

## CHAPTER 1: LIMITS, ALTERNATIVES, AND CHOICES

### Introduction

At the heart of the study of economics is the simple but very real prospect that we cannot have it all. We have too few resources to meet all of our wants and needs, so we are forced to make choices. Chapter 1 identifies the basic problem of economics and introduces the first models of decision making by individuals, firms, governments, and societies. The principle of tradeoffs takes both numeric and graphic form and provides the foundation for the rest of the economics course. Material from Chapter 1 appears in several multiple-choice questions on both the AP microeconomics and macroeconomics exams and occasionally appears in free-response questions.

### Scarcity and Economics

Throughout the economics course, you will probably notice terms that are familiar to you from other contexts. But you will find that, very often, economists use those terms in different or more specific ways. Take the word “scarce.” In most contexts, the word “scarce” simply means that something is rare or that little of it is available. But economists add a very important second part to the definition, which is that consumers want more of the item than is available. It is an important distinction. There is little polio in the world any more. However, an economist would not say that polio is scarce in the economic sense, because people are not trying to obtain more polio than is available. The competition for products and the resources used to make them is the foundation of the study of economics. In economics, we study how people make choices, using limited resources to satisfy their unlimited wants.

### The Economizing Problem

Scarcity of products results from the scarcity of resources used to make them. Land, labor, capital, and entrepreneurship—the factors of production—are all used to produce economic products. The competition for those resources forces us to make choices about what we will produce, how we will produce it, and who will receive the products. Just as individuals have to make choices, firms must choose what to produce and how to produce it. In the same way, whole societies have to make choices about whether to spend more of the federal budget for military or social welfare programs, or whether to use resources to drill for more oil or to invest in alternative forms of energy.

### Microeconomics and Macroeconomics

Microeconomics is the study of the small picture—the decision making of individuals, households, and firms. Macroeconomics is the study of the big picture—the decision making of consumers as a group, firms nationwide, governments, and banking systems. It is important to keep in mind that macroeconomic changes are the result of the many decisions made by individual consumers and firms.

### Bear in Mind

While the College Board has developed separate AP microeconomics and macroeconomics exams, many concepts are central to both disciplines. The issues of scarcity, the economizing problem, opportunity cost, and production possibilities introduced in Chapter 1 are concepts that will very likely appear on both exams.

## Theories, Principles, and Models

Economists use the scientific method to understand economic performance by observing, creating and testing hypotheses, and developing theories. These theories become models that explain and predict the behaviors of people, firms, and governments in our society. While people can make choices contrary to what we might expect, we can recognize generalized patterns of behavior with these principles or laws. During analysis, economists rely on *ceteris paribus*, an assumption that nothing in the world changes during the analysis except the variable(s) being measured. In that way, we can better determine the cause-and-effect relationships between variables. Of course, in the real world there is no way to hold everything else equal, but that assumption is essential for helping to sort out the many variables that can affect economic decision making.

## Opportunity Cost

Because we cannot have everything we want, we are forced to make choices which involve opportunity costs—the cost of giving up the next best opportunity when we make a decision. When you buy a hamburger, what is your next best alternative? A fish sandwich? When you go to class, what is your next best alternative? Working? Every decision involves an opportunity cost, because there is always some other alternative that might have been chosen. Some important things to note about opportunity cost:

- The opportunity cost is the other choice, not the price or the resource used to obtain it. If you spend \$20 to buy a DVD rather than a T-shirt, your opportunity cost is the T-shirt. It isn't the \$20, because you were going to spend that money either way. Your opportunity cost is your next best alternative *use* of that money.
- Opportunity cost is only the *next* best choice, not every available alternative. When you buy the DVD, your opportunity cost isn't the T-shirt and gas for your car and a pizza. It was only the next best choice. Think about the term “opportunity cost.” What was the opportunity you gave up?
- Costs that are incurred regardless of which choice you make are not opportunity costs. If you had to choose between going to a school band concert or a home basketball game, you would use the same amount of gas to drive to school, regardless of your decision. Therefore, even though gas does have a monetary cost, it would not be represented as an opportunity cost in that decision. But if you chose between going to the concert or staying home to watch TV, the cost of gas would be involved in that choice, since staying home incurs no cost of gas.
- Opportunity cost only involves costs, not benefits. Consider the expenses you will incur in college: tuition, fees, books, and room and board. The opportunity cost for your college education may be a house or cars. Your opportunity cost also includes the income you could have earned by working full-time during those college years. Despite the opportunity cost, students go to college because the long-term benefits outweigh the initial costs. But it's important to note that the opportunity cost doesn't include those benefits. Opportunity cost only recognizes what was given up, as a way of studying the problem of scarcity.

### Taking the EEK! Out of Economics

You must be able to recognize that every choice involves another alternative that was given up, even if the choice made the person better off. Keep in mind that you're looking for what was given up in making the decision, and that will help you to identify what is—and what is not—an opportunity cost.

### **Tradeoffs and Budget Constraints**

Because our unlimited desires are greater than our limited resources, we are forced to make choices. We can see those choices in a budget constraint, which illustrates the combination of products we can buy with our limited income. If you have \$120 to buy DVDs (at \$20 each) or books (at \$10 each), you could spend all of your money to buy six DVDs or twelve books. You could also buy a different combination such as three DVDs and six books.

One important concept to understand from this model is that the budget constraint line represents the tradeoffs involved in making choices. For each additional DVD you buy, you must give up buying two books, which represent the opportunity cost of your decision. Conversely, for each book you buy, you incur the opportunity cost of one-half DVD.

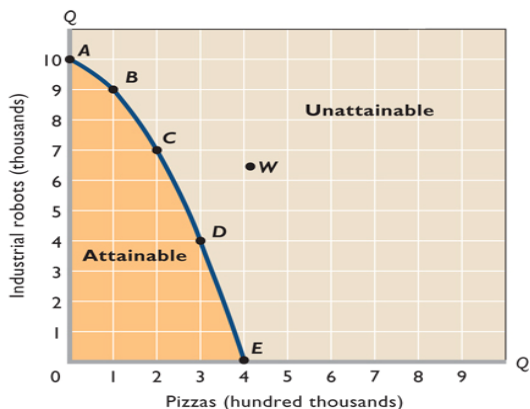
Another key point is that while points on or below the budget constraint are attainable, points outside the budget constraint are not attainable with your income. You could buy one DVD and one book and save the rest of your money, but you wouldn't maximize your satisfaction. However, buying six DVDs and six books simply isn't an option, because you don't have the income to satisfy your wants. While those with higher incomes are able to buy more DVDs and books, they still face a budget constraint; theirs is simply higher. The budget constraint serves as a limit, illustrating the problem of scarcity.

### **Utility**

When people make choices, economists assume that people will act rationally in their self-interest. Clearly, this isn't always the case. Remember the smiley face symbol (☺)? However, most people make decisions that they believe will be in their self-interest, given the information they have. When people make decisions, they try to increase their satisfaction through the utility of a product or an activity. Because people have determined that a car holds more utility than a can of soda, they are willing to incur a much larger opportunity cost to buy a car than to buy a soda.

### **The Production Possibilities Curve**

The production possibilities curve is a graphic model that can help us visualize the tradeoffs of opportunity cost and the limits of production in society. It is similar to the budget constraint facing the individual, but rather than focusing on what an individual can purchase, the production possibilities curve instead focuses on how many products can be produced by a society. This model starts with the assumptions that only two products can be produced in this society, that resources are fully employed, and that resources and technology are fixed for the period of analysis. Of course, in the real world, economies don't look exactly like this. Remember the smiley (☺)? However, the limitations on resources and technology limit our ability to produce all of the products people want in our society.



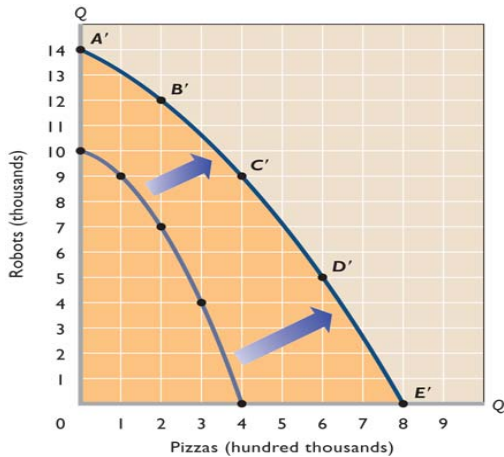
### *The production possibilities curve*

The production possibilities curve shows the maximum combination of goods that can be produced in an economy, given limited resources and technology. Every point on the curve represents full employment of resources. The curve shows the opportunity cost of producing a product. In this example, if we choose to produce ten units of industrial robots, we cannot produce any pizzas. If we then choose to produce our first unit of pizza, we must give up producing one unit of industrial robots. Therefore, our opportunity cost of producing one unit of pizza is one unit of industrial robots. The most important concept the production possibilities curve illustrates is that because of scarce resources, if we produce more of one good, we have to produce less of something else.

### **Bear in Mind**

You must be able to identify opportunity cost in words, numerically, and graphically. Be sure you can read a table that lists combinations of goods that can be produced with available resources. Also be sure you are comfortable interpreting a production possibilities curve with points illustrating those combinations. In either case, to identify the opportunity cost of increasing production of one good, look at how much production of the other good falls.

Points inside the curve are attainable but are not desirable and represent unemployment of resources. In this example, it would be possible to produce three units of robots and two units of pizza, but, because resources are scarce, we want to maximize the use of our resources to make as many products as possible. When we are producing at a point of unemployment, it is possible to increase production of both robots and pizza because we have unused resources available to make both products. Our short-run economic goal is to reach full employment and produce at a point on the production possibilities curve.



### *Economic growth and the production possibilities curve*

Points outside the curve are unattainable right now, due to limits on resources and technology. Over time, though, we can expand our production possibilities by finding new resources, improving the quality of our resources, and developing new technology. Our long-run goal is to find more resources and improve technology so we can actually shift the production possibilities curve outward—a shift that represents economic growth—to allow us to produce both more robots and more pizza.

One more consideration about production possibilities is the tradeoff between consumer goods for current consumption and capital goods produced for firms. When we produce capital goods like factories and manufacturing equipment, firms can use those capital goods to produce even more goods in the future. If we choose instead to use more of our resources to make consumer goods like televisions, cars, and clothing, that means we have fewer resources available to make capital goods, which can lead to lower long-run output because we have reduced our potential production possibilities. So as a society, it is important for us to find a balance between current consumption and future production.

In later chapters, we will look at the ability of countries to reach beyond their production possibilities by engaging in trade with countries with different production possibilities. When nations and firms specialize to produce goods they are most efficient in producing, consumers can obtain even more goods at lower prices. Even with international trade, though, limitations on resources and technology still limit production possibilities.

#### **Bear in Mind**

Previous free-response questions, particularly on the AP macroeconomics exam, have included production possibilities curves illustrating tradeoffs before and after international trade. Other free-response questions have connected increased labor productivity or investments in technology (or lower corporate taxes that would allow firms to invest in technology) to the effect on long-run changes in production possibilities, asking the student to draw a correctly-labeled production possibilities curve to illustrate those changes through shifts in the curve.

#### **Constant Opportunity Costs**

Constant opportunity costs occur when the production of one more unit of a good results in the same loss of production of the other good at every point on the production possibilities curve.

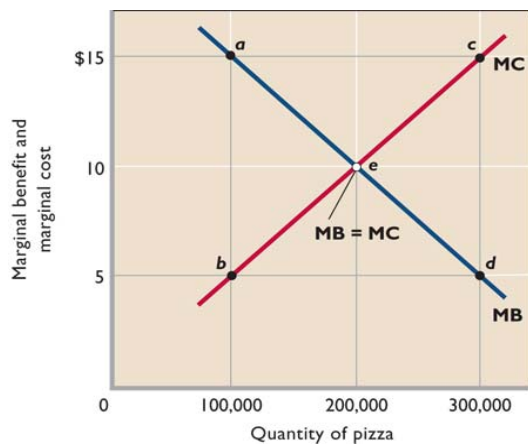
Our first production possibilities curve demonstrated that if we chose to produce our first unit of pizza, the opportunity cost would be one unit of industrial robots. If there were a constant opportunity cost in the relationship between pizzas and robots, every unit of pizza produced would cost one more unit of robots. A constant cost relationship between two products results in a straight-line production possibilities curve.

### The Law of Increasing Opportunity Costs

Many production possibilities curves do not demonstrate a constant cost relationship between products. At point C in our earlier example, when we produced one more unit of pizza, the opportunity cost increased to two units of robots. When we moved to point D, producing one more unit of pizza, the opportunity cost this time was three units of robots. The opportunity cost increased, since we gave up more and more robots to produce each additional unit of pizza. As a result, the production possibilities curve actually bows out.

The Law of Increasing Opportunity Costs explains that as production of one good increases, the opportunity cost increases. The problem is that resources are not perfectly adaptable in producing different products. Some workers are better at building robots, while other workers are better at making pizzas. When we decide to produce the first units of pizza, we could use the workers who are not very good at building robots; therefore, we wouldn't give up many robots in order to make those pizzas. But as we make more and more pizzas, we begin drawing better and better robot-makers into the pizza-making industry, so our opportunity cost increases, and we give up ever-increasing amounts of robots in order to make each additional unit of pizza. So how many pizzas and robots should our society make? We need to take a look at marginal analysis for that answer.

### Marginal Analysis



**Optimal output:  $MB = MC$**

An important economic concept is marginal decision making. When we make decisions, we generally make them at the margin, considering “one more.” Should I buy one more car? Should I study for one more hour? When we make rational decisions, we consider the marginal benefit and the marginal cost of that decision. The more of a good you obtain, the less marginal benefit you receive for the next unit. While the first ice cream cone holds a lot of utility, the second one holds somewhat less. By the third or fourth ice cream cone, you may actually be approaching negative utility. So marginal benefit is a downward-sloping curve. At the same time, the

marginal cost of producing each additional product rises, resulting in an upward-sloping marginal cost curve.

As long as the marginal benefit is greater than the marginal cost, you should undertake an activity and continue until the marginal benefit received from the next unit equals the marginal cost of that unit. That equilibrium point is the optimal output for society. If the marginal benefit from the first unit of pizza is \$15 and the marginal cost is \$5, it should be produced. The marginal benefit of the second pizza equals the marginal cost at \$10. But a third unit of pizza would result in a marginal cost of \$15 and marginal benefit of \$5, making society worse off. In this case, two units of pizza are optimal.

Once you have determined the optimal output of one product, you can find the optimal output of the other product by looking at the production possibilities curve. Two units of pizza are optimal in this society, and producing on the production possibilities curve is optimal. Therefore, we should produce at point C: two units of pizza and seven units of robots.

### **Taking the EEK! Out of Economics**

If you only have a production possibilities curve or table and no information that allows you to make a marginal analysis, you don't have enough information to determine which point on the production possibilities curve is optimal. While we do not want to produce at any point below the curve (indicating unemployment) and cannot produce anywhere outside the curve (due to limited resources and technology), any point on the curve represents full employment of resources and is equally acceptable.

### **Multiple-Choice Questions**

1. Economics is best defined as the study of
  - (A) why people buy products.
  - (B) supply and demand.
  - (C) how people satisfy unlimited wants with scarce resources.
  - (D) who receives the goods produced in an economy.
  - (E) how firms maximize profits.
2. Each of the following is a factor of production EXCEPT
  - (A) land/natural resources.
  - (B) capital.
  - (C) labor.
  - (D) money.
  - (E) entrepreneurial ability.
3. The study of macroeconomics would include
  - (A) a consumer's decision whether to buy a car or a motorcycle.
  - (B) a grocery store's decision to hire another cashier.
  - (C) the federal government's decision to increase military spending.
  - (D) a clothing manufacturer's decision to raise the price of jeans.
  - (E) a woman's decision to open her own business.

4. LaKenya's opportunity cost for attending college includes
- I. other goods that could have been bought with the money spent for tuition.
  - II. clothing LaKenya bought during the four years of college.
  - III. income LaKenya could have earned from work at a full-time job.
- (A) I only
  - (B) II only
  - (C) II and III only
  - (D) I and III only
  - (E) I, II, and III

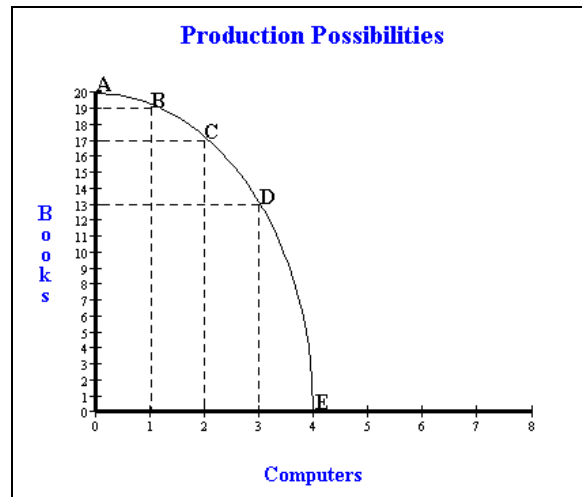
**Use the production possibilities table below to answer questions 5–7.**

	Consumer Goods	Capital Goods
<b>Point A</b>	20	0
<b>Point B</b>	12	1
<b>Point C</b>	6	3
<b>Point D</b>	2	6
<b>Point E</b>	0	10

5. What is the opportunity cost for moving from point C to point D?
- (A) four consumer goods
  - (B) two consumer goods
  - (C) six capital goods
  - (D) three capital goods
  - (E) eight economic products
6. If society chooses to produce at Point D rather than Point B, what will be the long-run effect for this society?
- (A) Fewer consumer goods will be produced in the future.
  - (B) It will be possible to produce both more consumer and capital goods in the future.
  - (C) Fewer capital goods will be produced in the future.
  - (D) The production of both consumer and capital goods will be lower in the future.
  - (E) The production of consumer goods will increase in the future, but the production of capital goods must fall.
7. Why does the opportunity cost increase as production of capital goods increases?
- (A) Capital goods are more expensive to produce than consumer goods.
  - (B) Resources are not perfectly adaptable between producing the two goods.
  - (C) The lower supply of consumer goods causes their price to increase.
  - (D) Capital goods are more useful to society than consumer goods.
  - (E) Buyers are willing to pay more for consumer goods than for capital goods.



**Use the production possibilities graph below to answer questions 8–10.**



8. If society is currently producing at Point C, what is the opportunity cost of increasing production of computers to Point D?
  - (A) four books
  - (B) seventeen books
  - (C) thirteen books
  - (D) three computers
  - (E) one computer
  
9. What would a decision to produce eight books and one computer represent?
  - (A) an unattainable point
  - (B) full employment
  - (C) efficient use of resources
  - (D) economic growth
  - (E) unemployment
  
10. Society's ability to produce more books and computers is limited by
  - (A) consumer demand for the products.
  - (B) workers' willingness to accept low wages.
  - (C) the wide variety of other products firms could choose to produce.
  - (D) available resources and technology.
  - (E) government quotas and production requirements.

**Free-Response Question**

Assume the nation of Camandland only produces two products: corn and soybeans.

- (a) Draw a correctly-labeled production possibilities curve to illustrate the relationship between these products.
- (b) If all resources are fully employed and society decides to produce more corn,
  - (i) explain what will happen to the production of soybeans.
  - (ii) explain why the effect on soybean production occurs.
- (c) Now assume a breakthrough occurs in farming technology. Illustrate the change on your production possibilities curve.

### Multiple-Choice Explanations

1. (C) While the other four answers are specific areas within the study of economics, the primary focus of economics is the issue of scarcity.
2. (D) Money is not a resource used to create products. While money can be used to buy factors of production (such as a piece of equipment), the money itself is not a factor of production.
3. (C) Macroeconomics is the study of the big picture of the entire national international economy; microeconomics is the study of the small picture of decision making by individuals or specific firms.
4. (D) Clothing is not part of the opportunity cost, because clothing would have been purchased whether LaKenya went to college or not.
5. (A) In moving from Point C to Point D, production of consumer goods falls from six products to two. Those four products given up are the opportunity cost.
6. (B) The current production of capital goods enables firms to expand so they can produce even more goods for consumers and other firms in the future.
7. (B) Because resources aren't perfectly adaptable, when we make more of one product, we have to give up ever-increasing amounts of the other.
8. (A) To increase production by one computer, production of books drops from seventeen to thirteen, showing four books were given up to produce the computer.
9. (E) Unemployment is represented by any point inside the production possibilities curve. It is possible to produce that output, but resources are not being used in a way to maximize possible output.
10. (D) The production possibilities curve assumes resources and technology are fixed in the short run.

### Free-Response Explanation

**4 points** (1 + 2 + 1)

- (a) 1 point:
  - 1 point is earned for a correctly labeled production possibilities curve.
- (b) 2 points:
  - 1 point is earned for correctly stating that the production of soybeans will fall.
  - 1 point is earned for correctly stating that resources and technology limit production; producing more corn requires a lower production of soybeans.
- (c) 1 point:
  - 1 point is earned for correctly illustrating an outward shift of the production possibilities curve.