

## Scarcity, Opportunity Cost, Production Possibilities and Comparative Advantage

### Introduction and Description

This lesson uses the concept of opportunity cost to develop a production possibilities curve. The production possibilities curve represents the choices that society faces. Opportunity cost is a fundamental concept in economics and includes not only out-of-pocket costs but also the cost to society of not using the resources to produce an alternative product or service. Alternative forms of the production possibilities curves illustrate different trade-offs. Activity 1 reinforces the concept of opportunity cost and investigates the alternative shapes of the production possibilities curve.

We use production possibilities curves to illustrate the economic situation that nations face and the advantages that exist if people or nations specialize in the production of specific goods and services and then trade for the goods and services they want. The concept of comparative advantage underlies trade and exchange within an economy and between different economies. Activity 2 provides practice at determining absolute and comparative advantage.

### Objectives

1. Define *scarcity* and *opportunity cost*.
2. Apply scarcity and opportunity cost to a number of everyday situations.
3. Construct production possibilities curves using hypothetical data.
4. Apply the concept of opportunity cost to a production possibilities curve.
5. Analyze the different locations of points on, outside and inside a production possibilities curve.
6. Demonstrate and explain different shaped production possibilities curves.
7. Define *absolute advantage* and *comparative advantage*.
8. Determine comparative advantage when given data.
9. Explain how both parties gain from specialization and exchange.

### Time Required

Two class periods or 90 minutes

### Materials

1. Activities 1 and 2
2. Visuals 1.1, 1.2, 1.3 and 1.4

### Procedure

1. Give a lecture on *scarcity* and *opportunity cost*.
  - (A) People have unlimited wants.
  - (B) Resources to fulfill these wants are limited. Resources are land, labor, capital and entrepreneurship.
  - (C) Here are some examples of scarcity you might want to use:
    - (i) A teenager wants to go to a soccer game on Saturday night but also wants to catch up on late school assignments. The teenager encounters the scarcity of time.
    - (ii) A family wants to take a vacation to Mexico and build an addition on the house. They experience scarcity because family income will not permit both to occur.
2. Individuals and society must choose between the competing wants. They must make decisions. *Opportunity cost* emphasizes that people are making *choices*. People choose to do one activity and the cost is giving up another activity.
3. Use Visual 1.1 of a production possibilities curve (PPC) and emphasize the following points.
  - (A) The PPC is drawn assuming that

- (i) all resources (land, labor, capital, entrepreneurship) are fully employed.
- (ii) the technology is constant.
- (B) The shape of the PPC (bowed out or concave to the origin) determines the trade-off in the production of the two commodities. Note that the trade-off is not constant but increasing as we move along the curve.
- (C) What other shapes could the PPC take, and what do the shapes imply about the trade-off? ***The PPC can be either a straight line, representing constant opportunity costs, or convex to the origin, representing decreasing costs. Visual 1.2 provides alternative shapes.***
- (D) If the factors of production were not fully utilized, where on the graph would an economy be? ***The economy would be interior to the PPC, that is, between the origin and the PPC.***
4. Have the students complete Activity 1 as homework.
5. When reviewing Activity 1, emphasize these points:
- (A) If the cost of obtaining one more unit of a good is increasing as you move down the PPC, then the cost of obtaining more of the other good must also be increasing as you move up the curve.
- (B) The assumptions that determine the location of the PPC curve
- (C) What determines if an economy is on the PPC curve, inside (in the region between the curve and the origin) or outside (beyond) the curve
6. Begin with a discussion of trade. Ask the students what life would be like if they could consume only the goods produced by the state they live in. How would production in the state change if each state had to be self-sufficient? Emphasize the point that it is individuals, not nations or states, that trade.
7. Use Visual 1.3 to distinguish between *absolute advantage* and *comparative advantage*. Discuss the examples on Visual 1.3.
- (A) What if an economics professor can do word processing faster than any secretary the professor could hire? The professor has an absolute advantage in teaching economics and in word processing. Should she do her own typing? ***No. The opportunity cost of the professor's time spent as a secretary is very high, perhaps \$75 an hour. She should hire a secretary to do the typing because a secretary's wage is significantly less than \$75 an hour.***
- (B) The auto-mechanic and doctor situation is the same as the professor/secretary situation.
8. Use Visual 1.4 to illustrate absolute and comparative advantage using outputs. Calculate the opportunity cost of corn and of sunscreen for the students. This will help the students do Activity 2. Demonstrate that comparative advantage is based on the lower opportunity cost. Mexico has the absolute advantage and comparative advantage in the production of corn. Neither has an absolute advantage in the production of sunscreen. France has a comparative advantage in producing sunscreen.
9. Have the students complete Activity 2 for homework.
10. Review the answers to Activity 2.

## Scarcity, Opportunity Cost and Production Possibilities Curves

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

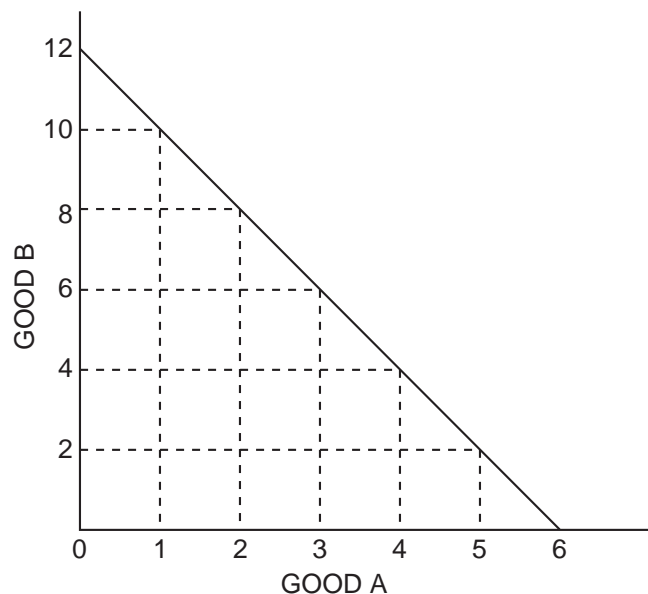
### Part A

Use Figures 1.1 and 1.2 to answer Questions 1 and 2. Fill in the answer blanks, or underline the correct answer in parentheses.



Figure 1.1

### Production Possibilities Curve 1

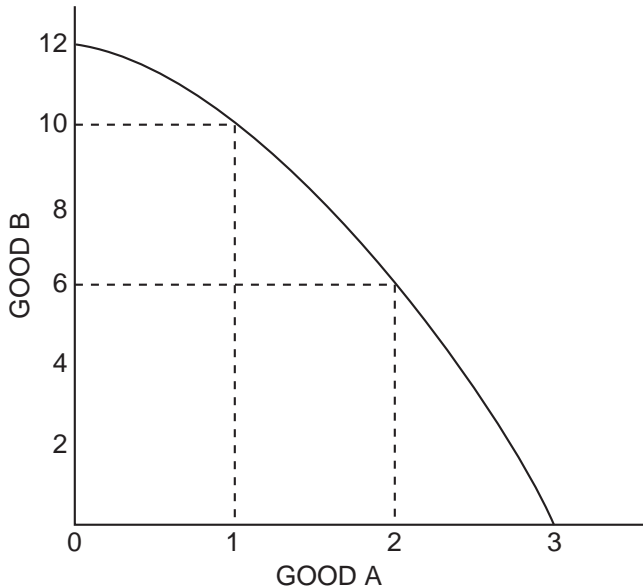


1. If the economy represented by Figure 1.1 is presently producing 12 units of Good B and zero units of Good A:
  - (A) The opportunity cost of increasing production of Good A from zero units to one unit is the loss of two unit(s) of Good B.
  - (B) The opportunity cost of increasing production of Good 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 1.2

## Production Possibilities Curve 2



2. If the economy represented in Figure 1.2 is presently producing 12 units of Good B and zero units of Good 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.
  - 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.
  - 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.
  - This is an example of (constant / increasing / decreasing / zero) opportunity cost per unit for Good A.

**Part B**

Use the axes in Figures 1.3 and 1.4 to draw the type of curve that illustrates the label above each axis.



Figure 1.3

**Production Possibilities Curve 3**

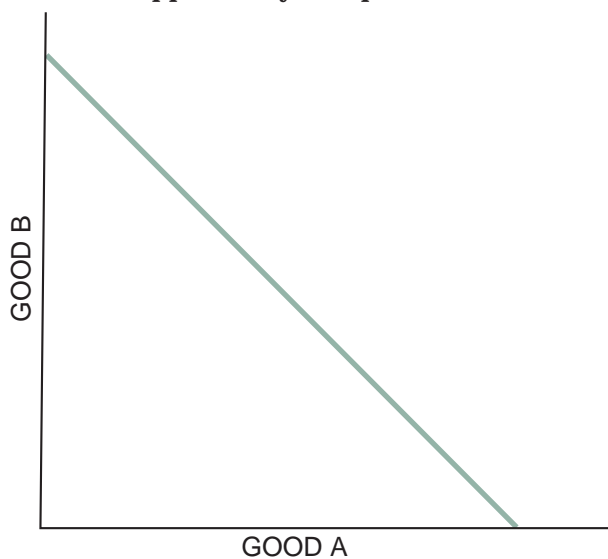
Increasing opportunity cost per unit of Good B



Figure 1.4

**Production Possibilities Curve 4**

Constant opportunity cost per unit of Good B



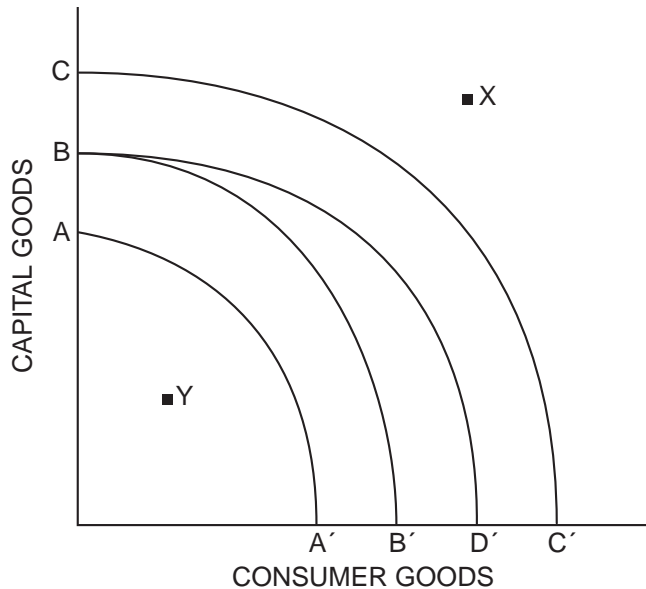
**Part C**

Use Figure 1.5 to answer the next five questions. Each question starts with Curve BB' as a country's production possibilities curve.



Figure 1.5

**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 imposes a significant tax on 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.*

## Opportunity Cost and Comparative Advantage

### Part B: Questions

1. What is the difference between comparative advantage and absolute advantage? *Absolute advantage states that a particular individual or country can produce more of a specific commodity than another individual or country using the same amount of resources. Comparative advantage states that a particular country or individual can produce a specific commodity at a lower opportunity cost (in terms of forgone production in an alternative commodity) than another country or individual.*
2. You're given the following information about a newlywed couple and the time it takes each of them to do two different chores: vacuuming a room or washing a load of dishes.

	Mike	Debbie
Vacuum a room	60 minutes	45 minutes
Wash a load of dishes	30 minutes	45 minutes

- (A) What is Mike's opportunity cost of vacuuming in terms of washing dishes?  
*Washing two loads of dishes*
- (B) What is Mike's opportunity cost of washing dishes in terms of vacuuming?  
*Vacuuming  $1/2$  of a room*
- (C) What is Debbie's opportunity cost of vacuuming in terms of washing dishes?  
*Washing one load of dishes*
- (D) What is Debbie's opportunity cost of washing dishes in terms of vacuuming?  
*Vacuuming one room*
- (E) Who has the *absolute* advantage in vacuuming? Debbie
- (F) Who has the *absolute* advantage in washing dishes? Mike
- (G) Who has the *comparative* advantage in vacuuming? Debbie
- (H) Who has the *comparative* advantage in washing dishes? Mike
- (I) Who should do which chore and why? Base your answer only on the information above and on comparative advantage considerations. *Mike should wash dishes and Debbie should vacuum. They will finish their chores sooner by specializing according to their comparative advantage. The person with the lower opportunity cost should perform the chore.*

3. Now, you're given the following information about Andy and Hannah and the time it takes each of them to clean an office and clean a jail cell:

	Andy	Hannah
Cleaning offices	60 minutes	20 minutes
Cleaning jail cells	30 minutes	15 minutes

- (A) What is Andy's opportunity cost of cleaning offices in terms of cleaning jail cells?  
***Cleaning two jail cells***
- (B) What is Hannah's opportunity cost of cleaning offices in terms of cleaning jail cells?  
***Cleaning  $\frac{4}{3}$  of a jail cell***
- (C) What is Andy's opportunity cost of cleaning jail cells in terms of cleaning offices?  
***Cleaning  $\frac{1}{2}$  of an office***
- (D) What is Hannah's opportunity cost of cleaning jail cells in terms of cleaning offices?  
***Cleaning  $\frac{3}{4}$  of an office***
- (E) Who has the *absolute* advantage in cleaning offices?           ***Hannah***
- (F) Who has the *absolute* advantage in cleaning jail cells?           ***Hannah***
- (G) Who has the *comparative* advantage in cleaning offices?           ***Hannah***
- (H) Who has the *comparative* advantage in cleaning jail cells?           ***Andy***
- (I) Who should do which chore and why? Base your answer only on the information above and on comparative advantage considerations. ***Hannah should clean offices and Andy should clean jail cells, and they will finish sooner. The person with the lower opportunity cost should perform the chore.***
4. Consider the following two countries. Assume they produce only these two goods. *Note that productivity is now measured in how many goods can be produced per hour, the opposite of how we measured it in Questions 2 and 3.*

	United States	Japan
Cars	12	10
Computers	4	6

- (A) What is the United States' opportunity cost of making cars?  
***For every car, it must give up  $\frac{1}{3}$  of a computer.***



- (B) What is Japan's opportunity cost of making cars?  
*For every car, it must give up  $\frac{3}{5}$  of a computer.*
- (C) What is the United States' opportunity cost of making computers?  
*For every computer, it must give up three cars.*
- (D) What is Japan's opportunity cost of making computers?  
*For every computer, it must give up  $\frac{5}{3}$  of a car.*
- (E) Which country has the *absolute* advantage in cars? United States
- (F) Which country has the *absolute* advantage in computers? Japan
- (G) Which country has the *comparative* advantage in cars? United States
- (H) Which country has the *comparative* advantage in computers? Japan
- (I) Which country should produce which good and why? Base your answer only on the information above and on comparative advantage considerations. *The United States should produce cars, and Japan should produce computers because cars and computers would then be produced by the lower-cost country. The total output of cars and computers will be higher.*
5. Use the law of comparative advantage to explain why self-sufficiency leads to a lower standard of living. *If people and nations do not trade on the basis of comparative advantage, there will be fewer goods and services for people to enjoy. People will be poorer. Less trade or self-sufficiency means a lower standard of living.*