapters. Once a practice test is complete, the student is presented with a personalized Study Plan featuring a series of highly targeted remediation resources, including "Teachable Moment" videos created by author, Roger Arnold.

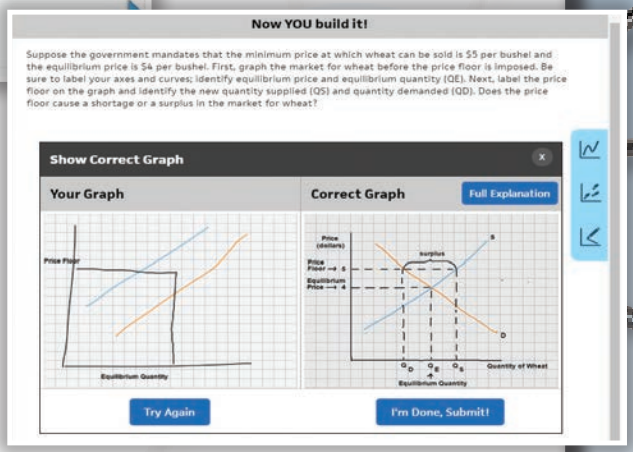
Adaptive Test Prep helps students more effectively gauge their understanding before taking an exam.



MINDTAP
From Cengage

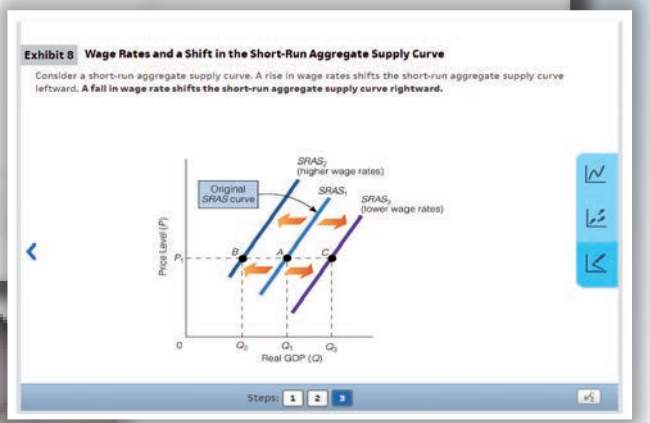
MindTap Economics 13th Edition is a personalized learning solution empowering students to analyze, apply, and improve their thinking. With MindTap, students can measure their progress and improve outcomes. Using the unique Learning Path in MindTap, students can follow prescribed steps that highlight valuable learning tools, such as readings, Talking Economics, What is Wrong With This Diagram video quizzing, Economics in 5 minutes, Problem Walk-Through videos, End-of-Chapter practice problems, the new Adaptive Test Prep App, new Graph Builders in the eReader, ConceptClip videos, Aplia, and much more.



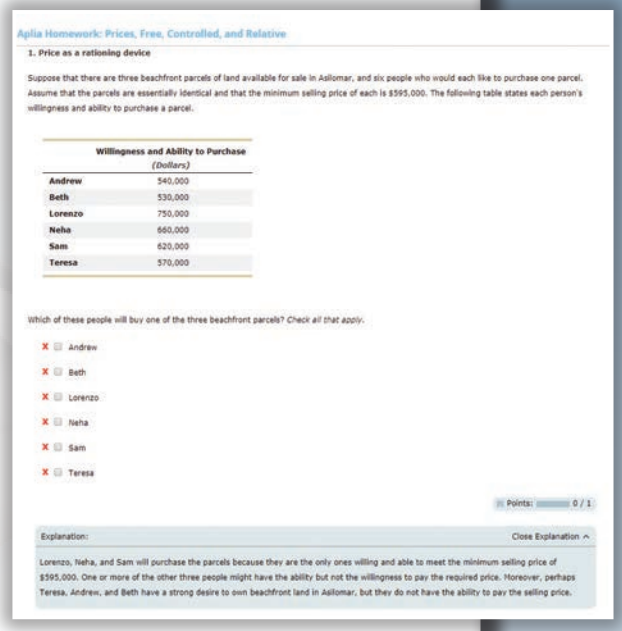


NEW! Graph Builder

Available in MindTap. Many economic graphs have been digitally enhanced in Arnold's eReader using our new Graph Builder technology. This feature allows students to work at their own pace in order to see a complex graph being built step-by-step. Progression Graphs decompose each graphical exhibit into several layers while still maintaining a rich, economic pedagogy.



Aplia is the most successful and widely used homework solution in the Economics market, with over 1 billion answers entered. Online interactive problem sets, analyses, tutorials, experiments, and critical-thinking exercises give students hands-on application without adding to instructors' workload. Based on discovery learning, Aplia requires students to take an active role in the learning process—helping them improve their economic understanding and ability to relate to the economic concepts presented. Instructors can assign homework that is automatically graded and recorded.


Aplia Homework: Prices, Free, Controlled, and Relative

1. Price as a rationing device

Suppose that there are three beachfront parcels of land available for sale in Asilomar, and six people who would each like to purchase one parcel. Assume that the parcels are essentially identical and that the minimum selling price of each is $595,000. The following table states each person's willingness and ability to purchase a parcel.

	Willingness and Ability to Purchase (Dollars)
Andrew	540,000
Beth	530,000
Lorenzo	750,000
Neha	660,000
Sam	620,000
Teresa	570,000

Which of these people will buy one of the three beachfront parcels? *Check all that apply.*

- ✗ Andrew
- ✗ Beth
- ✗ Lorenzo
- ✗ Neha
- ✗ Sam
- ✗ Teresa

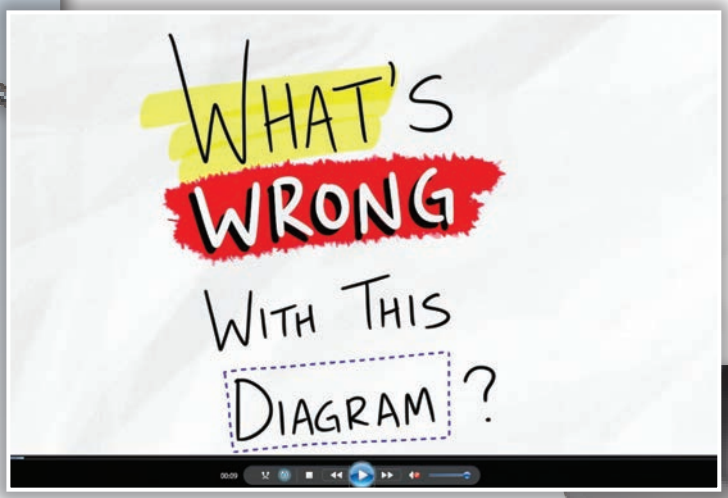
Points: 0 / 1

Explanation: Close Explanation

Lorenzo, Neha, and Sam will purchase the parcels because they are the only ones willing and able to meet the minimum selling price of $595,000. One or more of the other three people might have the ability but not the willingness to pay the required price. Moreover, perhaps Teresa, Andrew, and Beth have a strong desire to own beachfront land in Asilomar, but they do not have the ability to pay the selling price.

Embedded in the Aplia product for Arnold's 13th Edition is the fully interactive, media rich eReader. Combining the functionality you and your students are coming to expect from a modern eReader (text search, highlighting, note-taking) with our exclusive embedded media—Video Questions and Problems, and ConceptClips—this robust reading experience is just a click away as students work through their Aplia problem sets.

"What's Wrong With This Diagram?" assignable video quizzing walks students through the creation of a diagram, then stops the video and provides assessment that is focused on what is wrong with the newly created diagram. Once answered, the video continues to play and provides remediation and explanation. These activities are available in MindTap.



Because cultivating an economic way of thinking requires building on a foundation of theory and its application to real-world examples, ***ECONOMICS, 13e*** continues to set the standard for thoroughly updated content. In this edition, "Here What and How the Economist Thinks" and "Does It Matter to You If . . .?" are two new features included in every chapter. The first feature gives insight into just how economists go about thinking about various topics. The second feature ties what students read in an economics principles book–on such subjects as market structures, interest rates, aggregate demand and supply, monetary and fiscal policy, regulation and antitrust–directly to how each affects them. Does It Matter To You If You are Efficient or Not? or If the Economy is at One Point on the PPF Instead of Another? or If Something You Buy Is Taxed or Subsidized? It certainly does.

ECONOMICS 24/7

Obesity and a Soda Tax

The percentage of the U.S. population that is deemed obese today is higher than it was 20 years ago. Obesity is a health problem, so we often hear proposals directed at trying to reduce the obesity rate in the country. One proposal is to place a tax on high-fat, high-calorie so-called junk food. A similar proposal is to place a tax on soda.

We now know that a tax placed on one good (but not on another) will change the relative prices of the two goods. Placing a tax on good X, but not on good Y, will make good X relatively more expensive and Y relatively cheaper, prompting consumers to purchase relatively less X and relatively more Y.

Consider a tax placed on soda. We would expect the absolute (money) price of soda to rise. And if the tax is placed only on soda, its relative price will rise too. As soda becomes relatively more expensive, we would expect fewer sodas to be consumed and obesity to decline. Right? Well, fewer sodas might be purchased and consumed, but whether obesity will decline is not so clear. Consider soda and sugared iced tea. Both soda and sugared iced tea are sweet drinks. They might even be substitutes. With this idea in mind, suppose the absolute price of a soda is $1 and the absolute price of an iced tea (with sugar) is 50¢. It follows that the relative prices are

1 soda = 2 sugared iced teas
1 sugared iced tea = ½ soda

Now let's place a tax on soda that drives its price up to $2. The new relative prices for soda and iced tea are

1 soda = 4 sugared iced teas
1 sugared iced tea = ¼ soda

As a result of the tax on soda, its relative price has risen, but the relative price of sugared iced tea has fallen. We would thus expect people to consume relatively less soda and relatively more sugared iced tea.

Obesity is lessened by ingesting fewer calories, not the same number or more calories. Simply put, the soda tax might reduce the consumption of sodas, but it doesn't necessarily reduce obesity. Although the soda tax makes soda relatively more expensive, it makes soda substitutes (such as sugared iced tea) relatively less expensive and thus makes a rise in the consumption of sugared iced tea more likely.

Patt McConville / Alamy Stock Photo

IN APPRECIATION

Many colleagues have contributed to the success of this text over the last twelve editions. Their feedback continues to influence and enhance the text and ancillary package and I'm grateful for their efforts. Now into our 13th edition, space dictates that we can no longer list the names of all reviewers for each past edition; we are including here instructors who contributed to the development of the 13th edition, but continue to be grateful for the improvements suggested by all of the reviewers and contributors to this product over the years.

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I would like to thank Peggy Crane of Southwestern College, who revised the Test Bank and wrote the questions for the Adaptive Test Prep. I owe a debt of gratitude to all the fine and creative people I worked with at Cengage Learning. These persons include Erin Joyner, Vice President and General Manager (Social Science and Qualitative Business); Jason Fremder, Product Director; Chris Rader, Associate Product Manager; John Carey, Executive Marketing Manager; Molly Umbarger, Content Developer; Colleen Farmer, Senior Content Project Manager; and Michelle Kunkler, Senior Art Director.

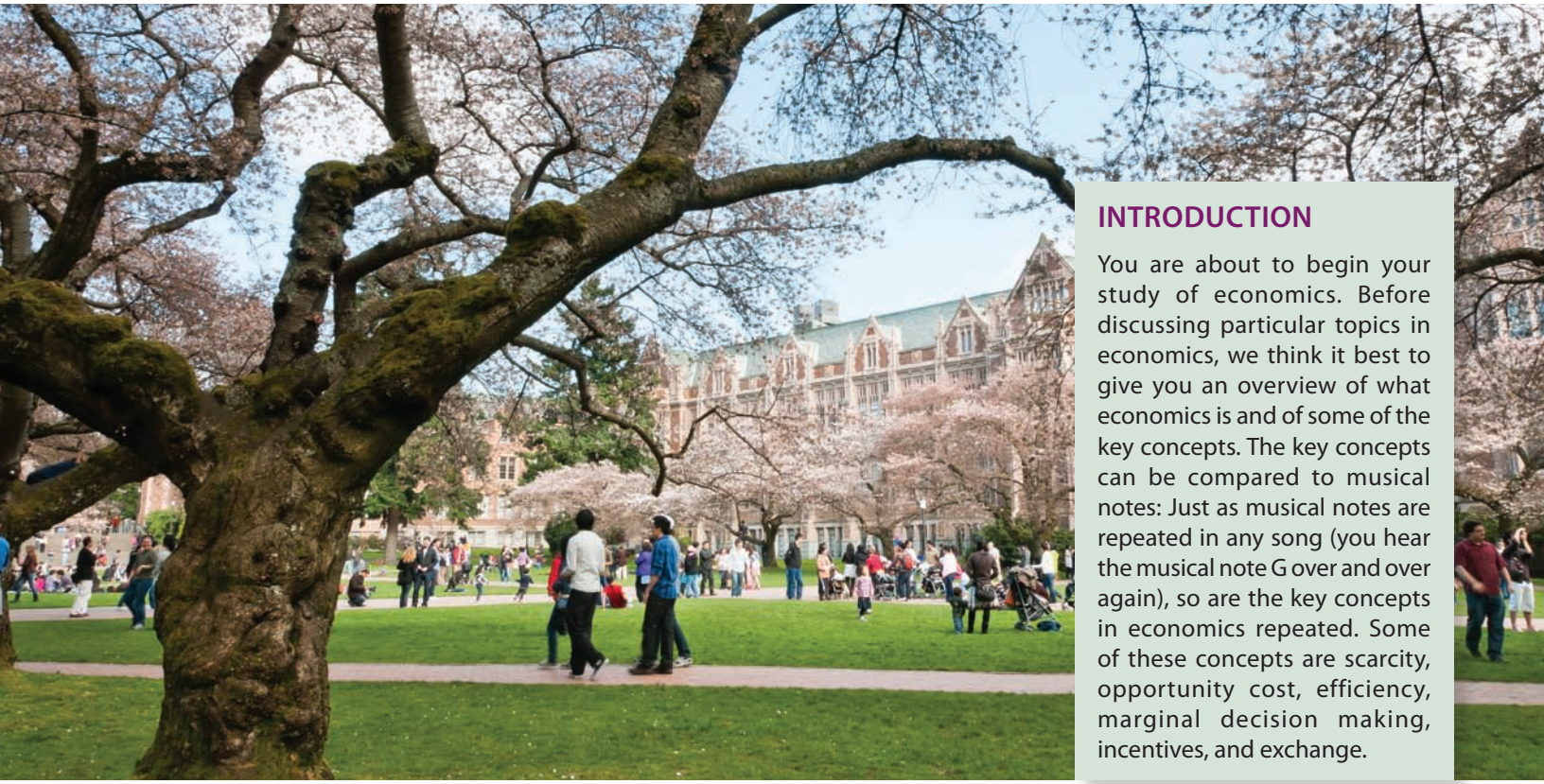
My deepest debt of gratitude goes to my wife, Sheila, and to my two sons, David and Daniel. They continue to make all my days happy ones.

Roger A. Arnold

CHAPTER

1

WHAT ECONOMICS IS ABOUT



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INTRODUCTION

You are about to begin your study of economics. Before discussing particular topics in economics, we think it best to give you an overview of what economics is and of some of the key concepts. The key concepts can be compared to musical notes: Just as musical notes are repeated in any song (you hear the musical note G over and over again), so are the key concepts in economics repeated. Some of these concepts are scarcity, opportunity cost, efficiency, marginal decision making, incentives, and exchange.

1-1 YOUR LIFE, 2019–2029

What will your life be like during the years 2019–2029? What kind of work will you do after college? How much will you earn in that first job after college? Where will you be living and who will your friends be? How many friends will you have? Will you buy a house in the next few years? If so, how much will you pay for the house? And, perhaps most importantly, will you be happy?

The specific answers to these questions and many more have to do with economics. For example, the salary you will earn has to do with the economic concept of *opportunity cost*. What you will do in your first job after college has to do with the *state of the economy* when you graduate. The price you pay for a house has to do with the state of the *housing market*. How many friends you have has to do with the economic concept of *scarcity*. Whether you are happy will depend on such things as the *net benefits* you receive in various activities, the *utility* you gain by doing certain things, and more.

In this chapter, we begin our study of economics. As you read the chapter (and those which follow), ask yourself how much of what you are reading is relevant to your life today and tomorrow. Ask: What does what I am reading have to do with *my* life? Our guess is that after answering this question a few dozen times, you will be convinced that economics explains much about your present and future.

1-2 A DEFINITION OF ECONOMICS

In this section, we discuss a few key economic concepts; then we incorporate knowledge of these concepts into a definition of economics.

1-2a Goods and Bads

Good
Anything from which individuals receive utility or satisfaction.

Utility
The satisfaction one receives from a good.

Bad
Anything from which individuals receive disutility or dissatisfaction.

Disutility
The dissatisfaction one receives from a bad.

Economists talk about *goods* and *bads*. A **good** is anything that gives a person **utility**, or satisfaction. Here is a partial list of some goods: a computer, a car, a watch, a television set, friendship, and love. You will notice from our list that a good can be either tangible or intangible. A computer is a tangible good; friendship is an intangible good. Simply put, for something to be a good (whether tangible or intangible), it only has to give someone utility or satisfaction.

A **bad** is something that gives a person **disutility** or dissatisfaction. If the flu gives you disutility or dissatisfaction, then it is a bad. If the constant nagging of an acquaintance is something that gives you disutility or dissatisfaction, then it is a bad.

People want goods, and they do not want bads. In fact, they will pay to get goods ("Here is $1,000 for the computer"), and they will pay to get rid of bads ("I'd be willing to pay you, doctor, if you can prescribe something that will shorten the time I have the flu").

Can something be a *good* for one person and a *bad* for another person? Smoking cigarettes gives some people utility; it gives others disutility. We conclude that smoking cigarettes can be a *good* for some people and a *bad* for others. This must be why the wife tells her husband, "If you want to smoke, you should do it outside." In other words, "Get those *bads* away from me."

1-2b Resources

Land
All natural resources, such as minerals, forests, water, and unimproved land.

Labor
The work brought about by the physical and mental talents that people contribute to the production process.

Capital
Produced goods, such as factories, machinery, tools, computers, and buildings that can be used as inputs for further production.

Entrepreneurship
The talent that some people have for organizing the resources of land, labor, and capital to produce goods, seek new business opportunities, and develop new ways of doing things.

Goods do not just appear before us when we snap our fingers. It takes resources to produce goods. (Sometimes *resources* are referred to as *inputs* or *factors of production.*)

Generally, economists divide resources into four broad categories: *land, labor, capital,* and *entrepreneurship.*

- **Land** includes natural resources, such as minerals, forests, water, and unimproved land. For example, oil, wood, and animals fall into this category. (Sometimes economists refer to the category simply as *natural resources.*)
- **Labor** consists of the physical and mental talents that people contribute to the production process. For example, a person building a house is using his or her own labor.
- **Capital** consists of produced goods that can be used as inputs for further production. Factories, machinery, tools, computers, and buildings are examples of capital. One country might have more capital than another; that is, it has more factories, machinery, tools, and the like.
- **Entrepreneurship** refers to the talent that some people have for organizing the resources of land, labor, and capital to produce goods, seek new business opportunities, and develop new ways of doing things.

1-2c Scarcity and a Definition of Economics

Scarcity
The condition in which our wants are greater than the limited resources available to satisfy those wants.

We are now ready to define a key concept in economics: *scarcity*. **Scarcity** is the condition in which our wants (for goods) are greater than the limited resources (land, labor, capital, and entrepreneurship) available to satisfy those wants. In other words, we want goods, but not enough resources are available to provide us with all the goods we want.

Look at it this way: Our wants (for goods) are infinite, but our resources (which we need to produce the goods) are finite. Scarcity is the result of our infinite wants hitting up against finite resources.

Many economists say that if scarcity didn't exist, neither would economics. In other words, if our wants weren't greater than the limited resources available to satisfy them, there would be no field of study called economics. This is similar to saying that if matter and motion didn't exist, neither would physics or that if living things didn't exist, neither would biology. For this reason, we define **economics** in this text as the science of scarcity. More completely, *economics is the science of how individuals and societies deal with the fact that wants are greater than the limited resources available to satisfy those wants*.

Economics
The science of scarcity; the science of how individuals and societies deal with the fact that wants are greater than the limited resources available to satisfy those wants.

THINKING LIKE AN ECONOMIST

Scarcity Affects Everyone Everyone in the world—even a billionaire—has to face scarcity. Billionaires may be able to satisfy more of their wants for tangible goods (houses, cars) than most people, but they still may not have the resources to satisfy all their wants. Their wants might include more time with their children, more friendship, no disease in the world, peace, and a hundred other things that they don't have the resources to "produce."

Thinking in Terms of Scarcity's Effects

Scarcity has effects. Here are three: (1) the need to make choices, (2) the need for a rationing device, and (3) competition.

Choices People have to make choices because of scarcity. Because our unlimited wants are greater than our limited resources, some wants must go unsatisfied. We must choose which wants we will satisfy and which we will not. Jeremy asks, "Do I go to Hawaii or do I pay off my car loan earlier?" Ellen asks, "Do I buy the new sweater or two new shirts?"

Need for a Rationing Device A **rationing device** is a means of deciding who gets what of available resources and goods. Scarcity implies the need for a rationing device. If people have infinite wants for goods and if only limited resources are available to produce the goods, then a rationing device is needed to decide who gets the available quantity of goods. Dollar price is a rationing device. For instance, 100 cars are on the lot, and everyone wants a new car. How do we decide who gets what quantity of the new cars? The answer is to use the rationing device called *dollar price*. The people who pay the dollar price for a new car end up with one.

Rationing Device
A means for deciding who gets what of available resources and goods.

Scarcity and Competition Do you see competition in the world? Are people competing for jobs? Are states and cities competing for businesses? Are students competing for grades? The answer to all these questions is yes. The economist wants to know why this competition exists and what form it takes. First, the economist concludes, competition exists because of scarcity. If there were enough resources to satisfy all our seemingly unlimited wants, people would not have to compete for the available, but limited, resources.

Second, the economist sees that competition takes the form of people trying to get more of the rationing device. If dollar price is the rationing device, people compete to earn dollars. Look at your own case. You are a college student working for a degree. One reason (but perhaps not the only reason) you are attending college is to earn a higher income after graduation. But why do you want a higher income? You want it because it will allow you to satisfy more of your wants.

Suppose muscular strength (measured by lifting weights), instead of dollar price, were the rationing device. Then people with more muscular strength would receive more resources and goods than people with less muscular strength. In that case, people would compete for muscular strength. (Would they spend more time at the gym lifting weights?) The lesson is simple: *Whatever the rationing device is, people will compete for it.*

FINDING ECONOMICS

At the campus bookstore To learn economics well, you must practice what you learn. One of the ways to practice economics is to find it in everyday life. Consider the following scene: You are in the campus bookstore buying a book for your computer science course, and you are handing over $85 to the cashier. Can you find the economics in this simple scene? Before you read on, think about it for a minute.

Let's work backward to find the economics. You are currently handing the cashier $85. We know that dollar price is a rationing device. But let's now ask ourselves why we would need a rationing device to get the book. The answer is scarcity. In other words, scarcity is casting its long shadow there in the bookstore as you buy a book. We have found one of the key economic concepts—scarcity—in the campus bookstore. (If you also said that a book is a good, then you have found even more economics in the bookstore. Can you find more than scarcity and a good?)

SELF-TEST

(Answers to Self-Test questions are in Answers to Self-Test Questions at the back of the book.)

1. True or false? Scarcity is the condition of finite resources. Explain your answer.
2. How does competition arise out of scarcity?
3. How does choice arise out of scarcity?

1-3 KEY CONCEPTS IN ECONOMICS

A number of key concepts in economics define the field. We discuss a few of these concepts next.

1-3a Opportunity Cost

Opportunity Cost
The most highly valued opportunity or alternative forfeited when a choice is made.

So far, we have established that people must make choices because scarcity exists. In other words, because our seemingly unlimited wants push up against limited resources, some wants must go unsatisfied. We must therefore *choose* which wants we will satisfy and which we will not. The most highly valued opportunity or alternative forfeited when we make a choice is known as **opportunity cost**. Every time you make a choice, you incur an opportunity cost. For example, you have chosen to read this chapter. In making this choice, you denied yourself the benefits of doing something else. You could have watched television, written text messages to a friend, taken a nap, eaten a few slices of pizza, read a novel, shopped for a new computer, and so on. Whatever you *would have chosen* to do is the opportunity cost of your reading this chapter. For instance, if you would have watched television instead of reading this chapter—if that was your next best alternative—then the opportunity cost of reading the chapter is watching television.

There Is No Such Thing as a Free Lunch Economists are fond of saying that "there is no such thing as a free lunch." This catchy phrase expresses the idea that opportunity costs are incurred whenever choices are made. Perhaps this is an obvious point, but consider how often people mistakenly assume that there *is* a free lunch. For example, some parents think that education is free, because they do not pay tuition for their children to attend public elementary school. That's a misconception. "Free" implies no sacrifice and no opportunities forfeited, but an elementary school education requires resources that could be used for other things.

Consider the people who speak about free medical care, free housing, free bridges ("there's no charge to cross it"), and free parks. Again, free medical care, free housing, free bridges, and free parks are misconceptions. The resources that provide medical care, housing, bridges, and parks could have been used in other ways.

ECONOMICS 24/7

Rationing Spots at Yale

Each year, Yale University receives more applications for admission to the freshmen class than spots are available. In most years, for every 100 applications for admission that Yale receives, it can accept only seven applicants for admission. What Yale has to do, then, is ration its available admission spots.


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How does it ration its available spots? One way is simply to use money as a rationing device. In other words, raise the dollar amount of attending Yale to a high enough level so that the number of spots equals the number of students willing and available to pay for admission. To illustrate, think of Yale as auctioning off spots in its freshman class. It calls out a price of $50,000 a year, and at this price more people wish to be admitted to Yale than there are spots available. Yale keeps on raising the price until the number of students who are willing and able to pay the tuition is equal to the number of available spots. Maybe this price is, say, $200,000.

As we know, Yale does not ration its available spots this way. In fact, it uses numerous rationing devices in an attempt to whittle down the number of applicants to the number of available spots. For example, it might use the rationing device of high school grades. Anyone with a GPA in high school of less than, say, 3.50 is not going to be admitted. If, after doing this, Yale still has too many applicants, it might then make use of the rationing device of standardized test scores. Anyone with an SAT score of under, say, 2100 is eliminated from the pool of applicants. If there are still too many applicants, then perhaps other rationing devices will be used, such as academic achievements, community service, degree of interest in attending Yale, and so on.

Yale might also decide that it wants to admit certain students over others, even if the two categories of students have the same academic credentials. For example, suppose Yale wants at least one student from each state in the country, and only 10 students from Wyoming have applied to go to Yale whereas 500 students from California have applied. Then Yale could very well use the rationing device of state diversity to decide in favor of the student from Wyoming instead of the applicant from California.

In the first week of April each year, Yale sends out many more rejection letters than acceptance letters. No doubt, some students who are rejected by Yale feel that some of the students who were accepted might not be as academically strong as they are. No doubt, the student with a 4.00 GPA and a perfect SAT score of 2400 feels that he might have been slighted by Yale when he learns that a student in his high school with a 3.86 GPA and SAT score of 2180 was chosen over him. What did the 3.86–2180 student have that he didn't have? What rationing device benchmark did the rejected student score lower on?

In life, you will often hear people arguing over what the rationing device for certain things should be. Should high school grades and standardized test scores be the only two rationing devices for college admission? What role should money play as a rationing device when a high school graduate applies to college? What role should ethnic or racial diversity, or state diversity, or income diversity play in the application process? Our point is a simple one: With scarcity comes the need for a rationing device. More people want a spot at Yale than there are spots available. Yale has to use one or more rationing devices to decide who will be accepted and who will be rejected.

THINKING LIKE AN ECONOMIST

Zero Price Doesn't Mean Zero Cost A friend gives you a ticket to an upcoming concert for zero price (i.e., you pay nothing). Does it follow that zero price means zero cost? No. There is still an opportunity cost of attending the concert. Whatever you would be doing if you don't go to the concert is the opportunity cost of attending. To illustrate, if you don't attend the concert, you would hang out with friends. The value you place on hanging out with friends is the opportunity cost of your attending the concert.

1-3b Opportunity Cost and Behavior

Economists believe that a change in opportunity cost can change a person's behavior. For example, Ryan, who is a sophomore at college, attends classes Monday through Thursday of every week. Every time he chooses to go to class, he gives up the opportunity to do something else, such as earn $15 an hour working at a job. The opportunity cost of Ryan's spending an hour in class is $15.

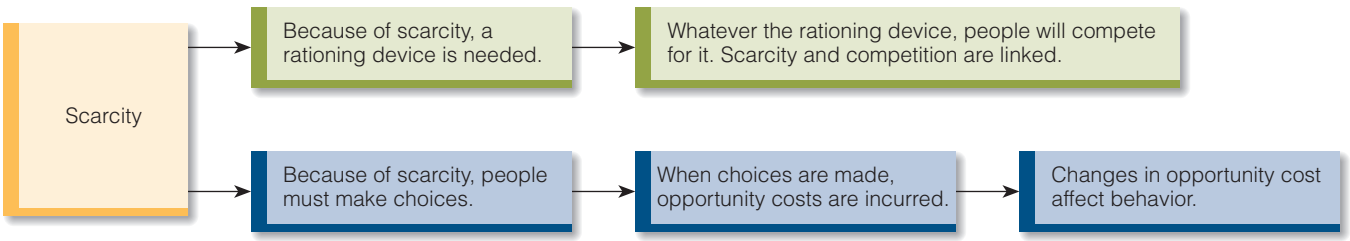
Now let's raise the opportunity cost of attending class. On Tuesday, we offer Ryan $70 to skip his economics class. He knows that if he attends his economics class, he will forfeit $70. What will Ryan do? An economist would predict that as the opportunity cost of attending class increases relative to the benefits of attending, Ryan is less likely to go to class.

This is how economists think about behavior: *The higher the opportunity cost of doing something, the less likely it is that it will be done.* This is part of the economic way of thinking.

Look at Exhibit 1, which summarizes some of the things about scarcity, choice, and opportunity cost up to this point.

EXHIBIT 1

Scarcity and Related Concepts



FINDING ECONOMICS

In Being Late to Class John is often a few minutes late to his biology class. The class starts at 10 a.m., but John usually walks into the class at 10:03 a.m. The instructor has asked John to be on time, but John usually excuses his behavior by saying that the traffic getting to college was bad or that his alarm didn't go off at the right time or that something else happened to delay him. One thing the instructor observes, though, is that John is never late when it comes to test day. He is usually in class a few minutes before the test begins. Where is the economics?

We would expect behavior to change as opportunity cost changes. When a test is being given in class, the opportunity cost of being late to class is higher than when a test is not being given and the instructor is simply lecturing. If John is late to class on test day, he then has fewer minutes to complete the test, and having less time can adversely affect his grade. In short, the higher the opportunity cost of being late to class, the less likely it is that John will be late.

1-3c Benefits and Costs

If we could eliminate air pollution completely, should we do it? If your answer is yes, then you are probably focusing on the *benefits* of eliminating air pollution. For example, one benefit might be healthier individuals. Certainly, individuals who do not breathe polluted air have fewer lung disorders than people who do breathe polluted air.

But benefits rarely come without costs. The economist reminds us that, although eliminating pollution has its benefits, it has costs too. To illustrate, one way to eliminate all car pollution tomorrow is to pass a law stating that anyone caught driving a car will go to prison for 40 years. With such a draconian law in place and enforced, very few people would drive cars and all car pollution would be a thing of the past. Presto! Cleaner air! However, many people would think that the cost of obtaining that cleaner air is too high. Someone might say, "I want cleaner air, but not if I have to completely give up driving my car. How will I get to work?"

What distinguishes the economist from the noneconomist is that the economist thinks in terms of *both* costs *and* benefits. Often, the noneconomist thinks in terms of one or the other. Studying has its benefits, but it has costs too. Coming to class has benefits, but it has costs too. Getting up early each morning and exercising has its costs, but let's not forget that there are benefits too.

1-3d Decisions Made at the Margin

It is late at night, and you have already studied three hours for your biology test tomorrow. You look at the clock and wonder if you should study another hour. How would you summarize your thinking process? What question or questions do you ask yourself to decide whether to study another hour?

Perhaps without knowing it, you think in terms of the costs and benefits of further study. You probably realize that studying an additional hour has certain benefits (you may be able to raise your grade a few points), but it has costs too (you will get less sleep or have less time to watch television or talk on the phone with a friend). *That* you think in terms of costs and benefits, however, doesn't tell us *how* you think in terms of costs and benefits. For example, when deciding what to do, do you look at the *total costs* and *total benefits* of the proposed action, or do you look at something less than the total costs and benefits? According to economists, for most decisions, you think in terms of *additional,* or *marginal,* costs and benefits, not *total* costs and benefits. That's because most decisions deal with making a small, or additional, change.

Marginal Benefits (*MB*)
Additional benefits; the benefits connected with consuming an additional unit of a good or undertaking one more unit of an activity.

Marginal Costs (*MC*)
Additional costs; the costs connected with consuming an additional unit of a good or undertaking one more unit of an activity.

To illustrate, suppose you just finished eating a hamburger and drinking a soda for lunch. You are still a little hungry and are considering whether to order another hamburger. An economist would say that, in deciding whether to order another hamburger, you compare the additional benefits of the second hamburger with its additional costs. In economics, the word *marginal* is a synonym for *additional.* So, we say that you compare the **marginal benefits (*MB*)** of the (next) hamburger to its **marginal costs (*MC*)**. If the marginal benefits are greater than the marginal costs, you obviously expect a net benefit to ordering the next hamburger, and therefore you order another. If, however, the marginal benefits are less than the marginal costs, you obviously expect a net cost to ordering the next hamburger, and therefore you do not order another. Logically, the situation is as follows:

Condition	Action
MB of next hamburger > *MC* of next hamburger	Buy next hamburger
MB of next hamburger < *MC* of next hamburger	Do not buy next hamburger

What you don't consider when making this decision are the *total* benefits and *total* costs of hamburgers. That's because the benefits and costs connected with the first hamburger (the one you have already eaten) are no longer relevant to the current decision. You are not deciding between eating two hamburgers or eating no hamburgers; your decision is whether to eat a second hamburger after you have already eaten one.

According to economists, when individuals make decisions by comparing marginal benefits with marginal costs, they are making **decisions at the margin**. The employee makes a decision at the margin in deciding whether to work two hours overtime; the economics professor makes a decision at the margin in deciding whether to put an additional question on the final exam.

Decisions at the Margin
Decision making characterized by weighing the additional (marginal) benefits of a change against the additional (marginal) costs of a change with respect to current conditions.

ECONOMICS 24/7

When Is It Too Costly to Attend College?

Look around your class. Are there any big-name actors, sports stars, or comedians between the ages of 18 and 25 in your class? Probably not. The reason is that, for these people, the opportunity cost of attending college is much higher than it is for most 18-to-25-year-olds. Think of LeBron James, a basketball star, Chris Rock, a comedian, Johnny Depp, an actor, Will Smith, also an actor—these people and many more like them chose not to go to college. Why didn't they go to college? The fact is that they didn't go to college because it was too expensive for them to go to college. Not "too expensive" in the sense that the "tuition was too high," but expensive in terms of what they would have had to give up if they attended college—expensive in opportunity cost terms.

To understand this idea, think of what it's costing you to attend college. If you pay $3,000 tuition a semester for eight semesters, the full tuition amounts to $24,000. However, $24,000 is not the full cost of attending college, because if you were not a student, you could be earning income working at a job. For example, you could be working at a full-time job earning $32,000 annually. Certainly, this $32,000, or at least part of it if you are currently working part time, is forfeited because you are attending college. It is part of the total cost of your attending college.

The *tuition cost* may be the same for everyone who attends your college, but the *opportunity cost* is not. Some people have higher opportunity costs of attending college than others. It just so happens that Johnny Depp, LeBron James, Will Smith, and Chris Rock had extremely high opportunity costs of attending college. Each would have to give up hundreds of thousands of dollars if he were to attend college on a full-time basis.

Simply put, our story illustrates two related points we have made in this chapter. First, earlier we said that *the higher the opportunity cost of doing something, the less likely it will be done*. The opportunity cost of attending college is higher for some people than others, and that is why not everyone who can pay for college chooses to attend college.

Kent Smith/NBAE/Getty Images

Second, we said that economists believe that *individuals think and act in terms of costs and benefits and that they undertake actions only if they expect the benefits to outweigh the costs*. Thus, Johnny Depp, LeBron James, Will Smith, and Chris Rock saw certain benefits to attending college—just as you see certain benefits to attending college. But those benefits—although they may be the same for you and everyone else—are not enough to get everyone to attend college. That's because the benefits are not all that matters. The costs matter, too. In the case of Johnny Depp, LeBron James, Will Smith, and Chris Rock, the costs of attending college were much higher than the benefits, so they chose not to attend college. In your case, the benefits are higher than the costs, so you have decided to attend college.

1-3e Efficiency

What is the right amount of time to study for a test? In economics, the *right amount* of anything is the *optimal* or *efficient* amount—the amount for which the marginal benefits equal the marginal costs. Stated differently, you have achieved **efficiency** when the marginal benefits equal the marginal costs.

Efficiency
Exists when marginal benefits equal marginal costs.

Suppose you are studying for an economics test, and for the first hour of studying, the marginal benefits (*MB*) are greater than the marginal costs (*MC*):

MB studying first hour > *MC* studying first hour

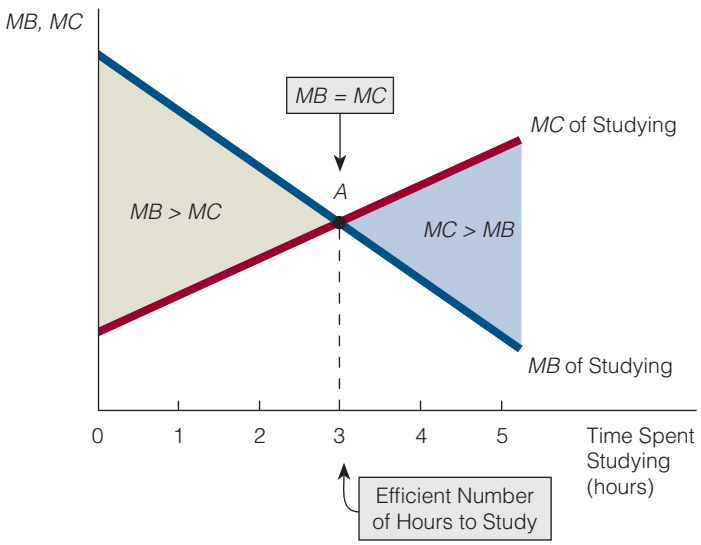
Given this condition, you will certainly study for the first hour, because it is worth it: The additional benefits are greater than the additional costs, so there is a net benefit to studying.

Suppose, for the second hour of studying, the marginal benefits are still greater than the marginal costs:

MB studying second hour > *MC* studying second hour

Then you will study for the second hour, because the additional benefits are still greater than the additional costs. In other words, studying the second hour is worthwhile. In fact, you will continue to study as long as the marginal benefits are greater than the marginal costs. Exhibit 2 illustrates this discussion graphically.

EXHIBIT 2



Efficiency

MB = marginal benefits and *MC* = marginal costs. In the exhibit, the *MB* curve of studying is downward sloping and the *MC* curve of studying is upward sloping. As long as *MB* > *MC*, the person will study. The person stops studying when *MB* = *MC*. This point is where efficiency is achieved.