section 1

Basic Economic Concepts

COMMON GROUND

The annual meeting of the American Economic Association draws thousands of economists, young and old, famous and obscure. There are booksellers, business meetings, and quite a few job interviews. But mainly the economists gather to talk and listen. During the busiest times, 60 or more presentations may be taking place simultaneously, on questions that range from the future of the stock market to who does the cooking in two-earner families.

What do these people have in common? An expert on the stock market probably knows very little about the economics of housework, and vice versa. Yet an economist who wanders into the wrong seminar and ends up listening to presentations on some unfamiliar topic is nonetheless likely to hear much that is familiar. The reason is that all economic analysis is based on a set of common principles that apply to many different issues.

Some of these principles involve *individual choice*—for economics is, first of all, about the choices that individuals make. Do you choose to work during the summer or take a backpacking trip? Do you buy a new CD or go to a movie? These decisions involve *making a choice* from among a limited number of alternatives—limited because no one can have everything that he or she wants. Every question in economics at its most basic level involves individuals making choices.

But to understand how an economy works, you need to understand more than how individuals make choices. None of us lives like Robinson Crusoe, alone on an island—we must make decisions in an environment that is shaped by the decisions of others. Indeed, in our global economy even the simplest decisions you make—say, what to have for breakfast—are shaped by the decisions of thousands of other people, from the banana grower in Costa Rica who decided to grow the fruit you eat to the farmer in Iowa who provided the corn in your cornflakes. And because each of us depends on so many others—and they, in turn, depend on us—our choices interact. So although all economics at a basic level is about individual choice, in order to understand behavior within an economy we must also understand economic *interaction*—how my choices affect your choices, and vice versa.

Many important economic interactions can be understood by looking at the markets for individual goods—for example, the market for corn. But we must also understand economy-wide interactions in order to understand how they can lead to the ups and downs we see in the economy as a whole.

In this section we discuss the study of economics and the difference between microeconomics and macroeconomics. We also introduce the major topics within macroeconomics and the use of models to study the macroeconomy. Finally, we present the production possibilities curve model and use it to understand basic economic activity, including trade between two economies. Because the study of economics relies on graphical models, an appendix on the use of graphs follows the end of this section.

What you will learn in this **Module:**

- How scarcity and choice are central to the study of economics
- The importance of opportunity cost in individual choice and decision making
- The difference between positive economics and normative economics
- When economists agree and why they sometimes disagree
- What makes macroeconomics different from microeconomics

Module 1 The Study of Economics

Individual Choice: The Core of Economics

Economics is the study of scarcity and choice. Every economic issue involves, at its most basic level, **individual choice**—decisions by individuals about what to do and what *not* to do. In fact, you might say that it isn't economics if it isn't about choice.

Step into a big store such as Walmart or Target. There are thousands of different products available, and it is extremely unlikely that you—or anyone else—could afford to buy everything you might want to have. And anyway, there's only so much space in your room. Given the limitations on your budget and your living space, you must choose which products to buy and which to leave on the shelf.

The fact that those products are on the shelf in the first place involves choice—the store manager chose to put them there, and the manufacturers of the products chose to produce them. The **economy** is a system that coordinates choices about production with choices about consumption, and distributes goods and services to the people who want them. The United States has a **market economy,** in which production and consumption are the result of decentralized decisions by many firms and individuals. There is no central authority telling people what to produce or where to ship it. Each individual producer makes what he or she thinks will be most profitable, and each consumer buys what he or she chooses.

An alternative to a market economy is a **command economy,** in which industry is publicly owned and there *is* a central authority making production and consumption decisions. Command economies have been tried, most notably in the Soviet Union between 1917 and 1991, but they didn't work very well. Producers in the Soviet Union routinely found themselves unable to produce because they did not have crucial raw materials, or they succeeded in producing but then found nobody wanted what the central authority had them produce. Consumers were often unable to find necessary items—command economies are famous for long lines at shops.

At the root of the problem with command economies is a lack of **incentives,** which are rewards or punishments that motivate particular choices. In market economies, producers are free to charge higher prices when there is a shortage of something, and to

Economics is the study of scarcity and choice.

Individual choice is decisions by individuals about what to do, which necessarily involve decisions about what not to do.

An **economy** is a system for coordinating a society's productive and consumptive activities.

In a **market economy,** the decisions of individual producers and consumers largely determine what, how, and for whom to produce, with little government involvement in the decisions.

In a **command economy,** industry is publicly owned and a central authority makes production and consumption decisions.

Incentives are rewards or punishments that motivate particular choices.

keep the resulting profits. High prices and profits provide incentives for producers to make more of the most-needed goods and services and eliminate shortages.

In fact, economists tend to be skeptical of any attempt to change people's behavior that doesn't change their incentives. For example, a plan that calls on manufacturers to reduce pollution voluntarily probably won't be effective; a plan that gives them a financial incentive to do so is more likely to succeed.

Property rights, which establish ownership and grant individuals the right to trade goods and services with each other, create many of the incentives in market economies. With the right to own property comes the incentive to produce things of value, either to keep, or to trade for mutual gain. And ownership creates an incentive to put resources to their best possible use. Property rights to a lake, for example, give the owners an incentive not to pollute that lake if its use for recreation, serenity, or sale has greater value.

In any economy, the decisions of what to do with the next ton of pollution, the next hour of free time, and the next dollar of spending money are *marginal decisions.* They involve trade-offs at the margin: comparing the costs and benefits of doing a little bit more of an activity versus a little bit less. The gain from doing something one more time is called the *marginal benefit.* The cost of doing something one more time is the *marginal cost.* If the marginal benefit of making another car, reading another page, or buying another latte exceeds the marginal cost, the activity should continue. Otherwise, it should not. The study of such decisions is known as **marginal analysis,** plays a central role in economics because the formula of doing things until the marginal benefit no longer exceeds the marginal cost is the key to deciding "how much" to do of any activity.

All economic activities involve individual choice. Let's take a closer look at what this means for the study of economics.

Property rights establish ownership and grant individuals the right to trade goods and services with each other.

Marginal analysis is the study of the costs and benefits of doing a little bit more of an activity versus a little bit less.

A **resource** is anything that can be used to produce something else.

Land refers to all resources that come from nature, such as minerals, timber and petroleum.

Labor is the effort of workers.

Capital refers to manufactured goods used to make other goods and services.

Entrepreneurship describes the efforts of entrepreneurs in organizing resources for production, taking risks to create new enterprises, and innovating to develop new products and production processes.

A **scarce** resource is not available in sufficient quantities to satisfy all the various ways a society wants to use it.

Resources Are Scarce

You can't always get what you want. Almost everyone would like to have a beautiful house in a great location (and help with the housecleaning), two or three luxury cars, and frequent vacations in fancy hotels. But even in a rich country like the United States, not many families can afford all of that. So they must make choices—whether to go to Disney World this year or buy a better car, whether to make do with a small backyard or accept a longer commute in order to live where land is cheaper.

Limited income isn't the only thing that keeps people from having everything they want. Time is also in limited supply: there are only 24 hours in a day. And because the time we have is limited, choosing to spend time on one activity also means choosing not to spend time on a different activity—spending time studying for an exam means forgoing a night at the movies. Indeed, many people feel so limited by the number of hours in the day that they are willing to trade money for time. For example, convenience stores usually charge higher prices than larger supermarkets. But they fulfill a valuable role by catering to customers who would rather pay more than spend the time traveling farther to a supermarket where they might also have to wait in longer lines.

Why do individuals have to make choices? The ultimate reason is that *resources are scarce.* A **resource** is anything that can be used to produce something else. The economy's resources, sometimes called *factors of production,* can be classified into four categories: **land** (including timber, water, minerals, and all other resources that come from nature), **labor** (the effort of workers), **capital** (machinery, buildings, tools, and all other manufactured goods used to make other goods and services), and **entrepreneurship** (risk taking, innovation, and the organization of resources for production). A resource is **scarce** when there is not enough of it available to satisfy the various ways a society wants to use it. For example, there are limited supplies of oil and coal, which currently provide most of the energy used to produce and deliver everything we buy. And in a growing world economy with a rapidly increasing human population, even clean air and water have become scarce resources.

Just as individuals must make choices, the scarcity of resources means that society as a whole must make choices. One way for a society to make choices is simply to allow

The real cost of an item is its **opportunity cost:** what you must give up in order to get it.

them to emerge as the result of many individual choices. For example, there are only so many hours in a week, and Americans must decide how to spend their time. How many hours will they spend going to supermarkets to get lower prices rather than saving time by shopping at convenience stores? The answer is the sum of individual decisions: each of the millions of individuals in the economy makes his or her own choice about where to shop, and society's choice is simply the sum of those individual decisions.

For various reasons, there are some decisions that a society decides are best not left to individual choice. For example, two of the authors live in an area that until recently was mainly farmland but is now being rapidly built up. Most local residents feel that the community would be a more pleasant place to live if some of the land were left undeveloped. But no individual has an incentive to keep his or her land as open space, rather than sell it to a developer. So a trend has emerged in many communities across the United States of local governments purchasing undeveloped land and preserving it as open space. Decisions about how to use scarce resources are often best left to individuals but sometimes should be made at a higher, community-wide, level.

Opportunity Cost: The Real Cost of Something Is What You Must Give Up to Get It

Suppose it is the last term before you graduate and you must decide which college to attend. You have narrowed your choices to a small liberal arts college near home or a large state university several hours away. If you decide to attend the local liberal arts college, what is the cost of that decision? Of course, you will have to pay for tuition, books, and housing, no matter which college you choose. Added to the cost of choosing the local college is the forgone opportunity to attend the large state university, your next best alternative. Economists call the value of what you must give up when you make a particular choice an **opportunity cost.**

Charles D. Winters

Opportunity costs are crucial to individual choice because, in the end, all costs are opportunity costs. That's because with every choice, an alternative is forgone—money or time spent on one thing can't be spent on another. If you spend $15 on a pizza, you forgo the opportunity to spend that $15 on a steak. If you spend Saturday afternoon at the park, you can't spend Saturday afternoon doing homework. And if you attend one school, you can't attend another.

The park and school examples show that economists are concerned with more than just costs paid in dollars and cents. The forgone opportunity to do homework has no direct monetary cost, but it is an opportunity cost nonetheless. And if the local college and the state university have the same tuition and fees, the cost of choosing one school over the other has nothing to do with payments and everything to do with forgone opportunities.

Now suppose tuition and fees at the state university are $5,000 less than at the local college. In that case, what you give up to attend the local college is the ability to attend the state university *plus* the enjoyment you could have gained from spending $5,000 on other things. So the opportunity cost of a choice includes all the costs, whether or not they are monetary costs, of making that choice.

The choice to go to college *at all* provides an important final example of opportunity costs. High school graduates can either go to college or seek immediate employment. Even with a full scholarship that would make college "free" in terms of monetary costs, going to college would still be an expensive proposition because most young people, if they were not in college, would have a job. By going to college, students forgo the income they could have earned if they had gone straight to work instead. Therefore, the opportunity cost of attending college is the value of all necessary monetary payments for tuition and fees *plus* the forgone income from the best available job that could take the place of going to college.

For most people the value of a college degree far exceeds the value of alternative earnings, with notable exceptions. The opportunity cost of going to college is high for people who could earn a lot during what would otherwise be their college years. Basketball

Photo by David Liam Kyle/NBAE via Getty Images

LeBron James understood the concept of opportunity cost.

star LeBron James bypassed college because the opportunity cost would have included his $13 million contract with the Cleveland Cavaliers and even more from corporate sponsors Nike and Coca-Cola. Golfer Tiger Woods, Microsoft co-founder Bill Gates, and actor Matt Damon are among the high achievers who decided the opportunity cost of completing college was too much to swallow.

Microeconomics Versus Macroeconomics

We have presented economics as the study of choices and described how, at its most basic level, economics is about individual choice. The branch of economics concerned with how individuals make decisions and how these decisions interact is called **microeconomics.** Microeconomics focuses on choices made by individuals, households, or firms—the smaller parts that make up the economy as a whole.

Macroeconomics focuses on the bigger picture—the overall ups and downs of the economy. When you study macroeconomics, you learn how economists explain these fluctuations and how governments can use economic policy to minimize the damage they cause. Macroeconomics focuses on **economic aggregates**—economic measures such as the unemployment rate, the inflation rate, and gross domestic product—that summarize data across many different markets.

Table 1.1 lists some typical questions that involve economics. A microeconomic version of the question appears on the left, paired with a similar macroeconomic question on the right. By comparing the questions, you can begin to get a sense of the difference between microeconomics and macroeconomics.

Microeconomics is the study of how people make decisions and how those decisions interact.

Macroeconomics is concerned with the overall ups and downs in the economy.

Economic aggregates are economic measures that summarize data across many different markets.

table **1.1**

Microeconomic Versus Macroeconomic Questions

Microeconomic Questions	Macroeconomic Questions
Should I go to college or get a job after high school?	How many people are employed in the economy as a whole this year?
What determines the salary that Citibank offers to a new college graduate?	What determines the overall salary levels paid to workers in a given year?
What determines the cost to a high school of offering a new course?	What determines the overall level of prices in the economy as a whole?
What government policies should be adopted to make it easier for low-income students to attend college?	What government policies should be adopted to promote employment and growth in the economy as a whole?
What determines the number of iPhones exported to France?	What determines the overall trade in goods, services, and financial assets between the United States and the rest of the world?

As these questions illustrate, microeconomics focuses on how individuals and firms make decisions, and the consequences of those decisions. For example, a school will use microeconomics to determine how much it would cost to offer a new course, which includes the instructor's salary, the cost of class materials, and so on. By weighing the costs and benefits, the school can then decide whether or not to offer the course. Macroeconomics, in contrast, examines the *overall* behavior of the economy—how the actions of all of the individuals and firms in the economy interact to produce a particular economy-wide level of economic performance. For example, macroeconomics is concerned with the general level of prices in the economy and how high or low they are relative to prices last year, rather than with the price of a particular good or service.

Positive economics is the branch of economic analysis that describes the way the economy actually works.

Normative economics makes prescriptions about the way the economy should work.

Positive Versus Normative Economics

Economic analysis, as we will see throughout this book, draws on a set of basic economic principles. But how are these principles applied? That depends on the purpose of the analysis. Economic analysis that is used to answer questions about the way the world works, questions that have definite right and wrong answers, is known as **positive economics.** In contrast, economic analysis that involves saying how the world *should* work is known as **normative economics.**

Imagine that you are an economic adviser to the governor of your state and the governor is considering a change to the toll charged along the state turnpike. Below are three questions the governor might ask you.

1. How much revenue will the tolls yield next year?
2. How much would that revenue increase if the toll were raised from $1.00 to $1.50?
3. Should the toll be raised, bearing in mind that a toll increase would likely reduce traffic and air pollution near the road but impose some financial hardship on frequent commuters?

There is a big difference between the first two questions and the third one. The first two are questions about facts. Your forecast of next year's toll revenue without any increase will be proved right or wrong when the numbers actually come in. Your estimate of the impact of a change in the toll is a little harder to check—the increase in revenue depends on other factors besides the toll, and it may be hard to disentangle the causes of any change in revenue. Still, in principle there is only one right answer.

But the question of whether or not tolls should be raised may not have a "right" answer—two people who agree on the effects of a higher toll could still disagree about whether raising the toll is a good idea. For example, someone who lives near the turnpike but doesn't commute on it will care a lot about noise and air pollution but not so much about commuting costs. A regular commuter who doesn't live near the turnpike will have the opposite priorities.

Peter Steiner/Alamy

Should the toll be raised?

This example highlights a key distinction between the two roles of economic analysis and presents another way to think about the distinction between positive and normative analysis: positive economics is about description, and normative economics is about prescription. Positive economics occupies most of the time and effort of the economics profession.

Looking back at the three questions the governor might ask, it is worth noting a subtle but important difference between questions 1 and 2. Question 1 asks for a simple prediction about next year's revenue—a forecast. Question 2 is a "what if" question, asking how revenue would change if the toll were to change. Economists are often called upon to answer both types of questions. Economic *models,* which provide simplified representations of reality such as graphs or equations, are especially useful for answering "what if" questions.

The answers to such questions often serve as a guide to policy, but they are still predictions, not prescriptions. That is, they tell you what will happen if a policy is changed, but they don't tell you whether or not that result is good. Suppose that your economic model tells you that the governor's proposed increase in highway tolls will raise property values in communities near the road but will tax or inconvenience people who currently use the turnpike to get to work. Does that information make this proposed toll increase a good idea or a bad one? It depends on whom you ask. As we've just seen, someone who is very concerned with the communities near the road will support the increase, but someone who is very concerned with the welfare of drivers will feel differently. That's a value judgment—it's not a question of positive economic analysis.

Still, economists often do engage in normative economics and give policy advice. How can they do this when there may be no "right" answer? One answer is that economists are also citizens, and we all have our opinions. But economic analysis can often be used to show that some policies are clearly better than others, regardless of individual opinions.

Suppose that policies A and B achieve the same goal, but policy A makes everyone better off than policy B—or at least makes some people better off without making other people worse off. Then A is clearly more efficient than B. That's not a value judgment: we're talking about how best to achieve a goal, not about the goal itself.

For example, two different policies have been used to help low-income families obtain housing: rent control, which limits the rents landlords are allowed to charge, and rent subsidies, which provide families with additional money with which to pay rent. Almost all economists agree that subsidies are the more efficient policy. (In a later module we'll see why this is so.) And so the great majority of economists, whatever their personal politics, favor subsidies over rent control.

When policies can be clearly ranked in this way, then economists generally agree. But it is no secret that economists sometimes disagree.

When and Why Economists Disagree

Economists have a reputation for arguing with each other. Where does this reputation come from?

One important answer is that media coverage tends to exaggerate the real differences in views among economists. If nearly all economists agree on an issue—for example, the proposition that rent controls lead to housing shortages—reporters and editors are likely to conclude that there is no story worth covering, and so the professional consensus tends to go unreported. But when there is some issue on which prominent economists take opposing sides—for example, whether cutting taxes right now would help the economy—that does make a good news story. So you hear much more about the areas of disagreement among economists than you do about the many areas of agreement.

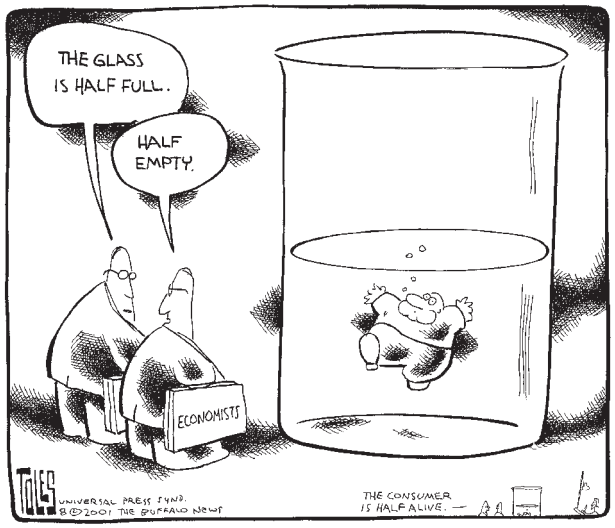
It is also worth remembering that economics is, unavoidably, often tied up in politics. On a number of issues, powerful interest groups know what opinions they want to hear. Therefore, they have an incentive to find and promote economists who profess those opinions, which gives these economists a prominence and visibility out of proportion to their support among their colleagues.

Although the appearance of disagreement among economists exceeds the reality, it remains true that economists often *do* disagree about important things. For example, some highly respected economists argue vehemently that the U.S. government should replace the income tax with a *value-added tax* (a national sales tax, which is the main source of government revenue in many European countries). Other equally respected economists disagree. What are the sources of this difference of opinion?

One important source of differences is in values: as in any diverse group of individuals, reasonable people can differ. In comparison to an income tax, a value-added tax typically falls more heavily on people with low incomes. So an economist who values a society with more social and income equality will likely oppose a value-added tax. An economist with different values will be less likely to oppose it.

A second important source of differences arises from the way economists conduct economic analysis. Economists base their conclusions on models formed by making simplifying assumptions about reality. Two economists can legitimately disagree about which simplifications are appropriate—and therefore arrive at different conclusions.

Suppose that the U.S. government was considering a value-added tax. Economist A may rely on a simplification of reality that focuses on the administrative costs of tax systems—that is, the costs of monitoring compliance, processing tax forms, collecting the tax, and so on. This economist might then point to the well-known high costs of administering a value-added tax and argue against the change. But economist B may think that the right way to approach the question is to ignore the administrative



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When Economists Agree

"If all the economists in the world were laid end to end, they still couldn't reach a conclusion." So goes one popular economist joke. But do economists really disagree that much?

Not according to a classic survey of members of the American Economic Association, reported in the May 1992 issue of the *American Economic Review.* The authors asked respondents to agree or disagree with a number of statements about the economy; what they found was a high level of agreement among professional economists on many of the statements. At the top of the list, with more than 90% of the economists agreeing, were the statements "Tariffs and import quotas usually reduce general economic welfare" and "A ceiling on rents reduces the quantity and quality of housing available." What's striking about these two statements is that many noneconomists disagree: tariffs and import quotas to keep out foreign-produced goods are favored by many voters, and proposals to do away with rent control in cities like New York and San Francisco have met fierce political opposition.

So is the stereotype of quarreling economists a myth? Not entirely. Economists do disagree quite a lot on some issues, especially in macroeconomics, but they also find a great deal of common ground.

costs and focus on how the proposed law would change individual savings behavior. This economist might point to studies suggesting that value-added taxes promote higher consumer saving, a desirable result. Because the economists have made different simplifying assumptions, they arrive at different conclusions. And so the two economists may find themselves on different sides of the issue.

Most such disputes are eventually resolved by the accumulation of evidence that shows which of the various simplifying assumptions made by economists does a better job of fitting the facts. However, in economics, as in any science, it can take a long time before research settles important disputes—decades, in some cases. And since the economy is always changing in ways that make old approaches invalid or raise new policy questions, there are always new issues on which economists disagree. The policy maker must then decide which economist to believe.

Module 1 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. What are the four categories of resources? Give an example of a resource from each category.
2. What type of resource is each of the following?
   a. time spent flipping hamburgers at a restaurant
   b. a bulldozer
   c. a river
3. You make $45,000 per year at your current job with Whiz Kids Consultants. You are considering a job offer from Brainiacs, Inc., which would pay you $50,000 per year. Which of the following are elements of the opportunity cost of accepting the new job at Brainiacs, Inc.? Answer yes or no, and explain your answer.
   a. the increased time spent commuting to your new job
   b. the $45,000 salary from your old job
   c. the more spacious office at your new job
4. Identify each of the following statements as positive or normative, and explain your answer.
   a. Society should take measures to prevent people from engaging in dangerous personal behavior.
   b. People who engage in dangerous personal behavior impose higher costs on society through higher medical costs.

Tackle the Test: Multiple-Choice Questions

1. Which of the following is an example of a resource?
   I. petroleum
   II. a factory
   III. a cheeseburger dinner
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III
2. Which of the following situations represent(s) resource scarcity?
   I. Rapidly growing economies experience increasing levels of water pollution.
   II. There is a finite amount of petroleum in the physical environment.
   III. Cassette tapes are no longer being produced.
   a. I only
   b. II only
   c. III only
   d. I and II only
   e. I, II, and III
3. Suppose that you prefer reading a book you already own to watching TV and that you prefer watching TV to listening to music. If these are your only three choices, what is the opportunity cost of reading?
   a. watching TV and listening to music
   b. watching TV
   c. listening to music
   d. sleeping
   e. the price of the book
4. Which of the following statements is/are normative?
   I. The price of gasoline is rising.
   II. The price of gasoline is too high.
   III. Gas prices are expected to fall in the near future.
   a. I only
   b. II only
   c. III only
   d. I and III only
   e. I, II, and III
5. Which of the following questions is studied in microeconomics?
   a. Should I go to college or get a job after I graduate?
   b. What government policies should be adopted to promote employment in the economy?
   c. How many people are employed in the economy this year?
   d. Has the overall level of prices in the economy increased or decreased this year?
   e. What determines the overall salary levels paid to workers in a given year?

Tackle the Test: Free-Response Questions

1. Define resources, and list the four categories of resources. What characteristic of resources results in the need to make choices?

Answer (6 points)

1 point: Resources are anything that can be used to produce something else.

1 point each: The four categories of the economy's resources are land, labor, capital, and entrepreneurship.

1 point: The characteristic that results in the need to make choices is scarcity.

2. In what type of economic analysis do questions have a "right" or "wrong" answer? In what type of economic analysis do questions not necessarily have a "right" answer? On what type of economic analysis do economists tend to disagree most frequently? Why might economists disagree? Explain.

What you will learn in this **Module:**

- What a business cycle is and why policy makers seek to diminish the severity of business cycles
- How employment and unemployment are measured and how they change over the business cycle
- The definition of aggregate output and how it changes over the business cycle
- The meaning of inflation and deflation and why price stability is preferred
- How economic growth determines a country's standard of living
- Why models—simplified representations of reality—play a crucial role in economics

Module 2 Introduction to Macroeconomics

Today many people enjoy walking, biking, and horseback riding through New York's beautiful Central Park. But in 1932 there were many people living there in squalor. At that time, Central Park contained one of the many "Hoovervilles"—the shantytowns that had sprung up across America as a result of a catastrophic economic slump that had started in 1929. Millions of people were out of work and unable to feed, clothe, and house themselves and their families. Beginning in 1933, the U.S. economy would stage a partial recovery. But joblessness stayed high throughout the 1930s—a period that came to be known as the Great Depression.

Why "Hooverville"? These shantytowns were named after President Herbert Hoover, who had been elected president in 1928. When the Depression struck, people blamed the president: neither he nor his economic advisers seemed to understand what had happened or to know what to do. At that time, the field of macroeconomics was still in its infancy. It was only after the economy was plunged into catastrophe that economists began to closely examine how the macroeconomy works and to develop policies that might prevent such disasters in the future. To this day, the effort to understand economic slumps and find ways to prevent them is at the core of macroeconomics.

In this module we will begin to explore the key features of macroeconomic analysis. We will look at some of the field's major concerns, including business cycles, employment, aggregate output, price stability, and economic growth.

The **business cycle** is the short-run alternation between economic downturns, known as recessions, and economic upturns, known as expansions.

A **depression** is a very deep and prolonged downturn.

Recessions are periods of economic downturns when output and employment are falling.

Expansions, or recoveries, are periods of economic upturns when output and employment are rising.

The Business Cycle

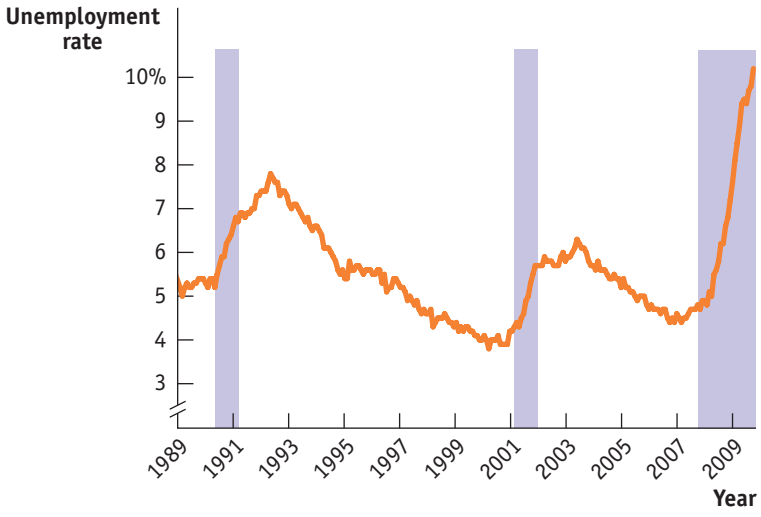
The alternation between economic downturns and upturns in the macroeconomy is known as the **business cycle.** A **depression** is a very deep and prolonged downturn; fortunately, the United States hasn't had one since the Great Depression of the 1930s. Instead, we have experienced less prolonged economic downturns known as **recessions,** periods in which output and employment are falling. These are followed by economic upturns—periods in which output and employment are rising—known as **expansions** (sometimes called *recoveries*). According to the National Bureau of Economic Research

figure 2.1

The U.S. Unemployment Rate and the Timing of Business Cycles, 1989–2009

The unemployment rate, a measure of joblessness, rises sharply during recessions (indicated by shaded areas) and usually falls during expansions.

Source: Bureau of Labor Statistics.



there have been 11 recessions in the United States since World War II. During that period the average recession has lasted 10 months, and the average expansion has lasted 57 months. The average length of a business cycle, from the beginning of a recession to the beginning of the next recession, has been 5 years and 7 months. The shortest business cycle was 18 months, and the longest was 10 years and 8 months. The most recent economic downturn started in December, 2007. Figure 2.1 shows the history of the U.S. unemployment rate since 1989 and the timing of business cycles. Recessions are indicated in the figure by the shaded areas.

The business cycle is an enduring feature of the economy. But even though ups and downs seem to be inevitable, most people believe that macroeconomic analysis has guided policies that help smooth out the business cycle and stabilize the economy.

What happens during a business cycle, and how can macroeconomic policies address the downturns? Let's look at three issues: employment and unemployment, aggregate output, and inflation and deflation.

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Defining Recessions and Expansions

Some readers may be wondering exactly how recessions and expansions are defined. The answer is that there is no exact definition!

In many countries, economists adopt the rule that a recession is a period of at least two consecutive quarters (a quarter is three months), during which aggregate output falls. The two-consecutive-quarter requirement is designed to avoid classifying brief hiccups in the economy's performance, with no lasting significance, as recessions.

Sometimes, however, this definition seems too strict. For example, an economy that has three months of sharply declining output, then three months of slightly positive growth, then another three months of rapid decline, should surely be considered to have endured a nine-month recession.

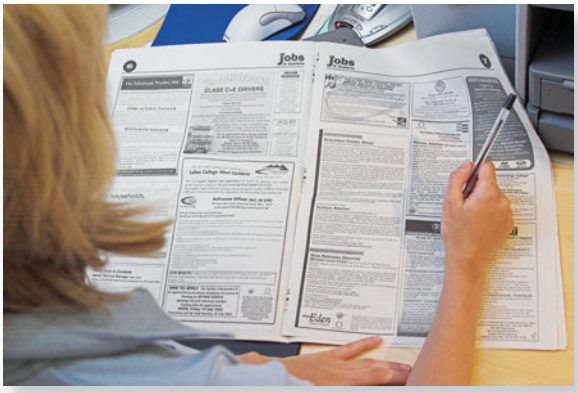
In the United States, we try to avoid such misclassifications by assigning the task of determining when a recession begins and ends to an independent panel of experts at the National Bureau of Economic Research (NBER). This panel looks at a variety of economic indicators, with the main focus on employment and production, but ultimately, the panel makes a judgment call.

Sometimes this judgment is controversial. In fact, there is lingering controversy over the 2001 recession. According to the NBER, that recession began in March 2001 and ended in November 2001, when output began rising. Some critics argue, however, that the recession really began several months earlier, when industrial production began falling. Other critics argue that the recession didn't really end in 2001 because employment continued to fall and the job market remained weak for another year and a half.

Employment, Unemployment, and the Business Cycle

Although not as severe as a depression, a recession is clearly an undesirable event. Like a depression, a recession leads to joblessness, reduced production, reduced incomes, and lower living standards.

To understand how job loss relates to the adverse effects of recessions, we need to understand something about how the labor force is structured. **Employment** is the total number of people currently working for pay, and **unemployment** is the total number of people who are actively looking for work but aren't currently employed. A country's **labor force** is the sum of employment and unemployment.



Freefall Images/Alamy

Finding a job was difficult in 2009.

The **unemployment rate**—the percentage of the labor force that is unemployed—is usually a good indicator of what conditions are like in the job market: a high unemployment rate signals a poor job market in which jobs are hard to find; a low unemployment rate indicates a good job market in which jobs are relatively easy to find. In general, during recessions the unemployment rate is rising, and during expansions it is falling. Look again at Figure 2.1, which shows the unemployment rate from 1989 through 2009. The graph shows significant changes in the unemployment rate. Note that even in the most prosperous times there is some unemployment. A booming economy, like that of the late 1990s, can push the unemployment rate down to 4% or even lower. But a severe recession, like the one that began in 2007, can push the unemployment rate into double digits.

Aggregate Output and the Business Cycle

Rising unemployment is the most painful consequence of a recession, and falling unemployment the most urgently desired feature of an expansion. But the business cycle isn't just about jobs—it's also about **output:** the quantity of goods and services produced. During the business cycle, the economy's level of output and its unemployment rate move in opposite directions. At lower levels of output, fewer workers are needed, and the unemployment rate is relatively high. Growth in output requires the efforts of more workers, which lowers the unemployment rate. To measure the rise and fall of an economy's output, we look at **aggregate output**—the economy's total production of goods and services for a given time period, usually a year. Aggregate output normally falls during recessions and rises during expansions.

Inflation, Deflation, and Price Stability

In 1970 the average production worker in the United States was paid $3.40 an hour. By October 2009 the average hourly earnings for such a worker had risen to $18.74 an hour. Three cheers for economic progress!

But wait—American workers were paid much more in 2009, but they also faced a much higher cost of living. In 1970 a dozen eggs cost only about $0.58; by October 2009 that was up to $1.60. The price of a loaf of white bread went from about $0.20 to $1.39. And the price of a gallon of gasoline rose from just $0.33 to $2.61. If we compare the percentage increase in hourly earnings between 1970 and October 2009 with the increases in the prices of some standard items, we see that the average worker's paycheck goes just about as far today as it did in 1970. In other words, the increase in the cost of living wiped out many, if not all, of the wage gains of the typical worker from 1970 to 2009. What caused this situation?

Between 1970 and 2009 the economy experienced substantial **inflation,** a rise in the overall price level. The opposite of inflation is **deflation,** a fall in the overall price level. A change in the prices of a few goods changes the opportunity cost of purchasing those goods but does not constitute inflation or deflation. These terms are reserved for more general changes in the prices of goods and services throughout the economy.

Employment is the number of people currently employed in the economy.

Unemployment is the number of people who are actively looking for work but aren't currently employed.

The **labor force** is equal to the sum of employment and unemployment.

The **unemployment rate** is the percentage of the labor force that is unemployed.

Output is the quantity of goods and services produced.

Aggregate output is the economy's total production of goods and services for a given time period.

A rising overall price level is **inflation.**

A falling overall price level is **deflation.**

Both inflation and deflation can pose problems for the economy. Inflation discourages people from holding on to cash, because if the price level is rising, cash loses value. That is, if the price level rises, a dollar will buy less than it would before. As we will see later in our more detailed discussion of inflation, in periods of rapidly rising prices, people stop holding cash altogether and instead trade goods for goods.

Deflation can cause the opposite problem. That is, if the overall price level falls, a dollar will buy more than it would before. In this situation it can be more attractive for people with cash to hold on to it than to invest in new factories and other productive assets. This can deepen a recession.

In later modules we will look at other costs of inflation and deflation. For now we note that, in general, economists regard **price stability**—meaning that the overall price level is changing either not at all or only very slowly—as a desirable goal because it helps keep the economy stable.

The economy has **price stability** when the aggregate price level is changing only slowly.

Economic growth is an increase in the maximum amount of goods and services an economy can produce.

Economic Growth

In 1955 Americans were delighted with the nation's prosperity. The economy was expanding, consumer goods that had been rationed during World War II were available for everyone to buy, and most Americans believed, rightly, that they were better off than citizens of any other nation, past or present. Yet by today's standards Americans were quite poor in 1955. For example, in 1955 only 33% of American homes contained washing machines, and hardly anyone had air conditioning. If we turn the clock back to 1905, we find that life for most Americans was startlingly primitive by today's standards.

Why are the vast majority of Americans today able to afford conveniences that many lacked in 1955? The answer is **economic growth,** an increase in the maximum possible output of an economy. Unlike the short-term increases in aggregate output that occur as an economy recovers from a downturn in the business cycle, economic growth is an increase in productive capacity that permits a sustained rise in aggregate output over time. Figure 2.2 shows annual figures for U.S. real gross domestic product (GDP) per capita—the value of final goods and services produced in the U.S. per person—from 1900 to 2009. As a result of this economic growth, the U.S. economy's aggregate output per person was almost nine times as large in 2009 as it was in 1900.

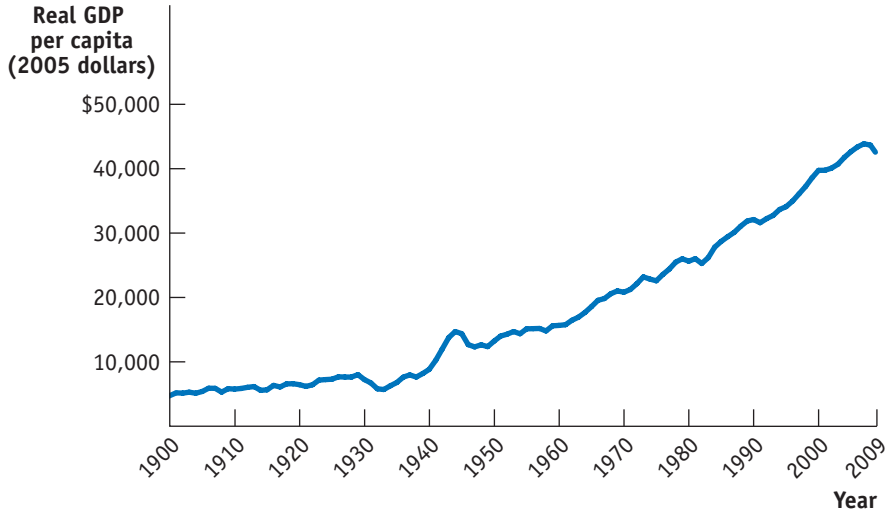
20th Century Advertising/Alamy

figure 2.2

Growth, the Long View

Over the long run, growth in real GDP per capita has dwarfed the ups and downs of the business cycle. Except for the recession that began the Great Depression, recessions are almost invisible.

Source: Angus Maddison, "Statistics on World Population, GDP and Per Capita GDP, 1–2006 AD," http://www.ggdc.net/maddison; Bureau of Economic Analysis.



A **model** is a simplified representation used to better understand a real-life situation.

The **other things equal assumption** means that all other relevant factors remain unchanged. This is also known as the *ceteris paribus* assumption.

Economic growth is fundamental to a nation's prosperity. A sustained rise in output per person allows for higher wages and a rising standard of living. The need for economic growth is urgent in poorer, less developed countries, where a lack of basic necessities makes growth a central concern of economic policy.

As you will see when studying macroeconomics, the goal of economic growth can be in conflict with the goal of hastening recovery from an economic downturn. What is good for economic growth can be bad for short-run stabilization of the business cycle, and vice versa.

We have seen that macroeconomics is concerned with the long-run trends in aggregate output as well as the short-run ups and downs of the business cycle. Now that we have a general understanding of the important topics studied in macroeconomics, we are almost ready to apply economic principles to real economic issues. To do this requires one more step—an understanding of how economists use *models*.

The Use of Models in Economics

In 1901, one year after their first glider flights at Kitty Hawk, the Wright brothers built something else that would change the world—a wind tunnel. This was an apparatus that let them experiment with many different designs for wings and control surfaces. These experiments gave them knowledge that would make heavier-than-air flight possible. Needless to say, testing an airplane design in a wind tunnel is cheaper and safer than building a full-scale version and hoping it will fly. More generally, models play a crucial role in almost all scientific research—economics included.

A **model** is any simplified version of reality that is used to better understand real-life situations. But how do we create a simplified representation of an economic situation? One possibility—an economist's equivalent of a wind tunnel—is to find or create a real but simplified economy. For example, economists interested in the economic role of money have studied the system of exchange that developed in World War II prison camps, in which cigarettes became a universally accepted form of payment, even among prisoners who didn't smoke.

Another possibility is to simulate the workings of the economy on a computer. For example, when changes in tax law are proposed, government officials use *tax models*—large mathematical computer programs—to assess how the proposed changes would affect different groups of people.

Models are important because their simplicity allows economists to focus on the effects of only one change at a time. That is, they allow us to hold everything else constant and to study how one change affects the overall economic outcome. So when building economic models, an important assumption is the **other things equal assumption,** which means that all other relevant factors remain unchanged. Sometimes the Latin phrase *ceteris paribus,* which means "other things equal," is used.

But it isn't always possible to find or create a small-scale version of the whole economy, and a computer program is only as good as the data it uses. (Programmers have a saying: garbage in, garbage out.) For many purposes, the most effective form of economic modeling is the construction of "thought experiments": simplified, hypothetical versions of real-life situations. And as you will see throughout this book, economists' models are very often in the form of a graph. In the next module, we will look at the *production possibilities curve,* a model that helps economists think about the choices every economy faces.

Module 2 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. Why do we talk about business cycles for the economy as a whole, rather than just talking about the ups and downs of particular industries?
2. Describe who gets hurt in a recession and how they are hurt.

Tackle the Test: Multiple-Choice Questions

1. During the recession phase of a business cycle, which of the following is likely to increase?
   a. the unemployment rate
   b. the price level
   c. economic growth rates
   d. the labor force
   e. wages
2. The labor force is made up of everyone who is
   a. employed.
   b. old enough to work.
   c. actively seeking work.
   d. employed or unemployed.
   e. employed or capable of working.
3. A sustained increase in aggregate output over several decades represents
   a. an expansion.
   b. a recovery.
   c. a recession.
   d. a depression.
   e. economic growth.
4. Which of the following is the most likely result of inflation?
   a. falling employment
   b. a dollar will buy more than it did before
   c. people are discouraged from holding cash
   d. price stability
   e. low aggregate output per capita
5. The other things equal assumption allows economists to
   a. avoid making assumptions about reality.
   b. focus on the effects of only one change at a time.
   c. oversimplify.
   d. allow nothing to change in their model.
   e. reflect all aspects of the real world in their model.

Tackle the Test: Free-Response Questions

1. Define an expansion and economic growth, and explain the difference between the two concepts.
2. Define inflation, and explain why an increase in the price of donuts does not indicate that inflation has occurred.

Answer (3 points)

1 point: An expansion is the period of recovery after an economic downturn.

1 point: Economic growth is an increase in the productive capacity of the economy.

1 point: An expansion can occur regardless of any increase in the economy's long-term potential for production, and it only lasts until the next downturn, while economic growth increases the economy's ability to produce more goods and services over the long term.

What you will learn in this **Module:**

- The importance of trade-offs in economic analysis
- What the production possibilities curve model tells us about efficiency, opportunity cost, and economic growth
- The two sources of economic growth—increases in the availability of resources and improvements in technology

Module 3 The Production Possibilities Curve Model

A good economic model can be a tremendous aid to understanding. In this module, we look at the *production possibilities curve,* a model that helps economists think about the *trade-offs* every economy faces. The production possibilities curve helps us understand three important aspects of the real economy: efficiency, opportunity cost, and economic growth.

Trade-offs: The Production Possibilities Curve

The 2000 hit movie *Cast Away,* starring Tom Hanks, was an update of the classic story of Robinson Crusoe, the hero of Daniel Defoe's eighteenth-century novel. Hanks played the role of a sole survivor of a plane crash who was stranded on a remote island. As in the original story of Robinson Crusoe, the Hanks character had limited resources: the natural resources of the island, a few items he managed to salvage from the plane, and, of course, his own time and effort. With only these resources, he had to make a life. In effect, he became a one-man economy.

One of the important principles of economics we introduced in Module 1 was that resources are scarce. As a result, any economy—whether it contains one person or millions of people—faces trade-offs. You make a **trade-off** when you give up something in order to have something else. For example, if a castaway devotes more resources to catching fish, he benefits by catching more fish, but he cannot use those same resources to gather coconuts, so the trade-off is that he has fewer coconuts.

To think about the trade-offs necessary in any economy, economists often use the **production possibilities curve** model. The idea behind this model is to improve our understanding of trade-offs by considering a simplified economy that produces only two goods. This simplification enables us to show the trade-offs graphically.

Figure 3.1 shows a hypothetical production possibilities curve for Tom, a castaway alone on an island, who must make a trade-off between fish production and coconut

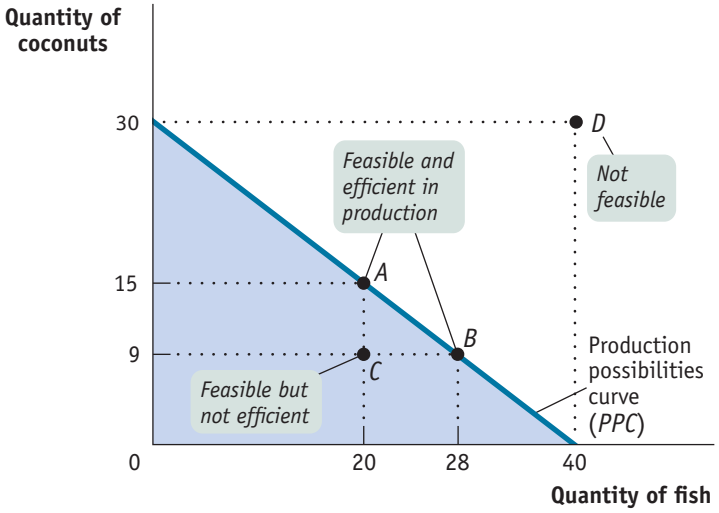
You make a **trade-off** when you give up something in order to have something else.

The **production possibilities curve** illustrates the trade-offs facing an economy that produces only two goods. It shows the maximum quantity of one good that can be produced for each possible quantity of the other good produced.

figure 3.1

The Production Possibilities Curve

The production possibilities curve illustrates the trade-offs facing an economy that produces two goods. It shows the maximum quantity of one good that can be produced, given the quantity of the other good produced. Here, the maximum quantity of coconuts that Tom can gather depends on the quantity of fish he catches, and vice versa. His feasible production is shown by the area *inside* or *on* the curve. Production at point *C* is feasible but not efficient. Points *A* and *B* are feasible and efficient in production, but point *D* is not feasible.



production. The curve shows the maximum quantity of fish Tom can catch during a week *given* the quantity of coconuts he gathers, and vice versa. That is, it answers questions of the form, "What is the maximum quantity of fish Tom can catch if he also gathers 9 (or 15, or 30) coconuts?"

There is a crucial distinction between points *inside* or *on* the production possibilities curve (the shaded area) and points *outside* the production possibilities curve. If a production point lies inside or on the curve—like point *C,* at which Tom catches 20 fish and gathers 9 coconuts—it is feasible. After all, the curve tells us that if Tom catches 20 fish, he could also gather a maximum of 15 coconuts, so he could certainly gather 9 coconuts. However, a production point that lies outside the curve—such as point *D,* which would have Tom catching 40 fish and gathering 30 coconuts—isn't feasible.

In Figure 3.1 the production possibilities curve intersects the horizontal axis at 40 fish. This means that if Tom devoted all his resources to catching fish, he would catch 40 fish per week but would have no resources left over to gather coconuts. The production possibilities curve intersects the vertical axis at 30 coconuts. This means that if Tom devoted all his resources to gathering coconuts, he could gather 30 coconuts per week but would have no resources left over to catch fish. Thus, if Tom wants 30 coconuts, the trade-off is that he can't have any fish.

The curve also shows less extreme trade-offs. For example, if Tom decides to catch 20 fish, he would be able to gather at most 15 coconuts; this production choice is illustrated by point *A*. If Tom decides to catch 28 fish, he could gather at most 9 coconuts, as shown by point *B*.

Thinking in terms of a production possibilities curve simplifies the complexities of reality. The real-world economy produces millions of different goods. Even a castaway on an island would produce more than two different items (for example, he would need clothing and housing as well as food). But in this model we imagine an economy that produces only two goods, because in a model with many goods, it would be much harder to study trade-offs, efficiency, and economic growth.

Efficiency

The production possibilities curve is useful for illustrating the general economic concept of efficiency. An economy is **efficient** if there are no missed opportunities—meaning that there is no way to make some people better off without making other people worse off. For example, suppose a course you are taking meets in a classroom that is

An economy is **efficient** if there is no way to make anyone better off without making at least one person worse off.

Alamy RF

A crowded classroom reflects inefficiency if switching to a larger classroom would make some students better off without making anyone worse off.

too small for the number of students—some may be forced to sit on the floor or stand—despite the fact that a larger classroom nearby is empty during the same period. Economists would say that this is an *inefficient* use of resources because there is a way to make some people better off without making anyone worse off—after all, the larger classroom is empty. The school is not using its resources efficiently. When an economy is using all of its resources efficiently, the only way one person can be made better off is by rearranging the use of resources in such a way that the change makes someone else worse off. So in our classroom example, if all larger classrooms were already fully occupied, we could say that the school was run in an efficient way; your classmates could be made better off only by making people in the larger classroom worse off—by moving them to the room that is too small.

Returning to our castaway example, as long as Tom produces a combination of coconuts and fish that is on the production possibilities curve, his production is efficient. At point *A,* the 15 coconuts he gathers are the maximum quantity he can get *given* that he has chosen to catch 20 fish; at point *B,* the 9 coconuts he gathers are the maximum he can get *given* his choice to catch 28 fish; and so on. If an economy is producing at a point on its production possibilities curve, we say that the economy is *efficient in production*.

But suppose that for some reason Tom was at point *C,* producing 20 fish and 9 coconuts. Then this one-person economy would definitely not be efficient in production, and would therefore be *inefficient:* it is missing the opportunity to produce more of both goods.

Another example of inefficiency in production occurs when people in an economy are involuntarily unemployed: they want to work but are unable to find jobs. When that happens, the economy is not efficient in production because it could produce more output if those people were employed. The production possibilities curve shows the amount that can *possibly* be produced if all resources are fully employed. In other words, changes in unemployment move the economy closer to, or further away from, the production possibilities curve (PPC). But the curve itself is determined by what would be possible if there were full employment in the economy. Greater unemployment is represented by points farther below the PPC—the economy is not reaching its possibilities if it is not using all of its resources. Lower unemployment is represented by points closer to the PPC—as unemployment decreases, the economy moves closer to reaching its possibilities.

Although the production possibilities curve helps clarify what it means for an economy to be efficient in production, it's important to understand that efficiency in production is only *part* of what's required for the economy as a whole to be efficient. Efficiency also requires that the economy allocate its resources so that consumers are as well off as possible. If an economy does this, we say that it is *efficient in allocation*. To see why efficiency in allocation is as important as efficiency in production, notice that points *A* and *B* in Figure 3.1 both represent situations in which the economy is efficient in production, because in each case it can't produce more of one good without producing less of the other. But these two situations may not be equally desirable. Suppose that Tom prefers point *B* to point *A*—that is, he would rather consume 28 fish and 9 coconuts than 20 fish and 15 coconuts. Then point *A* is inefficient from the point of view of the economy as a whole: it's possible to make Tom better off without making anyone else worse off. (Of course, in this castaway economy there isn't anyone else; Tom is all alone.)

Creativ Studio Heinemann/Getty Images

This example shows that efficiency for the economy as a whole requires *both* efficiency in production and efficiency in allocation. To be efficient, an economy must produce as much of each good as it can, given the production of other goods, and it must also produce the mix of goods that people want to consume.

Opportunity Cost

The production possibilities curve is also useful as a reminder that the true cost of any good is not only its price, but also everything else in addition to money that must be given up in order to get that good—the *opportunity cost*. If, for example, Tom decides to go from point *A* to point *B*, he will produce 8 more fish but 6 fewer coconuts. So the opportunity cost of those 8 fish is the 6 coconuts not gathered. Since 8 extra fish have an opportunity cost of 6 coconuts, 1 fish has an opportunity cost of $\frac{6}{8} = \frac{3}{4}$ of a coconut.

Is the opportunity cost of an extra fish in terms of coconuts always the same, no matter how many fish Tom catches? In the example illustrated by Figure 3.1, the answer is yes. If Tom increases his catch from 28 to 40 fish, an increase of 12, the number of coconuts he gathers falls from 9 to zero. So his opportunity cost per additional fish is $\frac{9}{12} = \frac{3}{4}$ of a coconut, the same as it was when his catch went from 20 fish to 28. However, the fact that in this example the opportunity cost of an additional fish in terms of coconuts is always the same is a result of an assumption we've made, an assumption that's reflected in the way Figure 3.1 is drawn. Specifically, whenever we assume that the opportunity cost of an additional unit of a good doesn't change regardless of the output mix, the production possibilities curve is a straight line.

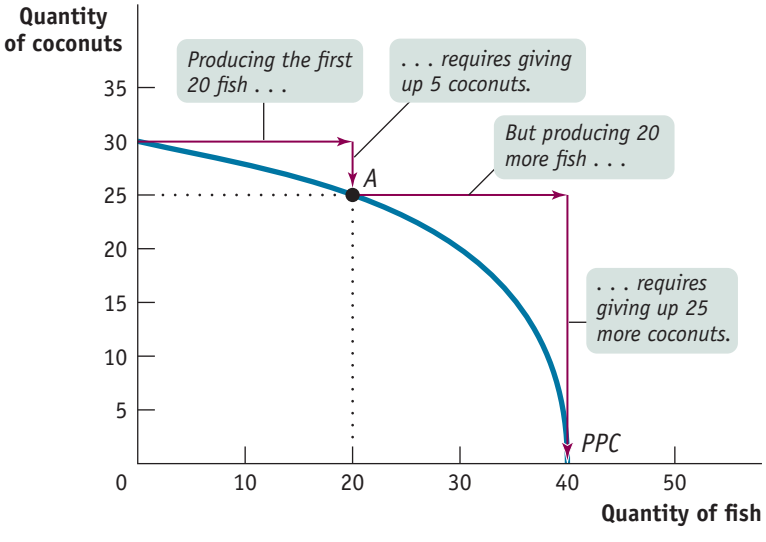
Moreover, as you might have already guessed, the slope of a straight-line production possibilities curve is equal to the opportunity cost—specifically, the opportunity cost for the good measured on the horizontal axis in terms of the good measured on the vertical axis. In Figure 3.1, the production possibilities curve has a *constant slope* of $-\frac{3}{4}$, implying that Tom faces a *constant opportunity cost* per fish equal to $\frac{3}{4}$ of a coconut. (A review of how to calculate the slope of a straight line is found in the Section I Appendix.) This is the simplest case, but the production possibilities curve model can also be used to examine situations in which opportunity costs change as the mix of output changes.

Figure 3.2 illustrates a different assumption, a case in which Tom faces *increasing opportunity cost*. Here, the more fish he catches, the more coconuts he has to give up to catch an additional fish, and vice versa. For example, to go from producing zero fish to producing 20 fish, he has to give up 5 coconuts. That is, the opportunity cost of those 20 fish is 5 coconuts. But to increase his fish production from 20 to 40—that is, to produce an additional 20 fish—he must give up 25 more coconuts, a much higher opportunity cost. As you can see in Figure 3.2, when opportunity costs are increasing rather

figure 3.2

Increasing Opportunity Cost

The bowed-out shape of the production possibilities curve reflects increasing opportunity cost. In this example, to produce the first 20 fish, Tom must give up 5 coconuts. But to produce an additional 20 fish, he must give up 25 more coconuts.



than constant, the production possibilities curve is a bowed-out curve rather than a straight line.

Although it's often useful to work with the simple assumption that the production possibilities curve is a straight line, economists believe that in reality, opportunity costs are typically increasing. When only a small amount of a good is produced, the opportunity cost of producing that good is relatively low because the economy needs to use only those resources that are especially well suited for its production. For example, if an economy grows only a small amount of corn, that corn can be grown in places where the soil and climate are perfect for growing corn but less suitable for growing anything else, such as wheat. So growing that corn involves giving up only a small amount of potential wheat output. Once the economy grows a lot of corn, however, land that is well suited for wheat but isn't so great for corn must be used to produce corn anyway. As a result, the additional corn production involves sacrificing considerably more wheat production. In other words, as more of a good is produced, its opportunity cost typically rises because well-suited inputs are used up and less adaptable inputs must be used instead.

Economic Growth

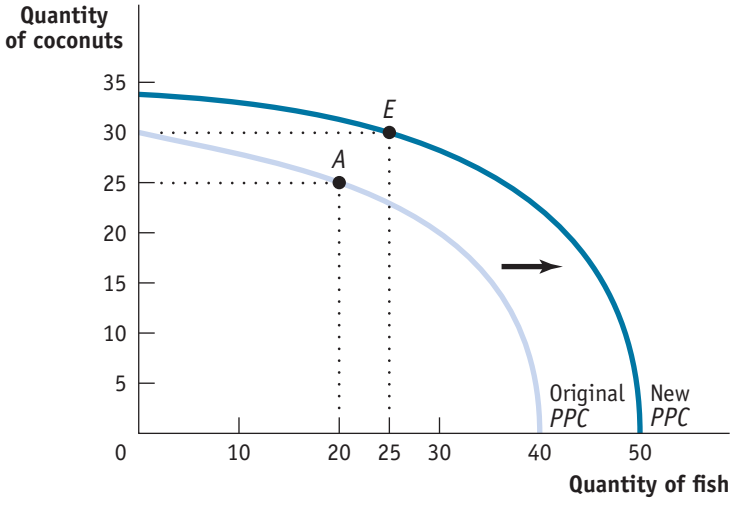
Finally, the production possibilities curve helps us understand what it means to talk about *economic growth*. We introduced the concept of economic growth in Module 2, saying that it allows *a sustained rise in aggregate output*. We learned that economic growth is one of the fundamental features of the economy. But are we really justified in saying that the economy has grown over time? After all, although the U.S. economy produces more of many things than it did a century ago, it produces less of other things—for example, horse-drawn carriages. In other words, production of many goods is actually down. So how can we say for sure that the economy as a whole has grown?

The answer, illustrated in Figure 3.3, is that economic growth means an *expansion of the economy's production possibilities:* the economy *can* produce more of everything. For example, if Tom's production is initially at point *A* (20 fish and 25 coconuts), economic growth means that he could move to point *E* (25 fish and 30 coconuts). Point *E* lies outside the original curve, so in the production possibilities curve model, growth is shown as an outward shift of the curve. Unless the PPC shifts outward, the points beyond the PPC are unattainable. Those points beyond a given PPC are beyond the economy's possibilities.

figure 3.3

Economic Growth

Economic growth results in an *outward shift* of the production possibilities curve because production possibilities are expanded. The economy can now produce more of everything. For example, if production is initially at point *A* (20 fish and 25 coconuts), it could move to point *E* (25 fish and 30 coconuts).



What can cause the production possibilities curve to shift outward? There are two general sources of economic growth. One is an increase in the resources used to produce goods and services: labor, land, capital, and entrepreneurship. To see how adding to an economy's resources leads to economic growth, suppose that Tom finds a fishing net washed ashore on the beach. The fishing net is a resource he can use to produce more fish in the course of a day spent fishing. We can't say how many more fish Tom will catch; that depends on how much time he decides to spend fishing now that he has the net. But because the net makes his fishing more productive, he can catch more fish without reducing the number of coconuts he gathers, or he can gather more coconuts without reducing his fish catch. So his production possibilities curve shifts outward.

Judith Pilossof/FoodPix/Getty Images

The other source of economic growth is progress in **technology,** the technical means for the production of goods and services. Suppose Tom figures out a better way either to catch fish or to gather coconuts—say, by inventing a fishing hook or a wagon for transporting coconuts. Either invention would shift his production possibilities curve outward. However, the shift would not be a simple outward expansion of every point along the PPC. Technology specific to the production of only one good has no effect if all resources are devoted to the other good: a fishing hook will be of no use if Tom produces nothing but coconuts. So the point on the PPC that represents the number of coconuts that can be produced if there is no fishing will not change. In real-world economies, innovations in the techniques we use to produce goods and services have been a crucial force behind economic growth.

Again, economic growth means an increase in what the economy *can* produce. What the economy actually produces depends on the choices people make. After his production possibilities expand, Tom might not choose to produce both more fish and more coconuts; he might choose to increase production of only one good, or he might even choose to produce less of one good. For example, if he gets better at catching fish, he might decide to go on an all-fish diet and skip the coconuts, just as the introduction of motor vehicles led most people to give up horse-drawn carriages. But even if, for some reason, he chooses to produce either fewer coconuts or fewer fish than before, we would still say that his economy has grown, because he *could* have produced more of everything. If an economy's PPC shifts inward, the economy has become smaller. This could happen if the economy loses resources or technology (for example, if it experiences war or a natural disaster).

The production possibilities curve is a very simplified model of an economy, yet it teaches us important lessons about real-life economies. It gives us our first clear sense of what constitutes economic efficiency, it illustrates the concept of opportunity cost, and it makes clear what economic growth is all about.

Technology is the technical means for producing goods and services.

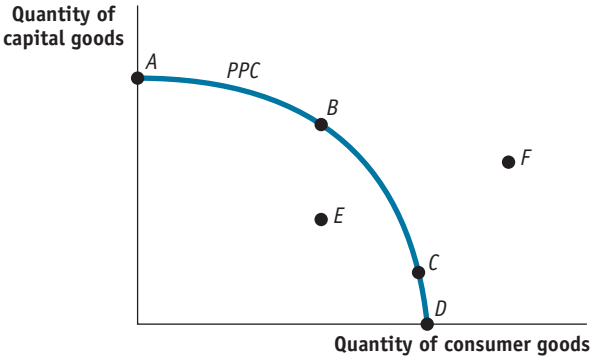
Module 3 AP Review

Solutions appear at the back of the book.

Check Your Understanding

1. True or false? Explain your answer.
   a. An increase in the amount of resources available to Tom for use in producing coconuts and fish does not change his production possibilities curve.
   b. A technological change that allows Tom to catch more fish relative to any amount of coconuts gathered results in a change in his production possibilities curve.
   c. Points inside a production possibilities curve are efficient and points outside a production possibilities curve are inefficient.

Tackle the Test: Multiple-Choice Questions

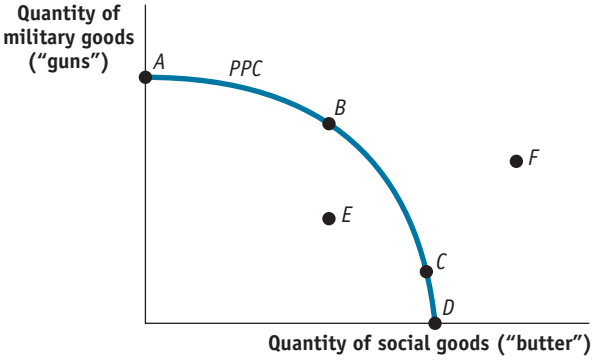


Refer to the graph above to answer the following questions.

1. Which point(s) on the graph represent efficiency in production?
   a. *B* and *C*
   b. *A* and *D*
   c. *A, B, C,* and *D*
   d. *A, B, C, D,* and *E*
   e. *A, B, C, D, E,* and *F*
2. For this economy, an increase in the quantity of capital goods produced without a corresponding decrease in the quantity of consumer goods produced
   a. cannot happen because there is always an opportunity cost.
   b. is represented by a movement from point *E* to point *A*.
   c. is represented by a movement from point *C* to point *B*.
   d. is represented by a movement from point *E* to point *B*.
   e. is only possible with an increase in resources or technology.
3. An increase in unemployment could be represented by a movement from point
   a. *D* to point *C*.
   b. *B* to point *A*.
   c. *C* to point *F*.
   d. *B* to point *E*.
   e. *E* to point *B*.
4. Which of the following might allow this economy to move from point *B* to point *F*?
   a. more workers
   b. discovery of new resources
   c. building new factories
   d. technological advances
   e. all of the above
5. This production possibilities curve shows the trade-off between consumer goods and capital goods. Since capital goods are a resource, an increase in the production of capital goods today will increase the economy's production possibilities in the future. Therefore, all other things equal (*ceteris paribus*), producing at which point today will result in the largest outward shift of the PPC in the future?
   a. *A*
   b. *B*
   c. *C*
   d. *D*
   e. *E*

Tackle the Test: Free-Response Questions

1. Refer to the graph below. Assume that the country is producing at point *C*.



   a. Does this country's production possibilities curve exhibit increasing opportunity costs? Explain.
   b. If this country were to go to war, the most likely move would be from point *C* to which point? Explain.
   c. If the economy entered into a recession, the country would move from point *C* to which point? Explain.

Answer (6 points)

1 point: Yes

1 point: The PPC is concave (bowed outward), so with each additional unit of butter produced, the opportunity cost in terms of gun production (indicated by the slope of the line) increases. Likewise, as more guns are produced, the opportunity cost in terms of butter increases.

1 point: *B*

1 point: The country would choose an efficient point with more (but not all) military goods with which to fight the war. Point A would be an unlikely choice because at that point there is no production of any social goods, some of which are needed to maintain a minimal standard of living.

1 point: *E*

1 point: A recession, which causes unemployment, is represented by a point below the PPC.

2. Assume that an economy can choose between producing food and producing shelter at a constant opportunity cost. Draw a correctly labeled production possibilities curve for the economy. On your graph:
   a. Use the letter *E* to label one of the points that is efficient in production.
   b. Use the letter *U* to label one of the points at which there might be unemployment.
   c. Use the letter *I* to label one of the points that is not feasible.