CHAPTER **1** | Economics:

Foundations and Models

Brief Chapter Summary and Learning Objectives

1.1 Three Key Economic Ideas (pages 4–8)

Explain these three key economic ideas: People are rational; people respond to economic incentives; and optimal decisions are made at the margin.

 People must make choices as they try to attain their goals. People make choices because resources are scarce.

1.2 The Economic Problem That Every Society Must Solve (pages 8–11)

Discuss how an economy answers these questions: What goods and services will be produced? Howwill the goods and services be produced? Who will receive the goods and services produced?

 A limited amount of resources will produce a limited amount of goods and services.

 The cost of producing more of one good is the value of what must be given up to produce it.

1.3 Economic Models (pages 11–15)

Understand the role of models in economic analysis.

 Economists use models—simplified versions of reality—to analyze real-world issues.

1.4 Microeconomics and Macroeconomics (pages 15–16)

Distinguish between microeconomics and macroeconomics.

1.5 A Preview of Important Economic Terms (pages16–17)

Define important economic terms.

Appendix: Using Graphs and Formulas (pages 24–35)

Review the use of graphs and formulas.

Key Terms

**Allocative efficiency**, p. 11. A state of the economy in which production is in accordance with consumer preferences; in particular, every good or service is produced up to the point where the last unit provides a marginal benefit to society equal to the marginal cost of producing it.

**Centrally planned economy**, p. 9. An economy in which the government decides how economic resources will be allocated.

**Economic model**, p. 4. A simplified version of reality used to analyze real-world economic situations.

**Economic variable**, p. 12. Something measurable that can have different values, such as the incomes of doctors.

**Economics**, p. 4. The study of the choices people make to attain their goals, given their scarce resources.

**Equity**, p. 11. The fair distribution of economic benefits.

**Macroeconomics**, p. 16. The study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

**Marginal analysis**, p. 7. Analysis that involves comparing marginal benefits and marginal costs.

**Market**, p. 4. A group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade.

**Market economy**, p. 9. An economy in which the decisions of households and firms interacting in markets allocate economic resources.

**Microeconomics**, p. 16. The study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.

**Mixed economy**, p. 10. An economy in which most economic decisions result from the interaction of buyers and sellers in markets but in which the government plays a significant role in the allocation of resources.

**Normative analysis**, p. 13. Analysis concerned with what ought to be.

**Opportunity cost**, p. 8. The highest-valued alternative that must be given up to engage in an activity.

**Positive analysis**, p. 13. Analysis concerned with what is.

**Productive efficiency**, p. 11. A situation in which a good or service is produced at the lowest possible cost.

**Scarcity**, p. 4. A situation in which unlimited wants exceed the limited resources available to fulfill those wants.

**Trade-off**, p. 8. The idea that, because of scarcity, producing more of one good or service means producing less of another good or service.

**Voluntary exchange**, p. 11. A situation that occurs in markets when both the buyer and the seller of a product are made better off by the transaction.

Chapter Outline

Is the Private Doctor’s Office Going to Disappear?

Traditionally, most doctors in the United States have worked in private practices that they own by themselves or with other doctors. But lately, an increasing number of doctors have chosen to be salaried employees of hospitals. Soaring health care costs have led many insurance companies and the state and federal governments to reduce the payments they make to doctors in return for treating patients. Doctors in private practice have found their incomes fluctuating, which makes a steady income from a hospital salary more attractive. One rule from the healthcare changes passed by Congress in 2010 requires doctors and hospitals receiving payments from Medicare to convert to electronic record keeping. Doctors can avoid the cost of acquiring computer systems, and the paperwork necessitated by other new rules, by choosing hospital employment.

Teaching Tips

There are special features in the textbook:

1. The introduction, or chapter opener, uses a real-world business example to preview the economic issues discussed in the chapter.

2. A feature titled *An Inside Look* appears at the end of textbook Chapters 1, 2, 3, and 4. This feature consists of a recent news article plus analysis and questions. The article links back to a topic discussed in the chapter opener. Visit **www.myeconlab.com** for additional current news articles and analyses.

3. A boxed feature titled *Economics in Your Life* complements the business example that opens the chapter. *Economics in Your Life* poses questions that help students make a personal connection with the chapter theme. At the end of the chapter, the authors use the concepts described in the chapter to answer these questions. Additional *Economics in Your Life* featuresare included in this Instructor’s Manual.

4. *Don’t Let This Happen to You* is a box feature that alerts students to common pitfalls covered in that chapter.

5. There are between two and four *Making the Connection* features in each chapter that provide real world reinforcement of key concepts by citing news stories that focus on business and policy issues. Additional *Making the Connection* features appear in this Instructor’s Manual.

6. *Solved Problems* use a step-by-step process for solving an economic problem related to one of the chapter’s learning objectives. Additional *Solved Problems* are included in this Instructor’s Manual.

7. *Real-Time Data Analysis* (RTDA) exercises are included with the problems at the end of macroeconomics chapters. These problems refer to data and graphs that students will find housed on the Web site of the Federal Reserve Bank of St. Louis (FRED). Many RTDA require more elaborate calculations than other problems and the use of Excel spreadsheets.

8. *Graphs Updated with Real-Time Data from FRED:*Select graphs, primarily in the macroeconomics volume, are continuously updated online with the latest available data from FRED (Federal Reserve Economic Data), which is a comprehensive, up-to-date data set maintained by the Federal Reserve Bank of St. Louis. Students can display a pop-up graph that shows new data plotted in the graph. The goal of this digital feature is to help students understand how to work with data and understand how including new data affects graphs.

You can use these features as the basis for classroom discussion, homework assignments, and examination questions.

People must make choices as they try to attain their goals. The choices people make represent the trade-offs made necessary by scarcity. **Scarcity** is a situation in which unlimited wants exceed the limited resources available to fulfill those wants. **Economics** is the study of the choices people make to attain their goals, given their scarce resources. An **economic model** is a simplified version of reality used to analyze real-world economic situations.

Teaching Tips

Students will better understand what scarcity means if you give them examples of things that are *not* scarce. Suggest examples of “free” resources—sand on a beach, fresh air, and so one—and ask your students to contribute their own examples; they will soon learn that the list of free resources is much shorter than the list of scarce resources.

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| **1.1** | Three Key Economic Ideas (pages 4–8)Learning Objective: Explain these three key economic ideas: People are rational; people respond to economic incentives; and optimal decisions are made at the margin. |
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A **market** is a group of buyers and sellers of a good or service and the institution or arrangement by which they come together to trade.

A. People Are Rational

Rational individuals weigh the benefits and costs of each action and choose an action if the benefits outweigh the costs.

B. People Respond to Economic Incentives

Economists emphasize that consumers and firms consistently respond to economic incentives.

C. Optimal Decisions Are Made at the Margin

Economists use the word “marginal” to mean an extra or additional benefit or cost from making a decision. The optimal decision is to continue any activity to the point where the marginal benefit equals the marginal cost. **Marginal analysis** is analysis that involves comparing marginal benefits and marginal costs.

Teaching Tips

You don’t need to spend a lot of class time with explanations of the material in this section; subsequent chapters will reinforce students’ understanding of markets and the “three key economic ideas.”

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| **1.2** | The Economic Problem That Every Society Must Solve (pages 8–11)Learning Objective: Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced? |
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Every society faces the economic problem that it has only a limited amount of economic resources, so it can produce only a limited amount of goods and services. Society faces trade-offs. A **trade-off** is the idea that, because of scarcity, producing more of one good or service means producing less of another good or service. Every activity has an **opportunity cost:** the highest-valued alternative that must be given up to engage in an activity. Trade-offs force society to answer three fundamental questions:

1. *What* goods and services will be produced?
2. *How* will the goods and services be produced?
3. *Who* will receive the goods and services produced?

A. What Goods and Services Will Be Produced?

The answer to this question is determined by the choices consumers, firms, and the government make. Each choice made comes with an opportunity cost.

B. How Will the Goods and Services Be Produced?

Firms choose how to produce the goods and services they sell. For example, firms often face trade-offs between using more workers or more machines.

C. Who Will Receive the Goods and Services Produced?

In the United States, who receives the goods and services produced depends largely on how income is distributed. An important policy question is whether the government should intervene to make the distribution of income more equal.

D. Centrally Planned Economies versus Market Economies

Societies organize their economies in two main ways. A **centrally planned economy** is an economy in which the government decides how economic resources will be allocated. A **market economy** is an economy in which the decisions of households and firms interacting in markets allocate economic resources. Today, only a few small countries, such as Cuba and North Korea, still have completely centrally planned economies. In a market economy, the income of an individual is determined by the payments he receives for what he sells. Generally, the more extensive the training a person has received and the longer the hours the person works, the higher his income will be.

E. The Modern “Mixed” Economy

The high rates of unemployment and business bankruptcies during the Great Depression of the 1930s caused a dramatic increase in government intervention in the economy in the United States and other market economies. Some government intervention is designed to raise the incomes of the elderly, the sick, and people with limited skills. In recent years, government intervention has expanded to meet goals such as the protection of the environment, the promotion of civil rights, and the provision of medical care to low-income people and the elderly.

Some economists argue that the extent of government intervention makes it more accurate to refer to the economies of the United States, Canada, and Western Europe as mixed economies rather than pure market economies. A **mixed economy** is an economy in which most economic decisions result from the interaction of buyers and sellers in markets but in which the government plays a significant role in the allocation of resources.

F. Efficiency and Equity

Market economies tend to be more efficient than centrally planned economies. There are two types of efficiency. **Productive efficiency** is a situation in which a good or service is produced at the lowest possible cost. **Allocative efficiency** is a state of the economy in which production is in accordance with consumer preferences; in particular, every good or service is produced up to the point where the last unit provides a marginal benefit to society equal to the marginal cost of producing it. **Voluntary exchange** is a situation that occurs in markets when both the buyer and the seller of a product are made better off by the transaction.

Inefficiency arises from various sources. Sometimes governments reduce efficiency by interfering with voluntary exchange in markets. The production of some goods damages the environment when firms ignore the costs of environmental damage. In this case, government intervention can increase efficiency.

Society may not find an efficient economic outcome to be desirable. Many people prefer economic outcomes that they consider fair or equitable even if these outcomes are less efficient. **Equity** is the fair distribution of economic benefits. Programs designed to increase equity may reduce efficiency.

Teaching Tips

Ask students for examples of government regulation of private markets in the United States. Responses may include: making the sale of cocaine and other addictive drugs illegal; minimum age requirements for the purchase of alcoholic beverages and cigarettes; the prohibition of the sale of new drugs before their effectiveness is demonstrated through government-supervised tests. Ask students whether one of these examples of government regulation promotes equity or fairness. The difficulty in defining equity will be apparent.

 To show how students may value equity less than they claim, an economics teacher at a college in Western New York once told her students at the beginning of her course that their grades would be auctioned to the highest bidders. Because grades are typically normally distributed, she offered to sell a few A grades, a few more B grades, and so on. Although the announcement produced shock and grumbling, the auction proceeded, with frenzied bidding for A grades. As prices for A grades rose, bidding switched to B grades. Because few students bothered to bid for C grades, one enterprising student bid on several such grades in the belief that those who lost out on getting an A or B would have to buy their C grades from him—for a higher price than he paid! After about a week, the instructor informed the class the auction was intended only as an economics lesson; they would have to earn their grades the old-fashioned way.

*Extra* Solved Problem 1.2

Advising New Government Leaders

Suppose that a low-income country experiences a change in government leadership. Prior to this change, the country had a centrally planned economy. The new leaders are willing to try a different system if they can be can be convinced that it will result in higher rates of economic growth. They hire an economist from a country with a market economy to advise them and will order their citizens to follow the economist’s recommendations for change. The economist suggests that a market economy replace central planning to answer the nation’s economic questions (*what*, *how*, and *who*?).

What will the economist suggest the leaders order their citizens to do in order to change from a centrally planned economy to a market economy?

Are there reasons why the leaders of this country might not accept the economist’s suggestions? Briefly explain.

Solving the Problem

**Step 1: Review the chapter material.**

 The problem is about different types of economic systems, so you may want to review the section “Centrally Planned Economies versus Market Economies” on page 9 of the textbook.

**Step 2: What will the economist suggest the leaders order their citizens to do?**

 Market economies allow members of households to select occupations and purchase goods and services based on self-interest and allow privately owned firms to produce goods and services based on their self-interest. Therefore, the economist would advise the leaders of the country to eliminate existing laws and regulations that restrict the economic activities that households and firms can engage in. Government officials should have no influence over individual decisions made in markets.

**Step 3: Are there reasons why the leaders of this country might not accept the economist’s suggestions?**

 Even democratically elected leaders, especially those with significant involvement in the country’s resource allocation, will find it difficult to accept the new system. They may wonder how self-interested individuals will produce and distribute goods and services so as to promote the welfare of the entire country. This new system requires a significant reduction in the government’s influence on people’s lives, but history has shown that most government officials are reluctant to give up this influence. Acceptance is most likely when the leaders have some knowledge and experience with the successful operation of a market economy in other countries. Ordinary citizens are more likely to accept the economist’s suggestions because they would have more freedom to pursue their own economic goals.

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| **1.3** | Economic Models (pages 11–15)Learning Objective: Understand the role of models in economic analysis. |
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Models are simplified versions of reality used to analyze real-world situations. To develop a model, economists generally follow five steps.

1. Decide on the assumptions to use in developing the model.

2. Formulate a testable hypothesis.

3. Use economic data to test the hypothesis.

4. Revise the model if it fails to explain the economic data well.

5. Retain the revised model to help answer similar economic questions in the future.

A. The Role of Assumptions in Economic Models

Models are based on making assumptions because models must be simplified to be useful. When using models, economists make behavioral assumptions about the motives of consumers and firms. Economists assume that consumers will buy goods and services that will maximize their satisfaction and firms will act to maximize their profits.

B. Forming and Testing Hypotheses in Economic Models

An **economic variable** is something measurable that can have different values, such as the incomes of doctors. A hypothesis in an economic model is a statement that may be correct or incorrect about an economic variable. To test a hypothesis, we analyze statistics on the relevant economic variables. Economists accept and use an economic model if it leads to hypotheses that are confirmed by statistical analysis.

C. Positive and Normative Analysis

**Positive analysis** is analysis concerned with what is. **Normative analysis** is analysis concerned with what ought to be.

D. Economics as a Social Science

Because economics studies the actions of individuals, it is a social science. Economics considers human behavior in every context, not just in the context of business. Economists have played an important role in formulating government policies in areas such as the environment, health care, and poverty.

*Extra* Solved Problem 1.3

Sunspot Activity and the Market for Natural Gas

Sunspots are sites of strong magnetic fields that appear as dark regions on the surface of the sun. The number of sunspots varies over an 11-year cycle. Scientists have found that the earth’s temperature declines when the number of sunspots decreases, so when the number of sunspots declined in 2013, there was an expectation that a period of lower temperatures could follow. British economist William Stanley Jevons (1835–1882) developed a model of economic growth based on the occurrence of sunspots. Jevons hypothesized that when the earth’s temperature varied throughout the sunspot cycle, agricultural output would change, too. Today, most economists attribute changes in economic growth to factors other than sunspots. But some analysts believe that changes in sunspot activity could result in changes in the demand for natural gas in the United States and, therefore, in its price. The development of new technology has resulted in a large increase in the production of natural gas in the United States in the twenty-first century. As a result, natural gas has replaced other sources of energy for businesses and households, and lower temperatures could lead to an increase in the demand for natural gas.

How can we develop a model that would test the relationship between sunspot activity and the market for natural gas?

# Source: Simon Constable, “As ‘Sun Spots’ Cool Down, Natural-Gas Market Heats Up,” *Wall Street Journa*l, July 1, 2013.

Solving the Problem

**Step 1:** Review the chapter material. This problem is about how to use models to analyze economic issues, so you may want to review the section “Economic Models,” which begins on page 11 of the textbook.

**Step 2:**  To develop and test a model of the relationship between sunspot activity and the market for natural gas, follow these steps:

1. *Decide on the assumptions to use in developing the model*. Two assumptions of the model are: (a) Changes in the earth’s temperature are related to changes in the amount of sunspot activity, and (b) changes in the earth’s temperature cause variations in the demand for natural gas, which is an energy source for homes and businesses.

2. *Formulate a testable hypothesis*. Given these assumptions, all else equal, the demand for natural gas and the price of natural gas will be higher in years when there is lower than average sunspot activity. All else equal, the demand for natural gas and the price of natural gas will be lower in years when there is higher than average sunspot activity.

3. *Use economic data to test the hypothesis*. Compare changes in sunspot activity with changes in the price of natural gas and the quantity of natural gas sold. Because sunspot activity varies in 11-year cycles, data should cover at least one of these cycles. For the United States, years of greater-than-average sunspot activity should be years of relatively low sales and prices for natural gas, while years of lower-than-average sunspot activity should be years of higher sales and prices for natural gas.

4. *Revise the model if it fails to explain the economic data well*. The model could fail if factors other than sunspot activity have a significant effect on the market for natural gas. These factors include: changes in the prices of other energy sources; changes in the cost of production for natural gas; and changes in government policies toward energy markets. A revised model would examine the separate influence of sunspots and these other factors. The model could also fail if factors other than sunspot activity, such as an increase in the amount of “greenhouse gases” in the atmosphere, affect the earth’s temperature.

5. *Retain the revised model to help answer similar economic questions in the future*. If the data support the model, one can assume that there is a relationship between sunspot activity and the market for natural gas. We need to keep in mind, though, that tests of the model with data from different time periods could either support or contradict these results. Acceptance of a model is always tentative pending the acquisition of new data or additional statistical analysis.

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| **1.4** | Microeconomics and Macroeconomics (pages 15–16)Learning Objective: Distinguish between microeconomics and macroeconomics. |
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**Microeconomics** is the study of how households and firms make choices, how they interact in markets, and how the government attempts to influence their choices.

**Macroeconomics** is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth.

*Extra* Solved Problem 1.4

Microeconomic and Macroeconomic Views

Sports fans are used to seeing game action on television from different camera angles. For popular events such as the Olympics, the World Series, and the Super Bowl, network coverage captures action from ground level as well as from higher locations. At many events, there is a camera located in a blimp that circles above the stadium where the event is held. The aerial view of the blimp’s camera is often visually appealing but never is broadcast for very long because the athletes are barely visible. Coverage of the events often includes a view from a mobile or “sideline” camera that can zoom in on individual players or fans sitting in the stands, a degree of detail much greater than that provided by the aerial view.

How do the different camera angles help to explain the difference between microeconomics and macroeconomics?

Solving the Problem

**Step 1: Review the chapter material.** This problem is about the differences between microeconomics and macroeconomics, so you may want to review the section “Microeconomics and Macroeconomics,” which begins on page 15 of the textbook.

**Step 2: Compare the focus of microeconomics with the television coverage of a sports event.** Microeconomics focuses on how individual households and firms make choices, how they interact in markets, and how the government attempts to influence their choices. This focus is similar to that of a sideline camera at a football game. The camera can focus in on an individual player or fan.

**Step 3: Compare the focus of macroeconomics with the television coverage of a sports event.** Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment, and economic growth. Macroeconomics does not study the decisions made by individuals but the consequences of the actions of all decision makers in an economy. This is similar to the blimp’s aerial view of the venue where a sports event occurs. One can see the entire venue, but the blimp’s point of view is too far away to see any individual player or fan.

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| ***Extra*** MakingtheConnection | Macroeconomic and Microeconomic Analysis |

Economists separate the study of how households and firms make choices and interact in markets (microeconomics) from the study of the economy as a whole (macroeconomics). But some issues can be viewed from both perspectives. Labor productivity is one such issue.

Labor productivity—the quantity of goods and services that can be produced by one worker or by one hour of work—is a microeconomic topic. Labor productivity increases when a firm invests in capital or when a firm’s technology improves. Increased labor productivity allows a firm to earn higher profits and to pay its workers higher wages. But macroeconomists also study labor productivity because it determines the standard of living a country can achieve for its citizens. An increase in productivity is beneficial in the long run, but it can slow the growth of jobs in the short run. Following the recessions of 2001 and 2007–2009, many economists were concerned that the unemployment rate did not decrease as quickly as it did following previous recessions. One reason for this was an increase in productivity. In 2009, for example, labor productivity increased by about 2.5 percent. Because workers were more productive, firms could hire fewer additional workers to produce an increase in the quantity of goods and services. But productivity growth slowed to less than 1 percent in 2012 and 2013. Economists at **J.P. Morgan** attributed the slowdown in productivity growth to decisions by U.S. firms to reduce their investment in research. After 1995, firms had invested in computer-related applications, which had helped increase productivity growth. The productivity slowdown led economist Robert Gordon of Northwestern University to comment that firms had “already picked the low-hanging fruit.”

Sources: “Slash and Earn,” *Economist*, March 18, 2010; Alex Tanzi, “U.S. Second Quarter Productivity and Cost Report,” *Bloomberg.com*, September 1, 2011; andJonathan House, “Productivity Advanced in the Second Quarter,” *Wall Street Journal*, August 16, 2013.

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| **1.5** | A Preview of Important Economic Terms (pages 16–17)Learning Objective: Define important economic terms. |
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This section provides a brief definition and preview of terms students will see throughout the book: firm (company or business), entrepreneur, innovation, technology, goods, services, revenue, profit, household, factors of production (economic resources or inputs), capital, and human capital.

*Extra* Economics in Your Life:

Is Cheating a Rational Decision?

In their best-selling book *Freakonomics*, Steven D. Levitt and Stephen J. Dubner argue that cheating is part of human behavior. Evidence that *some* people cheat surfaced in the summer of 2011 when the superintendent of the board of the Atlanta school district resigned after a report documented widespread cheating on standardized tests that implicated officials from about 80 percent of Atlanta’s elementary and middle schools. Following an investigation of the scandal, three dozen teachers and administrators were due to stand trial in 2013 for coaching students and changing their answers in order to improve test results.

Steven Levitt and other economists assume that decision makers—students and nonstudents alike—are rational. They compare the benefits and costs of their options and make choices for which the expected benefits exceed the expected costs. The benefits of (successful) cheating may be monetary; for example, K–12 teachers in some states are eligible for bonus payments of up to $25,000 if their students perform well on standardized tests. New technology has made it easier for high school and college students to cheat. The widespread use of cell phones and Internet access makes it easier (less costly) to share exam answers and buy term papers. Of course, cheating is also a moral matter for many people. For these people, one of the costs of cheating is the guilt they will feel for violating the rules governing the activity they are engaged in.

**Sources**: Steven D. Levitt and Stephen J. Dubner, *Freakonomics,* New York: HarperCollins, 2005, pp. 24–25; Patrik Jonsson, “America’s Biggest Teacher and Principal Cheating Scandal Unfolds in Atlanta,” *Christian Science Monitor*, July 5, 2011; and Mary Beth McCauley, “Atlanta School Cheating: When Teachers Cheat, What Do You Tell the Kids?” *Christian Science Monitor*, September 5, 2013.

Question: For the sake of argument, let’s assume that you would never cheat. Under what circumstances are students in general *more or less likely* to cheat on an economics examination?

Answer: Your economics instructor will be pleased if you would never cheat under any circumstances. But cheating is more likely when: (1) the positive consequences of receiving a high grade are great (for example, a high grade is necessary to maintain a scholarship, gain admittance to medical school, or get a good job offer), or (2) the probability of getting caught is low (the instructor gives the same multiple-choice exam to all students in a large classroom with no supervision). Reducing the benefit and increasing the cost of getting caught will reduce the incidence of cheating. If appeals to personal integrity are not enough to convince students not to cheat, a more effective deterrent may be for potential employers to let students know that they fire dishonest employees.

Extra**AN INSIDELOOK** News Article to Use in Class

Visit www.myeconlab.com for current **An** **Inside Look** news articles.

Appendix

Using Graphs and Formulas (pages 24–35)

Learning Objective: Review the use of graphs and formulas.

Graphs simplify economic ideas and make the ideas more concrete so they can be applied to real-world problems.

Graphs of One Variable

Figure 1A.1 in the textbook displays examples of two common types of graphs: bar graphs and pie charts. The height of the bars in the bar graph represents the market shares of automobile firms. The pie chart shows the same information with the market shares of each group of firms represented by the size of its slice of the pie. Information on economic variables can also be displayed in time-series graphs. These graphs are displayed on a coordinate grid. The vertical axis (*y*-axis) of a coordinate grid measures the value of one variable. The point where the vertical axis intersects the horizontal axis is the origin. The horizontal axis of a coordinate grid measures the value of another variable. The points in a coordinate grid represent the values of the two variables. Figure 1A.2 illustrates examples of time-series graphs.

Graphs of Two Variables

We often use graphs to show the relationship between two variables. Figure 1A.3 illustrates the graph of a linear or straight-line demand curve where price is measured along the vertical axis and quantity is measured along the horizontal axis.

A. Slopes of Lines

The slope of a straight line indicates how much the variable measured along the *y*-axis changes as the variable measured along the *x*-axis changes. Slope can be measured between any two points on the line because the slope of a straight line has a constant value. The slope can be expressed as the change in the value measured on the vertical axis divided by the change in the value measured on the horizontal axis; slope can also be expressed using the Greek letter delta (Δ) to stand for the change in a variable (slope = Δ*y* /Δ*x*). The slope is also referred to as the rise over the run.



B. Taking into Account More Than Two Variables on a Graph

The demand curve in Figure 1A.4 shows the relationship between the price of pizza and the quantity of pizza sold, but the quantity of any good sold depends on more than just the price of the good. Allowing other variables to change will cause the position of the demand curve in the graph to change. The table in Figure 1A.5 shows the effect of a change in the price of hamburgers on the quantity of pizza demanded. By shifting the demand curve we take into account the effect of changes in a third variable.

C. Positive and Negative Relationships

Sometimes the relationship between two variables is negative, as in the case with the price of pizza and the quantity of pizza demanded. The relationship between two variables can be positive, as in Figure 1A.6 which shows values for disposable personal income and consumption spending in the United States for 2009–2012.

D. Determining Cause and Effect

Inferring cause-and-effect relationships by observing graphs can lead to incorrect conclusions. One reason for this is that there may be an omitted variable that is not accounted for in the graph. A related problem in determining cause and effect is reverse causality; this occurs when we conclude that changes in variable *X* cause changes in variable *Y,* when actually changes in variable *Y* cause changes in variable *X.*

E. Are Graphs of Economic Relationships Always Straight Lines?

The relationship between two variables is linear when it can be represented by a straight line. Few economic relationships are actually linear. However, it is often useful to approximate a nonlinear relationship with a linear relationship.

F. Slopes of Nonlinear Curves

To measure the slope of a nonlinear curve at a particular point, we must measure the slope of a tangent to the curve at that point. A tangent line touches the curve at only one point. The slope of a tangent is measured in the same way as the slope of any straight line.

Formulas

This section reviews several useful formulas and shows how to use them.

A. Formula for a Percentage Change

The formula for a percentage change between two variables for any two periods is:

Percentage change 

B. Formulas for the Areas of a Rectangle and a Triangle

The formula for the area of a rectangle is Base × Height. The formula for the area of a triangle is

½ × Base × Height.

C. Summary of Using Formulas

Follow these steps when using a formula:

1. Make sure you understand the economic concept the formula represents.

2. Make sure you are using the correct formula for the problem you are solving.

3. Make sure the number you calculate using the formula is economically reasonable.

Teaching Tips

You can assign the appendix as “on your own” reading. But don’t assume students will understand the formulas for computing a slope or a percentage change. Reviewing these formulas in class will be time well spent, either at this point in the course or when these formulas are first applied. Unlike bar charts and pie charts, students will need to use graphs of two variables and percentage changes often throughout the remainder of the text.

Solutions to End-of-Chapter Exercises

Answers to *Thinking Critically* Questions

1. The technology discussed in the article will no doubt come with significant monetary costs, especially in maintaining current databases of medical information. These costs could be prohibitive for a doctor operating a private practice, whereas hospitals would be in a better position to assume such costs. Should the technology discussed in the article actually become a reality, doctors who are not in a financial position to use the technology could find themselves losing patients and, therefore, losing revenue. The increase in the demand for health care could result in doctors working longer hours, especially those in private practice. Doctors who are employed by hospitals often are able to work fewer hours than are doctors in private practice—and working fewer and more regular hours would be an economic incentive to many doctors to become hospital employees.

2. In developing an economic model, economists generally follow these five steps:

1. Decide on the assumptions to use in developing the model.
2. Formulate a testable hypothesis
3. Use economic data to test the hypothesis.
4. Revise the model if it fails to explain the economic data well.
5. Retain the revised model to help answer similar economic questions in the future.

The primary assumption you would probably make is that increased efficiency will have a positive effect on the level of patient care. The article states that improvements in technology are increasing efficiency, so your hypothesis might be that the increased efficiency is directly related to the level of care received by medical patients. In order to gauge improved efficiency, you would need to:

* Collect data on specific cost savings that have resulted from the advancements in technology as well as any increases in costs that are due to the implementation of the technology.
* Collect data from patients as to any changes in the level of care they have received following the implementation of the technology.
* Look at additional information, such as regulatory changes and potential changes in the industry due to health care reform, and use this information to revise your model if the original model fails to explain well the relationship between your original data.

Once you have a model that does explain your economic data, you would retain that model and use it to help answer similar questions in the future.

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| **1.1** | Three Key Economic Ideas Learning Objective: Explain these three key economic ideas: People are rational; people respond to incentives; and optimal decisions are made at the margin. |
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Review Questions

1.1 “People are rational” is the assumption that decision makers explicitly or implicitly weigh the benefits and costs of each action and then choose an action only if the benefits are expected to outweigh the costs. “People respond to incentives” by changing their behavior in response to an economic incentive. For example, if health insurance reduces an individual’s medical costs from being obese, it may give people an incentive to gain weight. “Optimal decisions are made at the margin” means that most decisions are not “all or nothing” but involve doing a little more or a little less of an activity. Therefore, the optimal decision is to continue any activity up to the point where the marginal benefit equals the marginal cost.

1.2 Scarcity is the situation in which unlimited wants exceed the limited resources available to fulfill those wants. Economics is the study of the choices consumers, business managers, and government officials make to attain their goals. Scarcity is central to economics because scarcity requires people to make choices about how to use their resources to best fulfill their wants. In making choices we must give up other opportunities that we value. What we give up (our second-best choice) is called the opportunity cost of our choice.

Problems and Applications

**1.3** Economists assume that people are rational in the sense that they use all available information as they act to achieve their goals. Rational individuals weigh the benefits and costs of each action, and they choose an action only if the benefits outweigh the costs. Economists do not assume everyone is a genius or always makes the “right” decision in every circumstance; rather, economists assume that the actions of consumers and businesses reflect their attempts to achieve their goals.

1.4 As noted in the chapter, the economic incentive to banks is clear—it is less costly to put up with bank robberies than to take these additional security measures. The marginal cost of adding the additional security is greater than the expected marginal benefit.

**1.5 a**. Students face scarcity of time, like everyone else, and respond to the incentives of the teacher’s grading system. Students have more incentive to put their efforts into the parts of the course that have the most weight in the grading system.

 **b**. Putting too little weight on outside readings, or similar assignments, gives students little incentive to read and master the material. Students will put less effort in the parts of the course that have little effect on their grades.

 **c**. Quizzes on assigned readings would give students an incentive to come to class having read the upcoming material. Some teachers give preparation assignments where students have to read and answer questions about the upcoming material, and over the course of the semester students have to successfully complete a certain percentage of the preparation assignments to qualify for an A, B, or other grade in the course.

**1.6** Universities and corporations might pay employees to take care of themselves because healthy employees are often more productive and lose fewer workdays due to illness and other health-related issues. Health insurance lessens the incentive for employees to improve or maintain their health, which increases medical expenses and, therefore, the health insurance premiums corporations and universities pay to insurance companies. The wellness programs corporations and universities use give employees an additional incentive to stay healthy, which reduces medical expenses and ultimately health insurance premiums.

**1.7 a.** Obese workers tend to suffer more medical problems than do people who are not overweight and so incur higher medical costs. The higher medical costs increase the health insurance premiums that firms must pay for employer-provided health insurance, which raises the firms’ costs. Obese workers raise a firm’s costs compared with the costs of workers who are not obese and are paid the same wage. Paying lower wages to obese workers helps firms to offset these higher costs.

 **b**. Bhattacharya and Bundorf found that firms that provide health insurance pay lower wages to obese workers than to workers who are not overweight but that firms that do not provide health insurance pay obese workers the same as workers who are not overweight. These findings imply that obese workers incur higher medical costs, pushing up health insurance premiums, and would be consistent with the idea that health insurance provides people with an incentive to become obese.

1.8 You would want to compare the expected additional revenue with the expected additional cost of serving breakfast all day. Your revenue calculations should include the effect of some customers buying breakfast instead of the more expensive lunch or dinner meals, and your cost calculations should include any extra employees or grills needed to prepare breakfast and lunch or dinner meals at the same time. The decision would not have to be all or nothing. Depending on the effect on additional revenue and additional cost, McDonald’s could decide how long to extend the breakfast hours and which breakfast items to include.

1.9 Jill is correct because profit equals revenue minus cost, so the additional revenue minus the additional cost will equal the additional profit.

1.10 Your friend is failing to think at the margin. It doesn’t matter how much time your friend has already spent studying psychology. What matters is the marginal benefit to be received from studying psychology relative to the marginal cost, where cost is measured as the opportunity cost of lower grades in other subjects. If the course is required, that may raise the marginal benefit.

1.11 A complete explanation for the connection between majoring in economics and success in business would involve many factors. But we can say that economics teaches us how to look at the trade-offs involved in every decision we make. Those who do not make decisions by weighing the costs of an action and against its benefits are unlikely to make good decisions. Climbing the corporate or governmental ladder requires making a wider and wider array of decisions.

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| **1.2** | The Economic Problem That Every Society Must Solve Learning Objective: Discuss how an economy answers these questions: What goods and services will be produced? How will the goods and services be produced? Who will receive the goods and services produced? |
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Review Questions

**2.1** Scarcity implies that every society and every individual faces trade-offs because wants are unlimited but the ability to satisfy those wants is limited. Societies and individuals cannot have everything they want, so they have to make choices of what to have and what not to have.

2.2 The three economic questions that every society must answer are: (1) What goods and services will be produced? (2) How will the goods and services be produced? (3) Who will receive the goods and services? In a centrally planned economy, the government makes most of these decisions. In a pure market economy, almost all of these decisions are made by the decentralized interaction of households and firms in markets. In a mixed economy, most economic decisions result from the interaction of buyers and sellers in markets, but government may play a significant role in the allocation of resources.

2.3 Productive efficiency occurs when a good or service is produced at the lowest possible cost. Allocative efficiency means that what is produced reflects consumer preferences—every good or service is produced up to the point at which the last unit provides a marginal benefit to consumers equal to the marginal cost of producing it.

2.4 Efficiency is concerned with producing the goods and services that people want at the lowest cost. Equity is “fairness,” a concept that can differ dramatically from person to person. Government policymakers often want to make economic outcomes “fairer,” but doing so usually involves redistributing income from one group to another. Redistributing income usually (but not always) hampers efficiency because it reduces incentives to produce and drives up production costs.

Problems and Applications

**2.5** Yes, even Bill Gates faces scarcity because his wants exceed his resources. Gates has established a foundation with billions of dollars to spend on worthy causes like eradicating malaria and reducing homelessness. However, there are an unlimited number of worthy causes that Gates desires to fund, so even he faces scarcity. Secondly, even Gates has only 24 hours in a day, so he must make choices about how to spend his scarce time. Everyone faces scarcity, because human desires are virtually unlimited. Because the world’s resources are limited, the only way not to face scarcity would be to reduce your wants to be less than your resources.

**2.6** Spending resources in a way that helps only one poor person is likely to be an ineffective way of helping poor people. How many poor people could be helped by using another method of helping the poor? The opportunity cost of using one method is the number of poor people that could be helped by using the best available alternative method.

**2.7** The incentive for a firm in a market economy to be allocatively efficient—producing goods and services that consumers demand—and productively efficient—producing those goods and services at the lowest cost—is profit. If a firm is not allocatively efficient and productively efficient, then it will eventually suffer losses and go out of business.

2.8 Managers in a market system generally have an economic incentive to adopt better machinery and equipment whenever the benefits to their firms exceed the costs. Managers in centrally planned economies rarely are rewarded as directly for such decisions, and they rarely are given the authority to carefully weigh costs versus benefits in making decisions.

2.9 a. It is doubtful that centrally planned economies have been less efficient purely by chance. The underlying reason seems to be that centrally planned economies don’t provide as strong incentives for hard work and innovation as market economies do. In addition, the people running centrally planned economies cannot make the most efficient decisions because they don’t have the information that all the decentralized decision makers possess in a market economy.

 b. You might still prefer having a centrally planned economy if you considered it to be more equitable. (Also, you might prefer a centrally planned economy if you were in charge.)

**2.10** Answers can vary, but it seems that it would be harder for the centrally planned economy to determine the various goods and services that consumers desire than to determine the cost-minimizing production process. Therefore, centrally planned economies are likely to be better at productive efficiency than allocative efficiency.

2.11 If all of an economic system’s resources were devoted to health care provision, then there would be other important goods and services, such as food, housing, clothing, and education that would not be provided. An economic system that provided its citizens state-of-the-art health care but so little food that most were on the verge of starvation and no housing so that many were sleeping in streets and fields and no schooling so most were illiterate, would generally be regarded as inefficient and treating the population unfairly by depriving them of such important goods and services. A market economy restricts access to health care, just as it restricts access to all goods and services, by charging a price at which less than an unlimited quantity of health care is demanded.

2.12 a. The groups that are most likely to get the tickets will be those for whom the expected marginal benefit of going to City Hall on Monday morning is greater than the expected marginal cost. These might include people who have a very low opportunity cost of traveling to City Hall and standing in line, such as people who don’t work during the morning and those who live or work very close by. These might also include people who see a large benefit from going to get the tickets, such as die-hard NASCAR fans or professional ticket resellers (“scalpers”).

 b. The major opportunity cost of distributing the tickets this way is the cost to the people who attempt to get the tickets—the cost of travel to City Hall, the activities that cannot be done (such as earning money at work) while standing in line, and the costs to all those people who try to get tickets but don’t get there soon enough. There’s also the cost of people blocking traffic in and around City Hall and the lost revenue to the city from giving away the tickets instead of selling them.

 c. This isn’t an efficient way to distribute the tickets because it wastes so much time. Auctioning off the tickets to the highest bidder would ensure that those who were willing to pay the highest price would obtain the tickets.

 d. Equity is hard to define. Some people will see this way of distributing the tickets as equitable because only the deserving, true fan will put up with the hassle of getting the tickets. Some people might also argue that this system is equitable because the tickets are being distributed for free, making it possible for people with very low incomes to obtain them. Others will disagree, saying that people with a strong desire to obtain the tickets, but who are unable to be at City Hall at the designated time, would have no chance to get the tickets. Other people might argue that the system was not equitable because no money was raised for the taxpayers of the city, who deserve to get the benefits of selling the tickets because they fund the police department.

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| **1.3** | Economic Models Learning Objective: Understand the role of models in economic analysis. |
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Review Questions

**3.1** Economists use models for the same reason that other scientists do—to make a complicated world simple enough that problems can be understood and analyzed, and questions can be accurately answered. Useful models will generate testable predictions. If these predictions are consistent with economic data, then the model isn’t rejected and can be used to understand the economy. Testing models with data can be very difficult, however, because the economy is always changing, and it is difficult to conduct controlled economic experiments.

**3.2** In arriving at a useful economic model, these five steps are followed: (1) decide the assumptions to be used; (2) formulate a testable hypothesis; (3) use economic data to test the hypothesis; (4) revise the model if it fails to explain the economic data well; and (5) retain the revised model to help answer similar economic questions in the future.

**3.3** Positive economic analysis concerns what is; that is, it deals with how the economy actually behaves. Normative economic analysis concerns what ought to be. Economics is mainly concerned with positive analysis—conceptualizing and measuring the costs and benefits of different courses of action. Decision makers (including voters and government officials) can use the trade-offs and costs and benefits identified by positive economic analysis in normatively deciding what course of action they should take.

Problems and Applications

**3.4**  The economist should revise the model in light of its failure to explain or predict real world events.

**3.5** The problem with Dr. Strangelove’s theory is that it cannot be tested unless we can devise a way to measure the emission of these subatomic particles, which seems to be impossible because they don’t exist in our universe. Because we cannot test the model’s predictions, it is not very useful to us; even though it might be true, we have no way of knowing.

**3.6** It would be helpful to know what role tuition plays in a student’s decision about whether to attend medical school. Have tuition increases had a large effect or a small effect on the number of applications to medical school, particularly for students interested in primary care? How much would paying $50,000 per year during residency affect whether medical students become primary-care physicians or specialists? These economic statistics would help inform the debate but would not resolve it due to the many normative issues, such as whether people who will eventually earn annual incomes that average $200,000 to $350,000 should be receiving reductions in their medical school tuition.

**3.7 a.** Consumers pay restaurants and hardware stores directly for the goods and services they sell, but doctors’ practices usually get paid indirectly, in many cases by private health care insurers or the government’s Medicare and Medicaid programs. Private health insurers as well as the federal and state governments set the amount that doctors receive for certain medical treatments. The amount of paperwork that doctors must complete in order to be paid for treating patients has increased in recent years.

 **b.** The costs of running a private practice have increased because of increased paperwork and for other reasons, while the revenue received has often declined as health insurers and the government have reduced the amounts they will reimburse doctors for some procedures. So, the economic incentives have increased for doctors in private practice to switch to being salaried employees of a hospital.

**3.8** In a private practice, doctors will earn profits (if their revenue is greater than their costs) or losses (if their revenue is less than their costs). A doctor in private practice knows that he or she will receive any additional revenue that results from working harder by, for example, seeing more patients per hour or being available to patients for longer hours. As salaried employees of hospitals, doctors do not share in the profits and losses of the hospitals, as they did in their own private practices. Some doctors may decide to work only as hard as needed to avoid being fired because they know they will not receive a share of the additional revenue the hospital will earn if they were to work harder.

**3.9.** a. and c. are positive statements because they are “what is” statements; b. and d. are normative statements because they are “what ought to be” statements.

**3.10 a.** The system helps protect consumers by providing high-quality training for physicians.

 **b.** This system allows physicians in a specialty to limit the number of physicians in that specialty. Increasing the number of physicians in a specialty is likely to reduce the incomes physicians earn.

 **c.** Occupational licensing is a major topic in economics. While the licensing requirements—in this case the control of the size of residency programs—help ensure high-quality training for physicians, they also are in the self-interest of physicians because the requirements help maintain physicians’ salaries. Given this trade-off, whether the system is a good one is a normative question.

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| **1.4** | Microeconomics and Macroeconomics Learning Objective: Distinguish between microeconomics and macroeconomics. |
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Review Question

**4.1** Microeconomics is the study of how households and firms make choices, how they interact in specific markets, and how the government influences their choices. “Micro” means small, and microeconomics deals with individual decision makers. Macroeconomics is the study of the economy as a whole. “Macro” means large, and macroeconomics deals with economy-wide outcomes, such as the inflation rate, the unemployment rate, and the economic growth rate.

**4.2** No, because many economic situations have both a microeconomic and a macroeconomic aspect. For example, the level of total consumption spending by households helps to determine how fast the economy grows—which is a macroeconomic issue. But to understand the amount of consumption spending by households, we have to analyze the incentives and constraints individual households face—which is a microeconomic issue.

Problems and Applications

**4.3** a. and d. are microeconomic questions because they relate to specific industries; b. and c. are macroeconomic questions because they relate to economy-wide issues.

**4.4** You should disagree with the assertion. Microeconomics deals with individual decision makers; because the unemployment rate in any one city would be an issue for the economy of the entire city and not an individual, it is a macroeconomic issue rather than a microeconomic issue. Macroeconomics deals with economy-wide outcomes, so the effect on teen smoking of an increase in the tax on cigarettes is better thought of as a microeconomic issue.

Solutions to Chapter 1 Appendix

**1A.1** **a.** The relationship is negative because as price decreases, the quantity of pies purchased increases.

 **b.**



 **c.** The slope = ∆*y*/∆*x* = rise/run = −1/1 = –1.

**1A. 2**



**1A.3** Answers will vary somewhat depending on the values determined from the time-series graph. The calculations below use Ford sales rounded to the nearest millions as shown in the table below.

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| **Year** | **Ford’s Auto Sales** |
| 2001 | 7.0 |
| 2002 | 7.0 |
| 2003 | 6.7 |
| 2004 | 6.8 |
| 2005 | 6.8 |
| 2006 | 6.6 |
| 2007 | 6.6 |
| 2008 | 5.4 |
| 2009 | 4.9 |
| 2010 | 5.5 |
| 2011 | 5.7 |
| 2012 | 5.7 |

**Period Percentage Change**

2001 to 2002 [(7.0 – 7.0)/7.0] × 100 = 0.0%

2002 to 2003 [(6.7 – 7.0)/7.0] × 100 = –4.3%

2003 to 2004 [(6.8 – 6.7)/6.7] × 100 = 1.5%

2004 to 2005 [(6.8 – 6.8)/6.8] × 100 = 0.0%

2005 to 2006 [(6.6 – 6.8)/6.8] × 100 = −2.9%

2006 to 2007 [(6.6 – 6.6)/6.6] × 100 = 0.0%

2007 to 2008 [(5.4 – 6.6)/6.6] × 100 = −18.2

2008 to 2009 [(4.9 – 5.4)/5.4] × 100 = −9.3%

2009 to 2010 [(5.5 – 4.9)/4.9] × 100 = 12.2%

2010 to 2011 [(5.7 – 5.5)/5.5] × 100 = 3.6%

2011 to 2012 [(5.7 – 5.7)/5.7] × 100 = 0.0%

We can conclude that sales fell at the fastest rate between 2007 and 2008.

**1A.4** [($14,418 − $14,834)/$14,834] × 100 = −2.8%

The percentage change in real GDP from one year to the next is the economy’s growth rate.

**1A.5 a.**



 **b.** At $2.50, the total revenue equals rectangles *A* + *B* = $250,000 (because $2.50 × 100,000 = $250,000). At $1.25, the total revenue equals rectangles *B* + *C* = $250,000 (because $1.25 × 200,000 = $250,000).

**1A.6**  The triangle’s area = (0.5) × (175,000 – 115,000) × ($2.25 − $1.50) = 0.5 × 60,000 × $0.75 = $22,500.

**1A.7**  The slope is calculated using the formula:



 At point *A*: rise = 300 − 175 = 125, run = 7 − 5 = 2. Therefore, the slope = 125/2 = 62.5.

 At point *B*: rise = 900 − 700 = 200, run = 14 – 12 = 2. Therefore, the slope = 200/2 = 100.