CHAPTER 2

SCARCITY, CHOICE, AND ECONOMIC SYSTEMS

MASTERY GOALS

The objectives of this chapter are to:

1. 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.
2. Explain the sources of the gains from specialization.
3. Define comparative advantage and absolute advantage and explain why specialization according to comparative advantage should be used to maximize production.
4. Apply the concept of comparative advantage to countries to explain trade among nations.
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.

THE CHAPTER IN A NUTSHELL

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. This is also applied to countries and trade among nations.

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.

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. *PPF*s 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 2009 was 80.9%, according to the Bureau of Labor Statistics.
   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

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

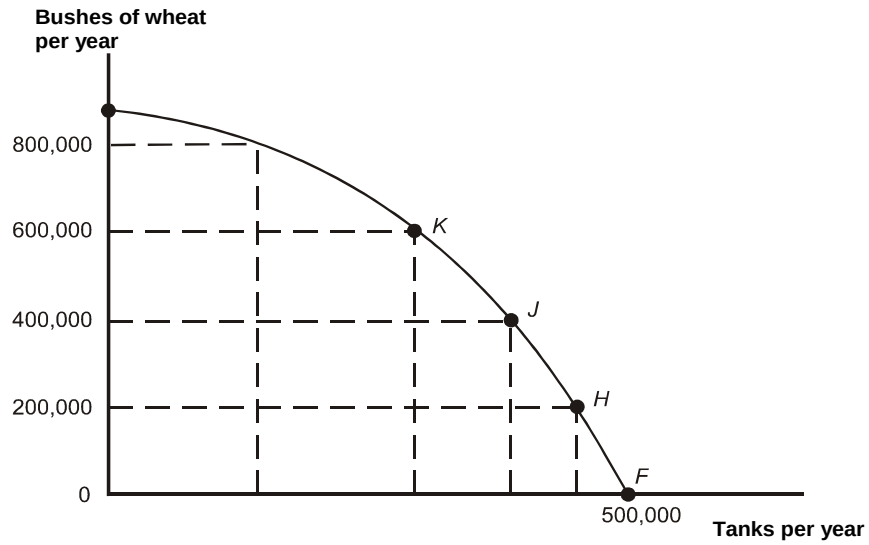
smaller opportunity cost than someone else. Comparative advantage is more important from an economic standpoint because total production of every good or service will be greatest when individuals specialize according to their comparative advantage.

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.

PROBLEM SET

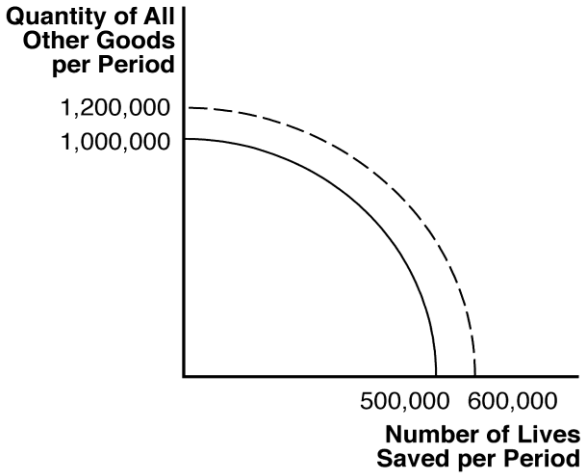
1. As society moves from point F to point H to point J and so forth, the opportunity cost of 200,000 additional bushels of wheat rises. Looking at the horizontal axis we see that as we go from point F to H to J and so forth, producing 200,000 additional bushels of wheat requires us to sacrifice more and more tanks. Therefore, the law of increasing opportunity cost does apply to the production of wheat.



2. 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.

3. A technological innovation in the production of other goods would rotate the PPF out along the vertical axis.

4 .



5. a. Labor Requirements for Berries and Fish

	Labor Required for:	
	1 Cup of Berries	**1 Fish**
Maryanne	1 hour	1 hour
Gilligan	½ hour	¼ hour

b. Maryanne has a competitive advantage in picking berries, since her opportunity cost of picking berries is lower than Gilligan's. Her opportunity cost of picking 1 cup of berries is 1 of a fish, while his opportunity cost of picking 1 cup of berries is 2 fish. Gilligan has a competitive advantage in fishing, since his opportunity cost of fishing is lower than Maryanne's. His opportunity cost of catching 1 fish is ½ cup of berries, while her opportunity cost of catching 1 fish is 1 cup of berries. When the castaways discover each other, Maryanne should specialize in picking berries, and Gilligan should specialize in fishing.

c. Both castaways can benefit from Gilligan's new abilities if they specialize in producing the good in which they have the comparative advantage. If Maryanne catches two less fish, she can use the two hours saved to produce two more cups of berries. Similarly, if Gilligan produces one less cup of berries, he saves half an hour, which he can instead use to catch two more fish. The final outcome on the island is no change in fish production and one more cup of berries caught. Thus, if the castaways begin to specialize and exchange goods, they can both benefit.

	Change in Berry Production	**Change in Fish Production**
Maryanne	+2	-2
Gilligan	-1	+2
Total Island	+1	0

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 competitive 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 ¼ coconut, while his opportunity cost of picking 1 pineapple is 1 coconut. Mr. Howell has a competitive 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	24	0
Total	24	12

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

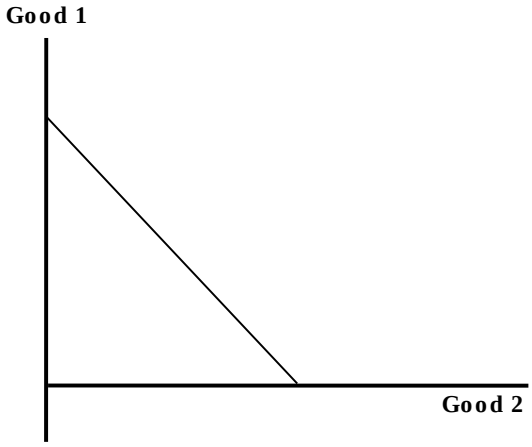
7. a. You have an absolute advantage in outlining since you can produce four more outlines each day than your friend. You also have an absolute advantage in typing since you can type ten more pages per day than your friend.

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 20/6 = 3 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 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. 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).



MORE CHALLENGING

9.

a. Because each bushel of soybean is exchanged for 3 T-shirts, and the U.S. exports 90 bushels of soybean, we know that the U.S. will receive 3*90 = 270 T-shirts.
b. After trade with China, Americans will have 10 more bushels of soybean, and 70 more T-shits to consume.

Changes in the U.S. due to partial specialization and trade with China

	Soybeans (Bushels)	T-Shirts
United States production	+100	-200
From trade with China	- 90	+270
Available in U.S. after trade	**+10**	**+70**

c. After trade with the U.S., the Chinese will have 10 more bushels of soybean, and 130 more T-shits to consume.

Changes in the China due to partial specialization and trade with the U.S.

	Soybeans (Bushels)	T-Shirts
Chinese production	- 80	+400
From trade with U.S.	+ 90	- 270
Available in China after trade	**+10**	**+130**

d. This statement is false. We can see that trade benefits both the U.S. and China as both countries have more of both goods available after trade.

10. Yes. If women are screened every year, instead of every three years, total mammogram costs triple. Cost per life saved would triple if no new cancers were found with more frequent mammograms. Alternatively, 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.

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.