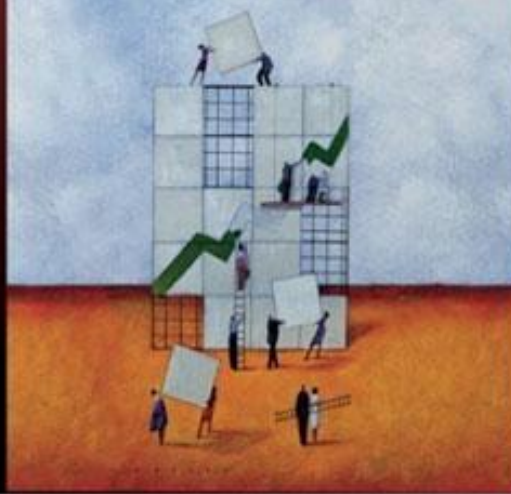


SOLUTIONS MANUAL

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MICROECONOMICS
Principles and Applications

4E



CHAPTER 2

SCARCITY, CHOICE, AND ECONOMIC SYSTEMS

MASTERY GOALS

The objectives of this chapter are to:

1. Explain the concept of opportunity cost, and measure it in terms of explicit costs and implicit costs, emphasizing that the money price we pay for something is not the same as its cost.
2. Construct a production possibilities frontier and use it to explain the concepts of productive inefficiency, recessions, the law of increasing opportunity cost, and economic growth.
3. Explain the sources of the gains from specialization.
4. Define comparative advantage and absolute advantage and explain why specialization according to comparative advantage should be used to maximize production.
5. Describe the three problems that all economies face in allocating scarce resources.
6. Describe the three methods of resource allocation and give examples of how each method is used in the United States.
7. Contrast three different methods of resource ownership and give examples of each.
8. Describe the four basic types of economic systems (systems of resource ownership *and* resource allocation), and explain why this course emphasizes the study of market capitalism.

THE CHAPTER IN A NUTSHELL

Chapter 2 deals with three topics: the concept of opportunity cost, the problem of resource allocation, and the different types of economic systems. All three topics arise from the central theme of scarcity.

Opportunity costs, from an individual's point of view, arise from the scarcity of time or income; from society's perspective, they arise from a scarcity of resources. All economic decisions taken by individuals or society are costly, and the correct way to measure the cost of a choice is its opportunity cost—that which must be foregone to make that choice. The opportunity cost of a choice is the best among the available alternatives to that choice. Opportunity cost has two components: explicit costs (the dollars sacrificed and actually paid out for a choice) and implicit costs (the value of something sacrificed for a choice that involves no actual payment).

Production possibilities frontiers (PPFs) are used to apply the principle of opportunity cost to society's choices and to demonstrate the law of increasing opportunity cost, productive inefficiency, recessions, and economic growth.

Every economic system over the past 10,000 years has been characterized by specialization and exchange. Specialization and exchange enable us to enjoy greater production and higher living standards than would otherwise be possible. The chapter explains why there are gains from specialization, and discusses some of the problems that may arise from specializing.

Resource allocation means deciding how to use our scarce resources; that is, deciding what to produce, how to produce, and for whom to produce. The three methods of resource allocation are tradition, command, and market. While all three methods are used in the United States, the dominant method of resource allocation is the market.

In addition to allocating resources, every society must decide how resources are owned. The three modes of resource ownership are communism, socialism, and capitalism.

The authors categorize four types of economic systems, based on the method of resource allocation and the mode of resource ownership. These four basic types are market capitalism, centrally planned socialism, centrally planned capitalism, and market socialism. The authors also explain why introductory economics courses focus on the case of market capitalism.

One of the key advantages of a market system is that, in most cases, it forces us to face the opportunity cost of our actions. The chapter ends with an example of what happens when we do *not* face the costs of our actions: the possible overuse of some life-saving techniques and underuse of others.

TEACHING TIPS

1. An insightful article that describes the strengths and weaknesses of market capitalism is: Robert J. Samuelson, "Capitalism Under Siege," *Newsweek*, May 6, 1996, p. 51.
2. *PPFs* are concave because the law of increasing opportunity cost holds. To see why, imagine a situation in which the law does not hold. For example, imagine an economy that produces two products: left moccasins and right moccasins.
 - a. What would its *PPF* look like? (A negatively sloped, 45-degree straight line)
 - b. Explain *why* the *PPF* has this shape. (Because the resources used to produce left and right moccasins are perfectly adaptable, so the law of increasing opportunity cost does not hold.)
 - c. What would the *PPF* look like if the economy produced ankle-high moccasins and knee-high moccasins? (The *PPF* would still be a negatively sloped straight line, although, since the knee-high moccasins use more material, it would not be a 45-degree line.)
3. How does an economy's present choices affect its future possibilities? Construct a production possibilities frontier showing capital goods on one axis and consumption goods on the other axis. Use this *PPF* to demonstrate the following:

- a. What will happen to our *PPF* over time if we employ our current resources to produce only consumption goods?
- b. How would our *PPF* change over time if we concentrated, instead, on producing just capital goods? What if we only produced enough capital goods to replace the ones that wear out in the current production period? What if we produced more than enough capital goods to replace the ones that wear out in the current period?

DISCUSSION STARTERS

1. Labor economists use the concept of opportunity cost to explain how small wage differences between men and women can lead to larger wage differences. The ratio of women's to men's median weekly earnings of full-time wage and salary workers in the United States in 2002 was 77.9%, according to Michael Williams, an economist with the Women's Bureau of the U.S. Department of Labor.
 - a. Which spouse, generally, has the higher opportunity cost of staying home to take care of children?
 - b. How might higher market wages for men influence husbands' and wives' decisions to enter the job market?
 - c. How might these decisions to enter the job market influence young men and women's decisions to pursue higher education? Would higher market wages for men influence men and women's choices of fields of study?
 - d. How would these education decisions further effect the ratio of women's to men's earnings?
2. Have students test their understanding of the concept of opportunity cost by completing the following exercise.
 - a. Ask students to estimate the opportunity cost of taking this class. They should include direct expenditures such as tuition, books, and supplies, as well as indirect expenditures such as the value of the time spent in class. Did they forget to include the opportunity cost of time spent preparing for class and studying for exams?
 - b. Ask the students to compare their opportunity cost calculation with those of a classmate. What factors cause the opportunity costs to vary? Possible answers might include different foregone wages, different backgrounds in economics, and differences in expected effort.

ANSWERS, SOLUTIONS, AND EXERCISES

ANSWERS TO ONLINE REVIEW QUESTIONS

1. *False.* Even Warren Buffett doesn't have *unlimited* resources. Very wealthy or high-income individuals have to make decisions about how to spend their funds, just as lower-income consumers do. And everyone, no matter how wealthy, faces a scarcity of time—spending time doing one thing means sacrificing something else.
2. A country might operate inside its *PPF* due to *productive inefficiency* or *recession*. In both circumstances, resources are not being used for maximum production.

Productive inefficiency occurs when resources are “being wasted.” More output could be produced using the same collection of inputs. Moving to the *PPF* often involves simply recombining inputs in better ways.

Recession denotes a slowdown in economic activity in the economy as a whole. Resources, including labor, are left idle. Hence, production falls short of what it could be if resources were utilized at normal rates.
3. The *PPF* is concave because of the *law of increasing opportunity cost*: The more of something we produce, the greater is the opportunity cost of producing still more.
4. Specialization results in higher output due to *improved expertise*, *less downtime when switching between tasks*, and *comparative advantage*. Concentrating on one job or a related set of tasks allows workers to hone their skills and improve their productivity. Likewise, workers needn't turn from one task to another, therefore they lose less time and preserve focus.

Most importantly, however, specialization allows the exploitation of comparative advantage. When a worker, or even an entire economy, can produce something at a lower opportunity cost than another producer, the worker or economy is said to have a comparative advantage in the production of that good. If each good is produced by those producers who have a comparative advantage in that good, more of all goods can be produced, and the overall standard of living in society will improve.
5. One has an absolute advantage in the production of some good when he or she can produce it using fewer resources than someone else, while one has a comparative advantage in the production of some good when he or she can produce it with a smaller opportunity cost than someone else. Comparative advantage is more important from an economic standpoint because total production of every good or service will be greatest when individuals specialize according to their comparative advantage.
6. The three questions of resource allocation are: (1) *Which* goods and services should be produced with society's resources; (2) *How* should those goods and services be produced; and (3) *Who* should receive them.

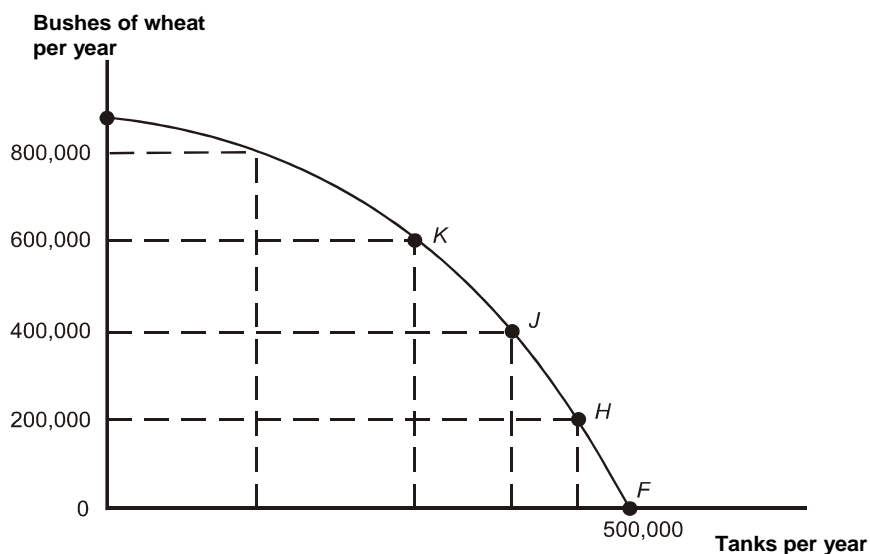
To answer these questions, three distinct allocative systems have evolved. Under a *traditional* system, custom, or the decision of the village elders, determines how resources are allocated. In a *command* system, some central authority decides most or all of the answers to the three questions. Central planning, the dominant mechanism in this system, was typical in countries like the old Soviet Union, and is still used in

mainland China. The *market* system is the third method of resource allocation. Decisions about what, how, and for whom to produce are left largely to individual economic decision makers.

7. The three primary ways in which resources are owned are communal ownership (where resources are owned by everyone), socialism (where resources are owned mostly by the state), and capitalism (where resources are owned privately).
8. Even in the United States, tradition and command are used to allocate resources. Many allocative decisions reside in families, where economic activity resembles more the “traditional village” system than the pure market system. Taxes, environmental, health and safety regulations are all examples of command. Also, there are cases of communal ownership of resources (such as, within the family), and government ownership (national parks, state highways, military bases) in the United States.
9. *False*. As Figure 6 makes clear, ownership and allocation are two different aspects of any economic system. There are several possible combinations of ownership and allocative structures (e.g., market capitalism, market socialism, etc.). Most of the world's economies today, however, now fall into the category of market capitalism.

PROBLEM SET

1. As society moves from point F to point H to point J and so forth, the opportunity cost of 200,000 additional bushels of wheat rises, measured along the horizontal axis as increasingly larger decreases in the number of tanks that could have been produced. Therefore, the law of increasing opportunity cost does apply to the production of wheat.



2. The opportunity cost of playing the computer game all weekend is the sacrifice of the Colorado ski trip, since that is the alternative that is the *next most attractive* to you.
3. A technological innovation in life-saving would rotate the PPF out along the horizontal axis, since the maximum number of lives saved would increase while the maximum quantity of all other goods would not change.

4. A technological innovation in the production of other goods would rotate the PPF out along the vertical axis.
5. (Note: in some versions of the book, the problem refers erroneously to “quarts” of berries, rather than “cups” of berries. It should be “cups.”)

a.

Labor Required for:

	1 Fish	1 Cup of Berries
Maryanne	1 hour	1 hour
Gilligan	¼ hour	½ hour

- b. Maryanne has a comparative advantage in berries, since her opportunity cost for berries (1 fish) is lower than Gilligan’s (2 fish). Gilligan has a comparative advantage in fishing, since his opportunity cost for fish (½ cup berries) is lower than Maryanne’s (1 cup berries). Maryanne should specialize in berries, and Gilligan in fish.
- c. There is more than one way to answer, depending on how the gains are divided between the two goods. First, suppose they want more fish but the same amount of berries. Then each time Gilligan picks 1 fewer cup of berries, he frees up ½ hour which can be used to catch 2 more fish. Each time Maryanne catches 1 fewer fish, she frees up 1 hour which can produce 1 more cup of berries. Each such change would give the following result:

	Change in Fish Production	Change in Berry Production
Maryanne	-1	+1
Gilligan	<u>+2</u>	<u>-1</u>
Total	+1	+0

Second, suppose they want more berries and the same amount of fish. Then Gilligan could produce 1 fewer cup of berries and 2 more fish, as before. But Maryanne would produce 2 fewer fish and 2 more cups of berries, giving us:

	Change in Fish Production	Change in Berry Production
Maryanne	-2	+2
Gilligan	<u>+2</u>	<u>-1</u>
Total	+0	+1

Finally, they could have both more fish *and* more berries. (To see how, have Gilligan produce 3 more fish and 1½ fewer cups of berries, while Maryanne produces 2 fewer fish and 2 more cups of berries.)

6. a.

Labor Requirements for Pineapples and Coconuts

Labor Required for:

	1 Pineapple	1 Coconut
Mr. Howell	1 hour	1 hour
Mrs. Howell	½ hour	2 hours

- b. Mrs. Howell has a comparative advantage in picking pineapples, since her opportunity cost of picking pineapples is lower than Mr. Howell's. Her opportunity cost of picking 1 pineapple is $\frac{1}{4}$ coconut, while his opportunity cost of picking 1 pineapple is 1 coconut. Mr. Howell has a comparative advantage in picking coconuts, since his opportunity picking coconuts is lower than Mrs. Howell's. His opportunity cost of picking 1 coconut is 1 pineapple, while her opportunity cost of picking 1 coconut is 4 pineapples. Mrs. Howell should specialize in picking pineapples, and Mr. Howell should specialize in picking coconuts.
- c. Before finding each other, Mr. and Mrs. Howell's total production would be:

	Pineapples	Coconuts
Mr. Howell	6	6
Mrs. Howell	12	3
Total	18	9

After specializing, their total production would be:

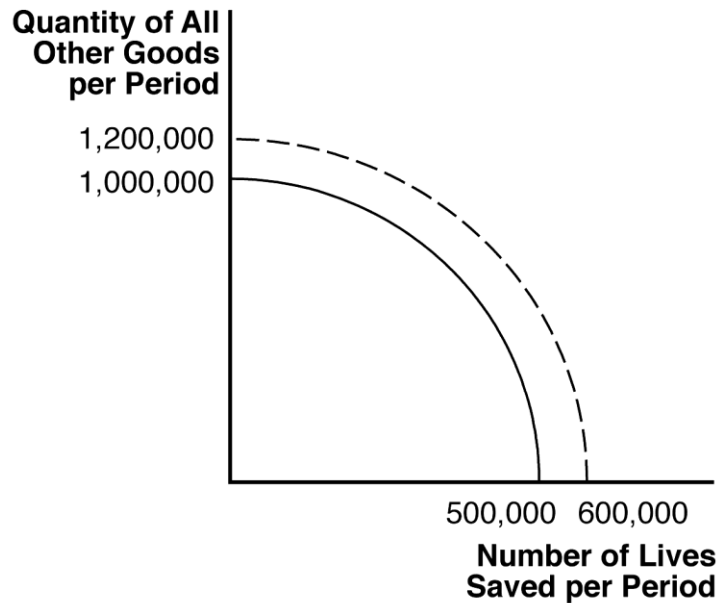
	Pineapples	Coconuts
Mr. Howell	0	12
Mrs. Howell	<u>24</u>	<u>0</u>
Total	24	12

Specifically, there are 6 more pineapples and 3 more coconuts available to be divided between them.

7. a. You have an absolute advantage in outlining since you can produce four more outlines each day than your friend. You also have an absolute advantage in typing since you can type ten more pages per day than your friend.
- b. If you spend a full day doing research, you can produce 6 outlines, but must give up 20 pages of typing; the opportunity cost of each outline is $\frac{20}{6} = 3 \frac{1}{3}$ typed pages. On the other hand, your friend could produce 2 outlines, and would have to give up 10 typed pages; for him, the opportunity cost of each outline is $\frac{10}{2} = 5$ typed pages. Thus, your opportunity cost of research is lower than your friend's—you have the *comparative advantage* in research. (By similarly calculating the opportunity cost in terms of "outlines foregone" of one typed page for both you and your friend, you find that your friend has a comparative advantage in typing.)
- c. According to the principle of comparative advantage, you should specialize in research, leaving all the typing to your friend.
8. Yes. If women are screened every year, instead of every three years, total mammogram costs triple. For the cost per life-year saved to remain constant, the extra screening would have to triple the number of cancerous, life-threatening tumors found.

A 40% increase in the cost per life-year saved indicates that the extra screening leads to the detection of fewer than triple extra cancerous, life-threatening tumors.

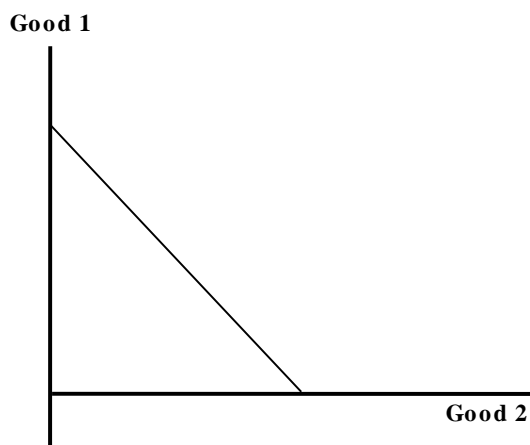
9. a. The average opportunity cost = explicit costs + implicit costs = $(\$21,236 + \$904) + \$16,500 = \$38,640$
 - b. The average opportunity cost = explicit costs + implicit costs = $\$904 + \$16,500 = \$17,404$.
 - c. The average opportunity cost = explicit costs + implicit costs = $(\$21,236 + \$904) + \$11,000 = \$33,140$.
10. New Problem 10 a. The average opportunity cost of attending a year of college at a 2-year public college = $(\$2,191 + \$801) + \$16,500 = \$19,492$.
 - b. In this case, the average opportunity cost of a year of college at a 2-year public institution = $\$801 + \$16,500 = \$17,301$.
 - c. In this case, the average opportunity cost of a year of college at a 2-year public college = $(\$2,191 + \$801) + \$11,000 = \$13,292$.
 11. Kylie's opportunity cost at College #1 = $\$801 + \$16,500 = \$17,301$, at College #2 = $\$894 + \$16,500 = \$17,394$, and at College #3 = $\$904 + \$16,500 = \$17,404$. Based solely on opportunity cost, Kylie will choose College #1 because, even though her scholarship there is smallest, so is her opportunity cost of attending.
 12. a.



- b. The general conclusion that a technological change allows us to choose greater production of all types of goods still holds.

MORE CHALLENGING QUESTION

13. If the PPF is a downward-sloping straight line, then the law of increasing opportunity cost does not hold. Instead, the opportunity cost of producing an additional unit of good 1 or good 2 remains constant as more of either is produced (i.e., there are constant opportunity costs in production).

**EXPERIENTIAL EXERCISES**

The ability to measure the true cost of a choice is a skill that will pay you great dividends. Using a recent issue of the *Wall Street Journal*, try to find an article that discusses a decision some firm has made. Then review this chapter's section on "The Concept of Opportunity Cost." Finally, make a list of the kinds of cost involved in the firm's decision. Identify each item in your list as an explicit cost or an implicit cost.

ThomsonNOW ECONOMIC APPLICATIONS EXERCISES AND ANSWERS (Students will require access to ThomsonNOW to use these exercises.)

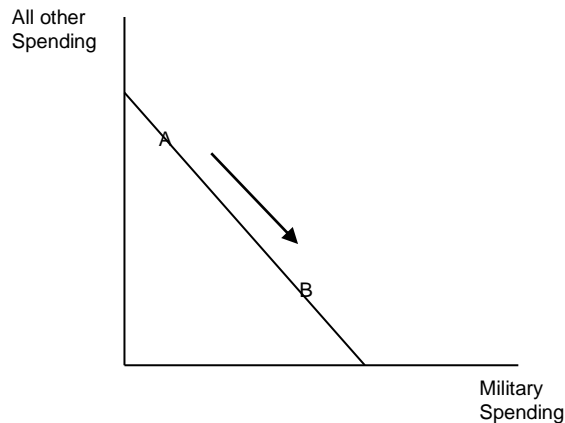
1. At the Hall and Lieberman ThomsonNOW Web site, select Chapter 2, and click on Economic Applications. Scroll down to find the debate, "Should there be a market for human organs?" Read the debate, and answer the following questions.
 - a. How (if at all) would compensation for organ donation offset the opportunity cost of donation?
Answers may vary.
 - b. Next, scroll down to find the article, "What Price for a Life?" Does this form of compensation eliminate the same opportunity cost as organ donation? Why or why not?
Answers may vary.
2. At the Hall and Lieberman ThomsonNOW Web site, select Chapter 2, and click on Economic Applications. At EconNews, find the article, "The Federal Budget: What a

Difference a Day Makes.” Read the summary, and answer the questions below.

- a. Does the article imply that the economy is producing efficiently? Why or why not?

The article implies that the economy is producing efficiently because in order for spending on military and security-related items to increase, spending on social programs must decrease.

- b. Draw a PPF between military spending on the horizontal axis, and all other government spending on the vertical axis. Where on the PPF does this article suggest the economy is moving?



- c. Is it possible for government to simultaneously increase both military spending and domestic spending?

Not if the economy is operating at a point along the PPF, such as with points A and B in the graph above. If the economy were operating inefficiently, say at a point below the PPF, then it would be possible to increase both simultaneously.