

Scarcity, Opportunity Cost and Production Possibilities Curves

Introduction and Description

This lesson deals with *opportunity cost*, one of the most important concepts in economics. Start with a lecture on scarcity and *production possibilities curves*. Then reinforce the lecture by using Activity 2, which develops the central economic problem of scarcity.

Opportunity costs include not only out-of-pocket expenses (*explicit costs*) but also the value of resources that could be used elsewhere (*implicit costs*). Understanding explicit and implicit costs will be essential as the students analyze product markets. Explicit and implicit costs are the focus of Activity 3.

In all societies, people must organize to deal with the basic problems raised by scarcity and opportunity cost. A society must decide which goods and services to produce, how to produce them and how to distribute them. Societies use three systems — tradition, command or market — to solve the basic problems. This is the focus of Activity 4. It is easier to analyze campus parking than a complex economic system.

Finally, the United States has a mixed market system. The circular flow diagram (Activity 5) describes in a nontechnical way the major flows of goods, services, resources and money in a market economy.

Objectives

1. Define *scarcity*, *opportunity cost* and *trade-offs*.
2. Identify the conditions that give rise to the economic problem of scarcity.
3. Identify the opportunity costs of various courses of action involving a hypothetical problem.
4. Construct production possibilities curves from sets of hypothetical data.
5. Apply the concept of opportunity cost to a production possibilities curve.
6. Analyze the significance of different locations on, above and below a production possibilities curve.
7. Identify the three questions every economic system must answer.
8. Analyze the advantages and disadvantages of each of the three economic systems (market, command and tradition).
9. Describe and analyze the different economic goals of different economies.
10. Determine the mix of tradition, command and market in different economies.
11. Analyze a market economy using the circular flow of income.

Time Required

Four class periods or 180 minutes

Materials

1. Activities 2, 3, 4 and 5
2. Visuals 1.2 and 1.3

Procedure

1. Give a lecture on scarcity.
 - (A) Wants are unlimited.
 - (B) Resources are limited and fall into four categories: land, labor, capital and entrepreneurship.
 - (C) There is a need to make decisions. The cost of choosing one good is giving up another. This is called opportunity cost.
2. Use Visual 1.2 of a production possibilities curve (PPC) and make points such as these:
 - (A) What trade-offs are involved?
 - (B) Why is the PPC concave, or bowed out, from the origin?
 - (C) What does a point inside the PPC illustrate?

- (D) What is an historical example of a point inside the PPC? *The Great Depression of the 1930s*
- (E) What is the significance of a point outside the PPC? *It is a point that cannot be achieved with current resources and technology.*
- (F) Under what conditions can a point outside the PPC be reached? *With more resources and improved technology*
3. Have the students complete Activity 2 as homework.
 4. Go over Activity 2. When discussing the answers, consider these points:
 - (A) The law of increasing opportunity cost is hard for students to grasp. If opportunity cost is constant or increasing for one of the goods, it is constant or increasing respectively for both goods.
 - (B) The free-good case is an exercise in graphic interpretation, which can be used to emphasize that there are very few free goods in the world. A free good has zero opportunity cost.
 5. Discuss with the students the difference between explicit costs and implicit costs. Give some examples of each.
 6. Have the students complete Activity 3 and go over the answers.
 7. Give a lecture on scarcity as the fundamental economic problem and explain how a combination of tradition, command and market solutions is used to deal with this problem. Every economic system uses some combination of tradition, command and market to answer the questions of what to produce, how to produce and for whom to produce.
 8. Have the students read Activity 4, “Campus Parking.” This case study helps the students apply tradition, command and market systems to an issue that is concrete to them. Students should answer the questions at the end of the case study.
 9. Discuss the case study. In the discussion, you may want to bring up how parking spaces are distributed at your high school. As in all case studies, encourage the students to differ. Some questions have specific answers, while others have no “right” answer.
 10. Use Visual 1.3 to introduce the circular flow diagram. To make the diagram more concrete, trace a single product through the circular flow.
 11. Reinforce the circular flow diagram by having the students complete Activity 5.
 12. Go over the answers to Activity 5.

Scarcity, Opportunity Cost and Production Possibilities Curves

Scarcity necessitates choice. Consuming or producing more of one thing means consuming or producing less of something else. The opportunity cost of using scarce resources for one thing instead of something else is often represented in graphical form as a *production possibilities curve*.

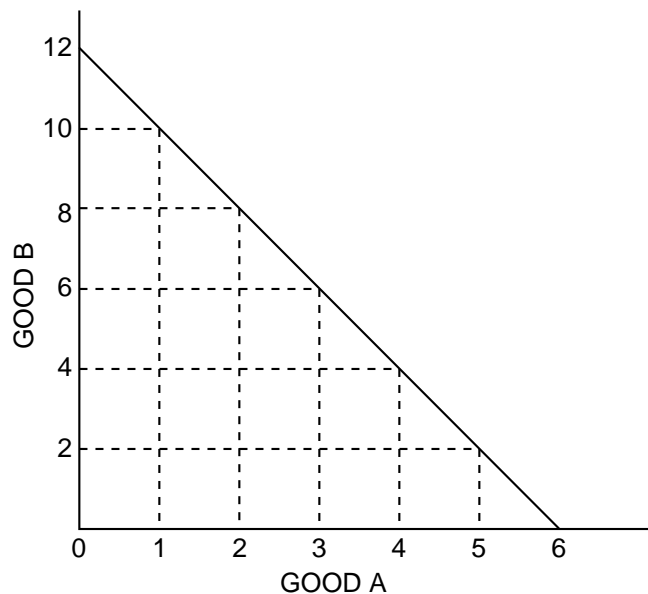
Part A

Use Figures 2.1 and 2.2 to answer these questions. Write the correct answer on the answer blanks, or underline the correct answer in parentheses.



Figure 2.1

Production Possibilities Curve 1

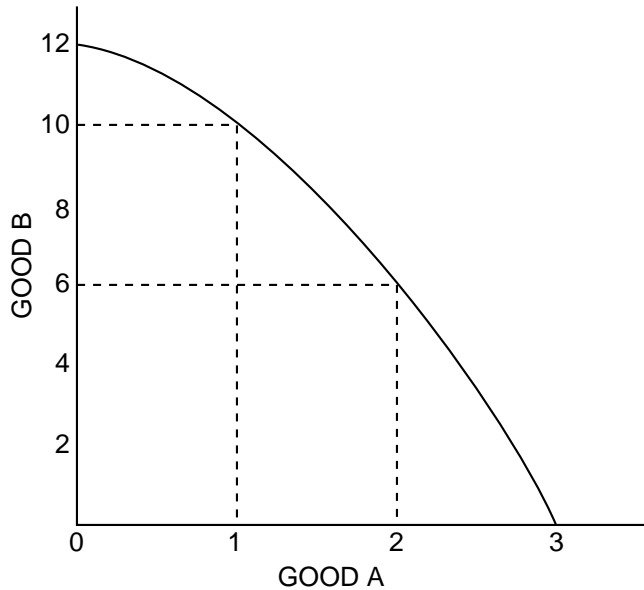


1. If the economy represented by Figure 2.1 is presently producing 12 units of Good B and zero units of Good A:
 - (A) The opportunity cost of increasing production of Good A from zero units to one unit is the loss of two unit(s) of Good B.
 - (B) The opportunity cost of increasing production of Good A from one unit to two units is the loss of two unit(s) of Good B.
 - (C) The opportunity cost of increasing production of Good A from two units to three units is the loss of two unit(s) of Good B.
 - (D) This is an example of (constant / increasing / decreasing / zero) opportunity cost per unit for Good A.



Figure 2.2

Production Possibilities Curve 2

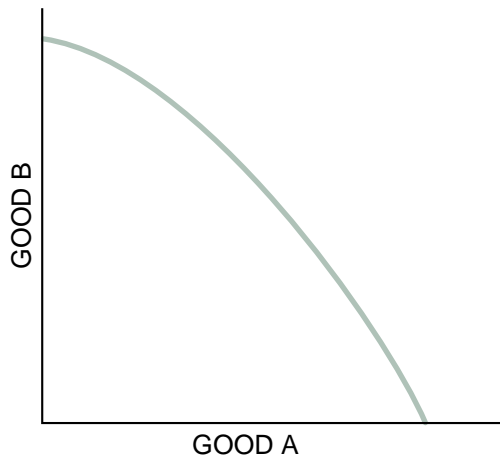


2. If the economy represented in Figure 2.2 is presently producing 12 units of Good B and zero units of Good A:
- (A) The opportunity cost of increasing production of Good A from zero units to one unit is the loss of two unit(s) of Good B.
 - (B) The opportunity cost of increasing production of Good A from one unit to two units is the loss of four unit(s) of Good B.
 - (C) The opportunity cost of increasing production of Good A from two units to three units is the loss of six unit(s) of Good B.
 - (D) This is an example of (constant / *increasing* / decreasing / zero) opportunity cost per unit for Good A.

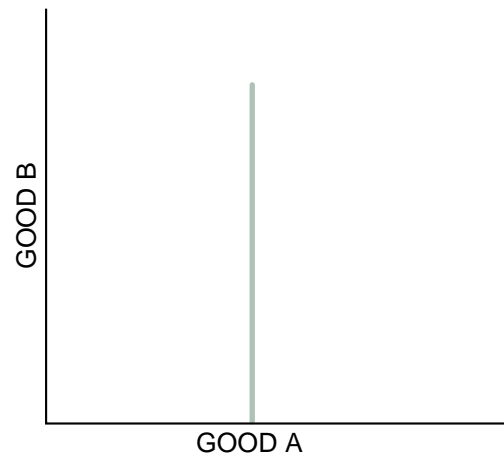
Part B

Use the axes in Figures 2.3, 2.4 and 2.5 to draw the type of curve that illustrates the label above each axis.

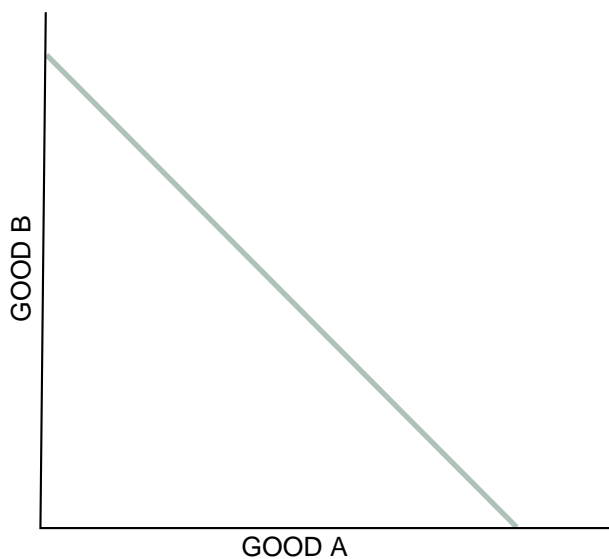
* Figure 2.3
Production Possibilities Curve 3
Increasing opportunity cost per unit of Good B



* Figure 2.4
Production Possibilities Curve 4
Zero opportunity cost per unit of Good B



* Figure 2.5
Production Possibilities Curve 5
Constant opportunity cost per unit of Good B



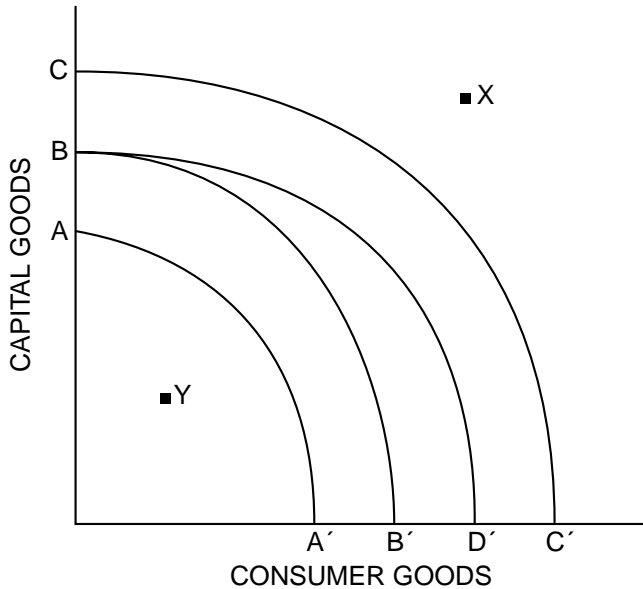
Part C

Use Figure 2.6 to answer the next five questions. Each question starts with Curve BB' as a country's production possibilities curve.



Figure 2.6

Production Possibilities Curve: Capital Goods and Consumer Goods



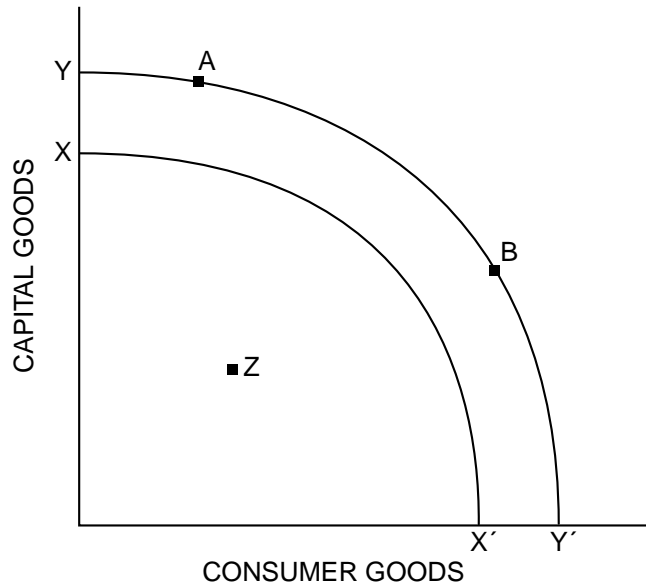
3. Suppose there is a major technological breakthrough in the consumer-goods industry, and the new technology is widely adopted. Which curve in the diagram would represent the new production possibilities curve? (Indicate the curve you choose with two letters.) BD'
4. Suppose a new government comes into power and forbids the use of automated machinery and modern production techniques in all industries. Which curve in the diagram would represent the new production possibilities curve? (Indicate the curve you choose with two letters.) AA'
5. Suppose massive new sources of oil and coal are found within the economy, and there are major technological innovations in both industries. Which curve in the diagram would represent the new production possibilities curve? (Indicate the curve you choose with two letters.) CC'
6. If BB' represents a country's current production possibilities curve, what can you say about a point like X? (Write a brief statement.) *It is impossible for a country by itself to attain with existing resources and technology.*
7. If BB' represents a country's current production possibilities curve, what can you say about a point like Y? (Write a brief statement.) *The economy is not fully using existing resources and technology. An example of Point Y is the Great Depression of the 1930s.*

Part D

Use Figure 2.7 to answer the next three questions.



Figure 2.7

Production Possibilities Curve: Capital Goods and Consumer Goods

8. What change could cause the production possibilities curve to shift from the original curve (XX') to the new curve (YY')? *New resources are discovered. New technologies are developed.*

9. Under what conditions might an economy be operating at Point Z? *Resources are not being fully employed.*

10. Why might a government implement policy to move the economy from Point B to Point A? *The government might want to emphasize the production of capital goods so the economy would grow more in the future. This would shift the PPC outward in the future.*

You Don't Have to Spend a Buck to Have a Cost

1. For each of the following situations, list at least two explicit costs and two implicit costs. Place them in the correct column.

	Explicit	Implicit
(A) You decide to go to college.	<u>Tuition, books, travel</u> _____	<u>Income not earned,</u> <u>less job experience</u>
(B) You take a job after school.	<u>Work clothes, meals,</u> <u>transportation</u>	<u>Less study and social</u> <u>time</u>
(C) You study for and take an AP Economics Examination.	<u>Cost of AP Economics</u> <u>books, cost of AP</u> <u>Economics Exam</u> _____	<u>Money earned from</u> <u>part-time job, less</u> <u>social time, less study</u> <u>time for other courses</u>
(D) A stay-at-home dad returns to work.	<u>Work clothes, taxes,</u> <u>child-care expenses</u>	<u>Less time with family,</u> <u>less time for recreation</u>
(E) Family members work in their parents' restaurant.		
Child's (employee) viewpoint	<u>Taxes, work clothes</u> _____ _____	<u>Lower pay than elsewhere,</u> <u>less time for study,</u> <u>less time for recreation</u>
Parents' (employer) viewpoint	<u>Payroll taxes, wages</u> <u>for child</u> _____	<u>Less flexibility in hiring</u> <u>and firing, more complex</u> <u>relationship with child</u>

2. Pick one of the situations in Question 1, and explain why the decision maker must have decided that the benefits he or she received exceeded, equaled or fell short of the opportunity costs to engage in the activity.

(A) *You decide to go to college: Consider the benefits of a college education to be your expected extra future income, growth in knowledge and social development. A decision to attend college occurs when the expected explicit and implicit costs are less than expected benefits. If income were the only criterion, individuals who drop out of college to become star professional athletes may have concluded that the costs of missing a professional sports career exceeded the anticipated future income from becoming a better educated, but nonstarring, individual in a career outside of sports.*

- (B) *You take a job after school: Working after school may supplement family income, but it normally increases the disposable income of the high school student. More disposable income benefits the income earner. Choice of hours, however, can make the benefits exceed the costs. Total benefits may exceed total costs, even when the cost of an additional hour of work per week exceeds the benefit of the additional hour of work. But the economic way of thinking causes the person to adjust work so the extra benefit from the extra hour just matches the extra cost. If this extra hour of work causes the worker to earn a lower grade in a class, total benefits of work may exceed total costs of work; but the marginal costs of that extra hour of work greatly exceed the marginal benefits of the extra income.*
- (C) *You study for and take an AP Economics Examination: While the benefits of studying for an AP Economics Examination are self-evident, there are costs that most students can list in a minute. AP Economics students may take other AP tests, so the management of study time becomes a crucial factor in mastery of all the tests. Marginal decisions determine time allocation among the subject areas: When an extra hour spent on economics adds more expected score points than an hour spent on chemistry, the student spends the hour studying economics.*
- (D) *A stay-at-home dad returns to work: Stay-at-home parents sacrifice money income. This stay-at-home dad concluded that the benefits of working for a living exceeded the lost benefits of staying at home. Lost benefits could be explicit in the form of lower or no public-assistance payments. Implicit lost benefits involve control over use of time, ability to bond with and teach children, and the ability to have household chores done without paying someone else. Explicit new costs will include payroll taxes, possibly income taxes, commuting costs, child-care expenses and the costs of work clothes.*
- (E) *Family members work in their parents' restaurant: This is the toughest scenario of all. Family decision making frequently follows tradition rather than market criteria. A student may work in a family business that is not the best fit for either the family or the student "just because" other generations worked there. At the other extreme, knowing the business and feeling a sense of ownership in it may bring out the finest service possible from a young worker. Either scenario carries costs and benefits. A student's voluntary work for a family business may generate few perceived benefits. The student works to earn family approval, and this approval is worth more than the perceived costs. Adult members of the family business may want their high school children to sharpen their work ethic. The business may absolutely need the family members to assist as part of family tradition or because a family member has higher productivity than a stranger. Some family restaurants hold secret recipes that are not entrusted to anyone beyond the family. Both parties — the employee and employer — must conclude that the benefits of working exceed the costs, or family labor services will not be purchased.*

Campus Parking Activity

1. What central problem does Stanford face in parking spaces? *Because the supply of parking spaces is limited, the scarce good must be allocated among people who want parking spaces.*

2. What are the three ways societies deal with scarcity? *Tradition, command and the market*

3. Categorize the five methods Stanford could use to allocate parking spaces. Which use tradition? Command? The market?

Leave things as they have been: tradition

First-come, first-served: tradition and command

Markets and a price system: the market

Democracy: a political solution, which is command

Random choice: command with some market because of reselling

4. For each proposed method, explain what behaviors are encouraged or discouraged by different groups.

Leave things as they have been: Faculty are rewarded; student parking is discouraged.

First-come, first-served: People with low opportunity costs for time are rewarded; those who have high opportunity costs for time and many productive activities are penalized. For example, a professor might spend time for research on hunting for a parking space.

Markets and a price system: People with higher incomes and more important time alternatives are rewarded; those with low opportunity costs for time or with lower incomes are penalized.

Democracy: People with political clout are rewarded.

Random choice: People with luck, regardless of cost, are rewarded; the unlucky are penalized.

5. If the goal is equity, which system would you adopt and why? *It is impossible to say because equality or fairness depends on each individual's perspective. Many students will choose first-come, first-served or random choice because everyone has an "equal chance." This could lead to a discussion about what is fair.*

6. If the goal is efficiency, which system would you adopt and why? *The market system leads to the greatest efficiency because every choice has an opportunity cost. There is an incentive to make choices that minimize opportunity cost. Each person makes choices based on his or her costs and benefits.*

7. Which system of allocating parking spaces do you recommend? Why? *Answers will vary. However, students should use equity or efficiency as the basis for their answers.*

Circular Flow Activity

1. Give three examples of resource owners. *Answers will vary because resource owners are anyone who has land, labor, capital or entrepreneurship to sell in the factor market.*
2. Define a business firm. *A business firm buys resources and, in turn, sells goods and services to resource owners.*
3. What is the product market? *A market where finished goods and services are bought and sold*
4. Give three examples of transactions you made this week in the product market. *Answers will vary. Any purchase of a good or service will do.*
5. What is a factor market? *A market where the factors of production (land, labor, capital, entrepreneurship) are bought and sold*
6. Give an example of a transaction you or your family made this month in a factor market. *It probably would be wages for labor, although many other transactions are possible.*
7. How are businesses connected to factor and product markets? *They buy in the factor markets and sell in the product markets.*
8. What determines the prices of land, labor, capital and entrepreneurship in a factor market? *Supply and demand*
9. Where do resource owners get the money to buy goods and services in the product market? *From selling their resources in the factor markets*
10. Where do business firms get the money to pay resource owners for their land, labor, capital and entrepreneurship in factor markets? *From selling the goods and services they produce with the factors of production*
11. Why is it important to know that a market economy is characterized by interdependence? *Interdependence is important because people specialize and trade their production in markets for other products they need. The circular flow of income shows the interdependence of the economy.*