CHAPTER ONE

LIMITS, ALTERNATIVES, AND CHOICES

# CHAPTER OVERVIEW

*This chapter begins with a discussion of the meaning and importance of economics. In this first chapter, however, we will not plunge into problems and issues; instead we consider some important preliminaries. We first look at the economic perspective—how economists think about problems. Next, we examine the specific methods economists use to examine economic behavior and the economy, including distinguishing between macroeconomics and microeconomics. We then look at the economizing problem from both an individual and societal perspective. For the individual we develop the budget line, for society the production possibilities model. In our discussion of production possibilities, the concepts of opportunity costs and increasing opportunity costs, unemployment, growth, and present vs. future possibilities are all demonstrated. Finally, in the Last Word, some of the problems, limitations, and pitfalls that hinder sound economic reasoning are examined.*

*The Appendix to Chapter 1 provides an important introduction to graphical analysis. While this will be review material for most students, for some this may be new. Instructors are strongly urged to confirm that their students understand this section before proceeding. The software supplement can provide effective remedial help for those students who are not familiar with graphical analysis, or just need a refresher.*

# WHAT’S NEW

The “Consider This” discussion in the Individual’s Economizing Problem section has been updated to more recent figures in the news.

There are also minor changes in wording in the chapter and the data has been updated.

# INSTRUCTIONAL OBJECTIVES

After completing this chapter, students should be able to:

1. Define economics.
2. Describe the “economic way of thinking,” including definitions of purposeful behavior, utility, opportunity costs, marginal costs, marginal benefits and how these concepts may be used in decision-making.
3. Explain how economists use the scientific method to formulate economic principles.
4. Explain the importance of *ceteris paribus* in formulating economic principles.
5. Explain the steps used by policy makers.
6. Differentiate between micro- and macroeconomics.
7. Differentiate between positive and normative economics.
8. Explain the economizing problem from the individual’s perspective
9. Construct and explain a budget line.
10. Describe the economizing problem facing society.
11. Identify types of economic resources and types of income associated with various factors.
12. Construct a production possibilities curve when given appropriate data.
13. Illustrate economic growth, unemployment and underemployment of resources, and increasing costs using a production possibilities curve.
14. Give some real-world applications of the production possibilities concept.
15. Summarize the general relationship between investment and economic growth.
16. Explain and give examples of the fallacy of composition, post hoc fallacy, and other logical pitfalls. (Last Word)
17. Explain and illustrate a direct relationship between two variables, and define and identify a positive sloping curve. (Appendix)
18. Explain and illustrate an inverse relationship between two variables, and define and identify a negative slope. (Appendix)
19. Identify independent and dependent variables. (Appendix)
20. Define and identify terms and concepts listed at end of chapter and appendix.

# COMMENTS AND TEACHING SUGGESTIONS

1. This chapter and related classroom activities will set the tone for the rest of the course. The methods used in the initial class meetings set the expectations and attitudes of the students. Making dramatic changes later can be confusing and the outcome less successful than desired. Please refer to the “Getting Started” section in the introduction for detailed suggestions. If you plan to make current events an integral part of the class, consider offering educational subscriptions to *The Wall Street Journal*, or one of the weekly news or business publications such as *The Economist*.
2. On the level of personal decision-making, students might be asked to list all of the economic choices they had to make that day or that week. This impresses upon them that, as Alfred Marshall said in the 1890s, “economics is the study of man in the ordinary business of life.” To illustrate the rational basis of their decisions, students could analyze one or two of these choices in terms of the alternatives they gave up. What other choices did they have? What criteria were used to judge the alternatives? A discussion of how rational our decisions are might also follow, providing an opportunity to introduce problems such as imperfect information and short v. long-term objectives.
3. There are many dimensions to the topic of “utility” that introductory students will benefit from contemplating. With these many dimensions comes the danger in taking students too deep too quickly. It is useful for students to understand that utility may be obtained both through material and nonmaterial means. Accordingly, it may be difficult to express how much one is willing to pay (or otherwise sacrifice) to obtain utility through a given activity.

When discussing rational behavior, and seemingly irrational decisions, is may be useful to point out that for some people their utility is interdependent. You can have a bit of fun telling students that economists define love as “strongly interdependent utility functions.” The main point, of course, is that there are many situations where people obtain utility through seeing others having material and nonmaterial wants satisfied. Likewise, some gain utility from watching others suffer, even if it means that they are themselves worse off in material terms.

If a question arises about the measurement of utility, the distinction between cardinal and ordinal utility can be made, but there is little to be gained from an elaborate discussion. Students may find it interesting that Jeremy Bentham (whom they meet in Origin of the Idea 1.2) envisioned some sort of “util-o-meter,” a contraption that one might strap to the head to record brain waves in an attempt to measure utility from an activity. Even suggesting that one might use “utils” as a measure of satisfaction often amuses students and helps them better recall this topic.

1. As the text suggests, it may be useful to discuss several noneconomic examples to illustrate the importance of models or simplification – for example, explaining that a road map is a model or simplification of the real world. The amount of detail on any road map would be determined by the needs of the traveler, i.e., “I need to travel between Chicago and Denver as quickly as possible,” versus, “I would like to visit some historical museums as I am traveling through Nebraska.” Neither road map would have the details of the real world. Devoting some time and effort to this point can help students see the importance of using economic models to represent the real world. You may wish to use the example below.

Concept Illustration -- Abstractions and Models

“What do you consider the largest map that would be really useful?”

“About six inches to the mile.”

“About six inches!” exclaimed Mein Herr. “We very soon got six yards to the mile. And then came the grandest idea of all! We actually made a map of the country on a scale of a mile to a mile!”

“Have you used it much?” I enquired.

“It has never been spread out yet,” said Mein Herr. “The farmers objected. They said it would cover the whole country and shut out the sunlight!”

Lewis Carroll  
*Silvie and Bruno*, 1889

In many ways, good economic models are like good maps. Both are abstractions that purposely leave out irrelevant facts and circumstances. Both are useful and practical *because* they simplify complex realities.

Maps not only help us understand geographical relationships but also serve as useful tools. A road map of the United States, for instance, helps us understand where Connecticut is located relative to California. It also is highly practical in helping us drive between Indiana and Idaho.

In much the same way, economic models are helpful and useful. For example, a model indicating how consumers respond to a change in a product’s price helps us understand a significant facet of human behavior. That model also is highly practical; among other things, it identifies the primary way a business can reduce an overstock of unsold goods.

The appropriate map or appropriate economic model is the simplest one that accomplishes a specific goal. Although we may need a highly detailed street map of Cleveland to find a specific residence there, we need only a general road map to drive between Cleveland and Columbus.

Similarly, we need a highly complex, detailed economic model to predict the economic effects of a general reduction of U.S. tariffs (taxes on imported goods) on the relative outputs of various U.S. industries. In contrast, a much simpler model will suffice to show how a reduced U.S. tariff on imported beef will affect the total consumption of beef in the United States.

You will discover many economic models in your study of economics. The trick is to use the right model for the right purpose. Think of these models as highly useful, highly practical “maps,” which help us better understand elements of the highly complex economy.

1. Most students are all too familiar with the problem of scarcity. Although income and time are not resources in the way in which we define resources in economics, these are what are most scarce to students. Explain how making a budget is dealing with the problem of their limited financial resources and their virtually unlimited wants. Other examples can be how businesses choose between two products when allocating their limited resources and choose between two resources when allocating their limited revenues. Further discussion can bring in examples of allocating federal and/or state tax revenues, especially when state revenues compete with funding the state university.
2. To personalize the problem of opportunity cost, ask what else they could be doing during a specific economics class; what are their foregone alternatives? Why might it be more expensive for older students to attend the class than younger ones? Encourage students to find examples of opportunity cost in newspaper articles and magazines. Choice is a necessary part of life; every action has its costs and benefits. Identifying and quantifying these tradeoffs is at the heart of economic analysis.

You may also want to use the following illustration to facilitate student understanding of opportunity cost.

Concept Illustration – Opportunity Cost

The concept of opportunity cost can be illustrated through the eyes of a small child. Suppose that a young girl named Amber receives a $30 gift certificate from her grandparents to be used at Toys4Me. The grandparents take the girl to the store, where she spots several toys she would like—all priced above $30. After gaining a sense of what is affordable, Amber narrows her focus to small stuffed animals ($10 each) and picture books ($5 each).

The grandparents tell Amber that she can buy three stuffed animals, six books, or some limited combinations of the two items. She initially settles on one stuffed animal at $10 and four picture books at $5 each. The grandparents assure her that this selection works; it will exactly use up the $30 certificate. Amber takes the goods to the checkout counter.

But while waiting to pay, she changes her mind. She decides she wants another stuffed animal because they are so cute. What should she do? The grandparents tell her to go pick out a second stuffed animal and then return two of her four books to the shelf. She makes the exchange, ending up with two stuffed animals at $10 each and two picture books at $5 each.

From an adult’s perspective, the second stuffed animal cost $10. But in the eyes of the child, *it cost two picture books*. To get the second stuffed animal, Amber had to give up two books. That sacrifice was the *opportunity cost* of her last-minute decision. Amber’s way of looking at cost is one of the fundamental ideas in economics.

1. Current news articles can serve many purposes in a principles class. Most instructors assign a high priority to helping students apply the general principles of economics to the specific problems and decisions they make. Short essays, oral reports, class discussion and longer-term projects are all examples of how current news could be incorporated into the course. A term project focused on current issues such as health care, welfare reform, environmental problems, defense spending, or education can help students develop an appreciation of the problem of scarcity and the trade‑offs that need to be considered when formulating public policy.
2. The problems of underdeveloped countries could also be used to illustrate the seriousness of choosing between capital goods and consumer goods. Focusing a project on the problems of a single developing country can be interesting. It would allow students to make many comparisons including the impact of differing economic systems, degree of government regulation, environmental quality standards, differences in resource availability, climate, educational levels, and the choice between consumer and capital goods.

# STUDENT STUMBLING BLOCKS

1. Instructors cannot take for granted students’ background knowledge of economics. Students generally have no idea about the magnitude of common economic measurements and, therefore, their reading of the news may be colored by this lack of knowledge. One teaching tip that has worked for others is to give students a pretest during the first week of class, in which simple questions are asked about the U.S. economy. For example, questions can be asked about the size of population and labor force, unemployment and inflation rates, GDP, federal budget, deficits and debt. You will find wildly different answers to these questions with most far away from “ball park” figures. This exercise accomplishes two things. First, it lets students know that they have a lot to learn about “everyday” news items. Second, the correct answers can give them some early perspective on news events as they relate to the course. As the course progresses, don’t forget to reinforce these facts by reminding students of them.
2. The specialized definitions in economics sometimes frustrate students, especially when they are familiar with a term in a different context. You may wish to use the following example to help students appreciate that specialized definitions are common in our everyday lives.

Concept Illustration -- Specialized Definitions

“Then you should say what you mean,” the March Hare went on.

“I do,” Alice hastily replied; “at least I mean what I say—that’s the same thing you know.”

“Not the same thing a bit!” said the Hatter.

“Why, you might just as well say that ‘I see what I eat’ is the same thing as ‘I eat what I see!’”

*Lewis Carroll,  
Alice in Wonderland, 1865*

In an indirect way, the specialized terms used in games such as soccer, baseball, bowling, and so forth provide insights on the study of economics. Consider the game of pool, for example. The following terms are used in pool but have slightly or totally different meanings in everyday language: “pool,” “cue,” “ kiss,” “bank,” “bridge,” “combination,” “break,” “lag,” “run,” “rack,” “scratch,” “chalk,” and “rail.” Economics, too, uses terms that have different meanings than in everyday usage. In economics “labor” usually means all productive effort, not simply blue-collar workers; “capital” means human-made productive resources, not money used to buy resources. Also, “investment” means spending to pay for production and accumulation of capital goods, not purchases of stocks and bonds; “public good” means goods that have special characteristics, not the good of society; and so forth.

Learning to communicate in the game of pool (or any other game) requires learning the meaning of specialized terms. It’s the same with economics! It is not enough to “mean what you say,” in economics. To communicate effectively (and to do well on exams!) you must “say what you mean,” using the precise terms of the discipline.

1. Principles of economics students are often frustrated by the apparent lack of precision and definitive answers in the discipline. Economists establish a framework of rational decision-making based on maximizing utility, only to have that utility be immeasurable, or decision outcomes to be less than optimal because of imperfect information or seemingly irrational behavior. It is important to help students understand that, among other things, they are gaining more of an analytical toolkit than a set of hard and fast rules or immutable natural laws. To help students appreciate this, it is useful to appeal back to the road map illustration. Using a road map, one can find the shortest (and presumably fastest) route from one point to another. Even if someone has driven a route many times, there are factors such as traffic, weather, and road construction that may cause the otherwise quickest route to be less than ideal for that day’s travel. Maps, like economic models, are often effective at telling people what they need to know. They are, however, limited in their effectiveness by factors beyond view.
2. In the discussion of marginal analysis, students often bring up examples that include “sunk” costs. For example, if you ask students why they came to class, many will answer that they paid tuition and imply that they would somehow lose that money if they didn’t attend. If probed further, however, students will acknowledge that the college is unlikely to refund their money for any missed classes. That doesn’t mean there wouldn’t be future expenditures (paying tuition later to retake a failed class). It also doesn’t mean that there aren’t some psychological benefits to “getting what you paid for,” but many students will erroneously identify that tuition payment as a marginal cost of attending a given day of class. While your intention may be to discuss sunk costs in a later chapter, student questions and discussion may require you to be prepared to introduce the concept earlier.
3. The concept of “full employment” is potentially problematic, particularly for those courses that will eventually cover macroeconomics. The use of the term in this chapter refers to the use of all available resources, human and non-human. In macroeconomics the concept is used to describe general conditions in labor markets and the economy as a whole, but is usually focused on the economy’s use of its human resources. Even then it is recognized that under conditions of full employment there is unemployed labor. There is also the potential for confusion as the concept applies to the land resource. Fully employed deposits of coal or petroleum do not imply exhaustion of those resources. It is more a question of whether there is an adequate amount of these non-human resources available to sustain full employment in labor markets. A full discussion of this is probably not appropriate with students at this point, but you may find it useful to emphasize here that the concept is most often applied to the human resources. Then, when the topic arises again in Chapter 26 (for those covering macroeconomics), students will be less likely to feel that you are changing definitions on them.
4. The production possibilities curve simplifies many concepts for students who don’t have “graph anxiety.” However, for those who are uncomfortable with graphs, this model may confuse rather than simplify. Computerized tutorials will be especially helpful for these students.
5. The “Consider This” on the September 11, 2001, terrorist attacks and subsequent wars in Afghanistan and Iraq may elicit emotional and/or politically charged responses from students. While one must be sensitive, especially regarding those directly and negatively impacted by those events, it presents an opportunity to demonstrate how economists attempt to detach their emotional and political biases to achieve a more objective economic analysis. It is also an opportunity to point out that the usual role of the economist is to tell us what choices are available, not what choices should be made.
6. The instructor could treat the appendix on graphical analysis as a supplement for those students who have weak backgrounds in reading or constructing simple graphs. There is often a wide disparity among student abilities here. Instructors may wish to have a remedial session and special assignments for students deficient in graphing skills. Comparing graphs to maps seems to help students who have “graph anxiety.” Instructors may also administer a math assessment on the basic math skills necessary to succeed in the course early in the course term.

# LECTURE NOTES

1. **Learning objectives** – After reading this chapter, students should be able to:
   1. Define economics and the features of the economic perspective.
   2. Describe the role of economic theory in economics.
   3. Distinguish microeconomics from macroeconomics and positive economics from normative economics.
   4. Explain the individual’s economizing problem and how trade-offs, opportunity costs, and attainable combination cab be illustrated with budget lines.
   5. List the categories of scarce resources and delineate the nature of society’s economizing problem.
   6. Apply production possibilities analysis, increasing opportunity costs, and economic growth.
   7. Explain how economic growth and international trade increase consumption possibilities.
   8. (Appendix) Understand graphs, curves, and slopes as they relate to economics.
2. **Definition of Economics**
   1. The social science concerned with how individuals, institutions, and society make optimal choices under conditions of scarcity.
   2. Human wants are unlimited, but the means to satisfy the wants are limited.
3. **The Economic Perspective**
   1. Scarcity and choice
      1. Resources can only be used for one purpose at a time.
      2. Scarcity requires that choices be made.
      3. The cost of any good, service, or activity is the value of what must be given up to obtain it. This is known as the opportunity cost.
   2. Consider This … Free for All?
      1. Products provided for “free” to an individual are not free for society because of the required use of scarce resources to produce them.
      2. Companies provide “free” goods as a marketing strategy to promote brand awareness.
      3. Products that are promoted as “free” to the individual may actually be bundled with another good for which the consumer must pay. Because a purchase is required to obtain them, these products are not really free to the buyer.
      4. Therefore, there is “no free lunch,” a common economic expression.
   3. Purposeful Behavior
      1. Rational self-interest entails making decisions to achieve maximum utility.
         1. Utility is the pleasure or satisfaction obtained from consuming a good or service.
         2. Utility is measured in a unit called “utils.”
      2. Different preferences and circumstances (including errors) lead to different choices.
      3. Rational self-interest is not the same as selfishness.
   4. Marginal Analysis: Comparing Benefits and Costs
      1. Most decisions concern a change in current conditions; therefore the economic perspective is largely focused on marginal analysis.
      2. Each option considered weighs the marginal benefit against the marginal cost.
      3. Whether the decision is personal or one made by business or government, the principle is the same.
      4. The marginal cost of an action should not exceed its marginal benefits.
      5. Opportunity cost is the value of the next best thing forgone.
      6. Opportunity costs are always present whenever a decision is made.
   5. Consider This … Fast Food Lines—An Economic Perspective
      1. People choose the shortest line to reduce time cost.
      2. Lines tend to have equal lengths as people shift from longer to shorter lines in effort to save time.
      3. Lines are chosen based on length without much other information—cost of obtaining more information is not worth the benefit.
         1. Imperfect information may lead to an unexpected wait.
         2. Imperfect information may cause some people to leave when they see a long line.
      4. When a customer reaches the counter, other economic decisions are made about what to order. From an economic perspective, these choices will be made after the consumer the costs and benefits of possible choices.
4. **Theories, Principles, and Models**
   1. Economists use the scientific method to establish theories, laws, and principles.
      1. The scientific method consists of:
         1. The observation of facts (real data).
         2. The formulations of explanations of cause and effect relationships (hypotheses) based upon the facts.
         3. The testing of the hypotheses.
         4. The acceptance, rejection, or modification of the hypotheses.
         5. The continued testing with an eye toward determination of a theory, law, principle, or model.
      2. Theories, principles, and models are “purposeful simplifications.”
      3. Principles are used to explain and/or predict the behavior of individuals and institutions.
      4. Terminology—Principles, laws, theories, and models are all terms that refer to generalizations about economic behavior. They are used synonymously in the text, with custom or convenience governing the choice in each particular case.
   2. Generalizations—Economic principles are expressed as the tendencies of the typical or average consumer, worker, or business firm.
   3. “Other things equal” or *ceteris paribus* assumption—In order to judge the effect one variable has upon another it is necessary to hold other contributing factors constant. Natural scientists can test with much greater precision than can economists. They have the advantage of controlled laboratory experiment. Economists must test their theories using the real world as their laboratory.
   4. Graphical Expression—Many economic relationships are quantitative, and are demonstrated efficiently with graphs. The “key graphs” are the most important.
5. **Microeconomics and Macroeconomics**
   1. Microeconomics looks at specific economic units.
      1. It is concerned with the individual industry, firm or household and the price of specific products and resources.
      2. It is an examination of sand, rocks, and shells, and not the beach.
   2. Macroeconomics examines the economy as a whole.
      1. It includes measures of total output, total employment, total income, aggregate expenditures, and the general price level.
      2. It is a general overview examining the beach, not the sand, rocks, and shells.
   3. Positive and Normative Economics.
      1. Positive economics describes the economy as it actually is, avoiding value judgments and attempting to establish scientific statements about economic behavior.
      2. Normative economics involves value judgments about what the economy should be like and the desirability of the policy options available.
      3. Most disagreements among economists involve normative, value-based questions.
6. **Individual’s Economizing Problem**
   1. Individuals are confronted with the need to make choices because their wants exceed their means to satisfy them.
   2. Limited income – everyone, even the most wealthy, has a finite amount of money to spend.
   3. Unlimited wants – people’s wants are virtually unlimited.
      1. Wants include both necessities and luxuries (although many economists don’t worry about this distinction).
      2. Wants change, especially as new products are introduced.
      3. Both goods and services satisfy wants.
      4. Even the wealthiest have wants that extend beyond their means (e.g. Bill Gates’ charitable efforts).
   4. The combination of limited income and unlimited wants force us to choose those goods and services that will maximize our utility.
   5. Budget line
      1. Definition: A schedule or curve that shows the various combinations of two products a consumer can purchase with a specific money income.
      2. The model assumes two goods, but the analysis generalizes to all goods available to consumers.
      3. The location of a budget line depends on a consumer’s money income, and the prices of the two products under analysis.
      4. The slope of the graphed budget line is the ratio of the price of the good measured on the horizontal axis (*Pb* in the text) to the price of the good measured on the vertical axis (*Pdvd*). A change in the price of one of the goods will change the slope of the budget line and change the purchasing power of the consumer.
      5. The budget line illustrates a number of important ideas:
         1. Points on or inside the budget line represent points that are unattainable given the relevant income and prices. Points outside (up and to the right) the budget line are unattainable.
         2. Tradeoffs and opportunity costs – the negative slope of the budget line represents that consumers must make tradeoffs in their consumption decisions; the value of the slope measures precisely the opportunity cost of one more unit of a good under analysis.
         3. Limited income and positive prices force people to choose. Note that the budget line does not indicate what a consumer *will* choose, only what they *can* choose.
         4. Income changes will shift the budget line. Greater income will shift the line out and to the right, allowing consumers to purchase more of both goods. Increasing income lessens scarcity, but does not eliminate it.
   6. Consider This … Did Zuckerberg, Seacrest, and Swift Make Bad Choices?
      1. The college decision requires weighing future benefits, including projected lifetime earnings, against present costs, including *direct* costs (tuition) and *indirect* costs (forgone wages).
      2. Despite the success of celebrities such as Mark Zuckerberg, Ryan Seacrest, and Taylor Swift, in general those attending and completing college will earn greater lifetime earnings (about 50% more) than those holding only high school diplomas.
      3. For Zuckerberg, Seacrest, Swift, and others like them, the opportunity cost of college was extremely high, and it would be hard to argue that they made a wrong decision.
7. **Society’s Economizing Problem**
   1. Scarce resources
      1. Economic resources are limited relative to wants.
      2. Economic resources are sometimes called *factors of production* and include all natural, human, and manufactured resources used to produce goods and services.
   2. Resource categories:
      1. Land or natural resources (“gifts of nature”).
      2. Labor or human resources, which include physical and mental abilities used in production.
      3. Capital or investment goods, which are all manufactured aids to production like tools, equipment, factories, transportation, etc.
      4. Entrepreneurial ability, a special kind of human resource that provides four important functions:
         1. Combines resources needed for production.
         2. Makes basic business policy decisions.
         3. Is an innovator for new products, production techniques, and organizational forms.
         4. Bears the risk of time, effort, and funds.
8. **Production possibilities tables and curves are devices used to illustrate and clarify society’s economizing problem.**
   1. Assumptions:
      1. Economy is employing all available resources (Full employment).
      2. Available supply of resources is fixed in quantity and quality at this point in time.
      3. Technology is constant during analysis.
      4. Economy produces only two types of products.
         1. While any two goods or services could be used, the example in the chapter assumes that one product is a consumer good (pizza), the other a capital good (industrial robots).
         2. Consumer goods *directly* satisfy wants; capital goods, which are used to produce consumer goods, *indirectly* satisfy wants.
   2. Choices will be necessary because resources and technology are fixed. A production possibilities table illustrates some of the possible choices (see Table 1.1).
   3. A production possibilities curve is a graphical representation of choices.
      1. Points on the curve represent maximum possible combinations of robots and pizza given resources and technology.
      2. Points inside the curve represent underemployment or unemployment.
      3. Points outside the curve are unattainable at present.
   4. Optimal or best product-mix:
      1. It will be some point on the curve.
      2. The exact point depends on society; this is a normative decision.
   5. Law of increasing opportunity costs:
      1. The amount of other products that must be foregone to obtain more of any given product is called the opportunity cost.
      2. Opportunity costs are measured in real terms rather than money (market prices are not part of the production possibilities model).
      3. The more of a product produced the greater is its (marginal) opportunity cost.
      4. The slope of the production possibilities curve becomes steeper, demonstrating increasing opportunity cost. This makes the curve appear bowed out, concave from the origin.
      5. Economic Rationale:
         1. Economic resources are not completely adaptable to alternative uses.
         2. To get increasing amounts of pizza, resources not particularly well suited for the purpose of making pizza must be used. For example, workers that are accustomed to producing robots on an assembly line may not do well as kitchen help.
   6. Optimal allocation revisited:
      1. How does society decide its optimal point on the production possibilities curve?
      2. Recall that society receives marginal benefits from each additional product consumed, and as long as this marginal benefit is more than the additional cost of the product, it is advantageous to have the additional product.
      3. Conversely, if the additional (marginal) cost of obtaining an additional product is more than the additional benefit received, then it is not “worth” it to society to produce the extra unit.
      4. Figure 1.3 reminds us that marginal costs rise as more of a product is produced.
      5. Marginal benefits decline as society consumes more and more pizzas. In Figure 1.3 we can see that the optimal amount of pizza is 200,000 units, where marginal benefit just covers marginal cost.
         1. Beyond 200,000 pizzas, the added benefits would be less than the added cost.
         2. At less than 200,000, the added benefits will exceed the added costs, so it makes sense to produce more.
      6. Generalization: The optimal production of any item is where its marginal benefit is equal to its marginal cost. In our example, this must occur at 7,000 robots.
   7. Consider This … The Economics of War
      1. The costs of the war on terrorism at the end of 2015 were estimated to be around $1.4 trillion.
      2. The war on terrorism can be represented by a movement along the production possibilities curve, as resources are reallocated from “civilian goods” to “defense goods.” The decision of how much to reallocate should be made by weighing the marginal benefits against the marginal costs of more defense goods.
      3. Marginal benefit – marginal cost analysis is needed to find the optimal mix of defense and civilian goods. The September 11, 2001, terrorist attacks caused a perceived increase the MB curve for defense goods, and shifts in resources toward defense goods since the attacks reflect that perception. As the model reveals, however, it is possible to go too far, sacrificing too many civilian goods to obtain defense goods.
9. **Unemployment, Growth, and the Future**
   1. Unemployment occurs when the economy is producing at less than full employment or inside the curve (point U in Figure 1.4).
   2. A growing economic results in larger total output, and is illustrated by an outward shift of the production possibilities curve.
   3. There are three main causes of economic growth.
      1. Increases in the quantity of resources supplied.
      2. Increases or improvements in the quality of resources supplied.
      3. Advances in technology employed in the production or distribution process.
   4. Present choices and future possibilities
      1. Using resources to produce consumer goods and services represents a choice for present over future consumption.
      2. Using resources to invest in technological advance, education, and capital goods represents a choice for future over present goods.
      3. The decision as to how to allocate resources in the present will create more or less economic growth in the future.
   5. A Qualification: International Trade
      1. A nation can avoid the output limits of its domestic production possibilities through international specialization and trade.
      2. Specialization and trade have the same effect as having more and better resources of improved technology.
10. **LAST WORD: Pitfalls to Sound Reasoning**
    1. Biases—Preconceptions that are not based on facts.
    2. Loaded terminology.
       1. Terms that contain the prejudice and value judgments of others.
       2. It is very difficult for a person to describe economic behavior without letting their options about that behavior creep into their discussion. The distinction between positive and normative statements is not always clearly apparent.
       3. Often, however, there is a deliberate attempt to sway opinion by using loaded terminology (greedy owners, obscene profits, exploited workers, mindless bureaucrats, costly regulations, creeping socialism).
    3. Fallacy of Composition
       1. Fallacy: What is true for one individual or part of a whole is necessarily true for a group of individuals or the whole.
       2. Examples: An individual stockholder’s sales of shares v. a large number of stockholders selling large numbers of shares; revenues of an individual cattle rancher v. falling prices due to the actions of a large group of cattle ranchers
    4. Causation Fallacies
       1. Post hoc fallacy: When two events occur in time sequence, the first event is not necessarily the cause of the second event.
       2. Correlation versus causation: Events may be related without a causal relationship.
          1. The positive relationship between education and income does not tell us which causes the increase in the other. (Which is the independent variable and which is the dependent variable?)
          2. It may be that the increase income that occurs with increased education is due to some other third factor that is not under direct consideration.

# APPENDIX TO CHAPTER 1

*This appendix is to prepare students for reading, analyzing, and constructing simple graphs in later chapters. To determine which students need help in this area, the instructor may want to give a brief pretest. In other words, you may want to excuse those students who already have graphing skills from this review. For students who do need help in this area, software graphics tutorials are also very useful, especially the ones designed to accompany the text.*

1. **Graphs and Their Meaning**
   1. Graphs help students to visualize and understand economic relationships. Most of our economic models explain relationships between just two sets of economic facts.
   2. Constructing a two-dimensional graph involves drawing a horizontal and a vertical axis.
      1. Mark the axis using convenient increments and fitting the data given.
      2. Each point on the graph yields *two* pieces of information, the quantity of the variable on the horizontal axis and the corresponding quantity of the variable on the vertical axis.
   3. Direct and inverse relationships
      1. If two variables change in the same direction (an increase in one is associated with an increase in the other) it is a direct or positive relationship.
      2. If the two sets of data move in opposite directions, they are inversely or negatively related.
   4. Dependent and independent variables:
      1. Economists are often interested in determining which variable is the “cause” and which is the “effect” when two variables appear to be related.
      2. Mathematicians are always consistent in applying the rule that the independent variable or “cause” is placed on the horizontal axis and the dependent variable or outcome (effect) is placed on the vertical axis.
      3. Economists are less tidy, and traditionally have put price and cost data on the vertical axis.
      4. Note that inverse relationships are downward sloping to the right and direct relationships are upward sloping to the right regardless of which variable is placed on the horizontal or vertical axis.
   5. Other things equal
      1. When economists plot the relationship between two variables, all other influences are assumed to remain exactly the same (ceteris paribus).
      2. If any of the other factors do change, a new plot of the relationship must be made.
      3. This point is extremely important for student understanding of the market model developed in chapter 3. It provides the distinction between a “slide” along an existing curve, and the “shift” of a curve that is required if a variable not labeled on the axis is changed.
   6. The slope of a straight line is the ratio of the vertical change to horizontal change between any two points on the line. Some students will remember this as “rise over run.”
      1. The slope of a line will be positive if both variables change in the same direction (a positive or direct relationship).
      2. The slope of a line will be negative if the variables change in the opposite direction (an inverse or negative relationship).
      3. The numerical value of the slope will depend on the way the relevant variables are measured.
      4. Economic analysis is often concerned with marginal changes, the relative change in one variable with respect to another; it is this *rate of change* that is measured by the slope.
      5. Lines that are parallel with either the horizontal or vertical axis indicate that the two variables are unrelated, that is, a change in one variable has no effect on the value of the other.
         1. A vertical line has an infinite slope. It is worth noting that often students learn in mathematics courses that the slope of a vertical line has an undefined slope.
         2. A horizontal line has a zero slope.
   7. The vertical intercept of a line is the point where the line intersects the vertical axis.
   8. Equation of a linear relationship
      1. If the vertical intercept and the slope are known, the general form **y = a + bx** describes the line.
      2. y represents the variable on the vertical axis (the dependent variable in standard mathematical form) **a** is the vertical intercept, **b** is the slope of the line, and **x** represents the variable on the horizontal axis (the independent variable in standard mathematical form).
      3. The income—consumption example places the dependent and the independent in proper mathematical form.
      4. The price-quantity example reverses their position and places price (the independent variable) on the vertical axis and quantity (the dependent variable) on the horizontal axis.
   9. Slope of a nonlinear curve
      1. The slope of a nonlinear relationship changes from one point to another.
      2. The slope of a curve at point **a** is equal to the slope of a line tangent to the curve at point.

# QUIZ

1. Economics is a social science concerned with:
2. the best use of scarce resources to achieve the maximum satisfaction of economic wants.
3. increasing the level of productive resources so there is a minimum level of income.
4. increasing the level of productive resources so there is maximum output in society.
5. the best use of scarce resources paid for at the minimum level of cost to consumers and businesses.

Answer: A

1. A person should consume more of something when its marginal:
2. benefit exceeds its marginal cost.
3. cost exceeds its marginal benefit.
4. cost equals its marginal benefit.
5. benefit is still positive.

Answer: A

1. The process of developing hypotheses, testing them against facts, and using the results to construct theories is called:
2. Opportunity cost calculation
3. Microeconomics
4. Marginal analysis
5. The scientific method

Answer: D

1. Which is an illustration of a microeconomic question?
2. What is the current national rate of unemployment?
3. Is the economy experiencing a decline in the rate of inflation?
4. Will a new type of television set increase the number of buyers?
5. Is the production of goods and services in the economy greater this year than last year?

Answer: C

1. A schedule or curve that shows the various combinations of two products a consumer can purchase with a specific amount of money income is:
2. A tradeoff
3. A budget line
4. A tangent point
5. An optimal output

Answer: B

1. Which of the following is real capital?
2. a pair of stockings
3. a construction crane
4. a savings account
5. a share of IBM stock

Answer: B

1. A point inside a production possibilities curve best illustrates:
2. unemployment.
3. the efficient use of resources.
4. the use of best-available technology.
5. unlimited wants.

Answer: A

1. A normative statement is one that:
2. is based on the law of averages.
3. applies only to microeconomics.
4. applies only to macroeconomics.
5. is based on value judgments.

Answer: D

1. The problems of aggregate inflation and unemployment are:
2. major topics of macroeconomics.
3. not relevant to the U.S. economy.
4. major topics of microeconomics.
5. peculiar to command economies.

Answer: A

1. On a production possibilities curve, the single optimal or best combination of output for any society:
2. Is at a point near the top of the curve
3. Is at the precise midpoint of the curve
4. Is at a point near the bottom of the curve
5. Depends upon the preferences of society

Answer: D