Scarcity and the World of Trade-Offs

Learning Objectives

After you have studied this chapter, you should be able to

1. define production, scarcity, resources, land, labor, human and physical capital, entrepreneurship, goods, services, opportunity costs, production possibilities curve, technology, efficiency, inefficient point, law of increasing additional cost, specialization, absolute advantage, comparative advantage, and division of labor;

2. distinguish between a free good and an economic good;

3. determine the opportunity cost of an activity, when given sufficient information;

4. draw production possibilities curves under varying assumptions, and recognize efficient and inefficient points relating to such curves; and

5. understand the difference between a person’s or nation’s comparative advantage and absolute advantage.

Outline

1. Because individuals or communities do not have the resources to satisfy all their wants, scarcity exists.
   a. If society can get all that it wants of good A when the price of good A is zero, good A is not scarce.
   b. If the price of good B is zero, and society cannot get all that it wants of good B, then B is scarce.
   c. Because resources, or factors of production, are scarce, the outputs they produce are scarce.
      i. Land, the natural resource, includes all the gifts of nature.
      ii. Labor, the human resource, includes all productive contributions made by individuals who work.
iii. Physical capital, the man-made resource, includes the machines, buildings, and tools used to produce other goods and services.

iv. Human capital includes the education and training of workers.

v. Entrepreneurship includes the functions of organizing, managing, assembling, and risk-taking necessary for business ventures.

d. Goods include anything from which people derive satisfaction, or happiness.
   i. Economic goods are scarce.
   ii. Noneconomic goods are not scarce.
   iii. Services are intangible goods.

e. Economists distinguish between wants and needs. The latter are objectively undefinable.

2. Because of scarcity, choice and opportunity costs arise.
   a. Due to scarcity, people trade off options.
   
   b. The production possibilities curve (PPC) is a graph of the trade-offs inherent in a decision.
      i. When the amount of one resource or good that must be given up to produce an additional unit of another resource or good remains constant, the PPC is a straight line.
      ii. When the amount of one resource or good that must be given up to produce an additional unit of another resource or good rises, the PPC is bowed outward.
      iii. A point on a PPC is an efficient point. Points inside a PPC are inefficient. Points outside the PPC are unattainable (impossible), by definition.

3. Economic growth can be depicted through PPCs.
   a. There is a trade-off between present consumption and future consumption.
   
   b. If a nation produces fewer consumer goods and more capital goods now, then it can consume more goods in the future than would otherwise be the case.

4. Specialization occurs because different individuals experience different costs when they engage in the same activities.
   
   a. People have an economic incentive to specialize in producing an item for which they have a comparative advantage, or a lower opportunity cost of producing that item compared to other products.
   
   b. Absolute advantage, or the ability to produce more units of an item using a given amount of inputs, does not explain why people specialize and trade. Only comparative advantage matters.
   
   c. The process of division of labor increases output and permits specialization.
Key Terms

Consumption  Human capital  Production
Division of labor  Inefficient point  Production possibilities curve
Economic goods  Labor  Scarcity
Entrepreneurship  Land  Services
Goods  Physical capital  Specialization

Key Concepts

Absolute advantage  Efficiency  Opportunity cost
Comparative advantage  Law of increasing additional cost  Technology

Completion Questions

Fill in the blank, or circle the correct term.

1. The factors of production include ____________________, ____________________, ____________________, ____________________, and ____________________.

2. People tend to specialize in those activities for which they have (a comparative, an absolute) advantage.

3. When people choose jobs that maximize their income, they are specializing according to their ____________________ advantage.

4. If at a zero price quantity demanded exceeds quantity supplied for a good, that good is a(n) ____________________. If at a zero price quantity supplied exceeds quantity demanded for a good, that good is a(n) _____________________.

5. The ____________________ of good A is the highest-valued alternative that must be sacrificed to attain it.

6. If the opportunity cost of additional units of a good remains constant, the production possibilities curve will be (linear, bowed outward). If the opportunity cost of additional units of a good rises, the production possibilities curve will be (linear, bowed outward).

7. Because specialized resources are more suited to specific tasks, the opportunity cost of producing additional units of a specific good will (rise, fall).

8. If an economy is inefficient, its actual output combination will lie (inside, outside) the production possibilities curve.
True-False Questions

Circle the T if the statement is true, the F if it is false. Explain to yourself why a statement is false.

T  F  1. Most individuals’ needs exceed their wants.
T  F  2. Because resources are scarce, the goods that they produce are also scarce.
T  F  3. For most activities, no opportunity cost exists.
T  F  4. If a production possibilities curve is linear, the opportunity cost of producing additional units of a good rises.
T  F  5. At any given moment in time, it is impossible for an economy to be inside its production possibilities curve.
T  F  6. The opportunity cost to a motorist of the time that she is stuck in traffic is the next-highest value of the equivalent amount of time.
T  F  7. People have little incentive to specialize in jobs for which they have a comparative advantage.
T  F  8. Economic growth shifts the production possibilities curve outward.
T  F  9. If the price to a specific user is zero, the good must be a noneconomic good.
T  F  10. Evidence indicates that developing new technologies, specializing, and engaging in trade helped Homo sapiens win out over Neanderthals.

Multiple Choice Questions

Circle the letter that corresponds to the best answer.

1. Because of scarcity,
   a. people are forced to make choices.
   b. opportunity costs exist.
   c. people face trade-offs.
   d. All of the above.

2. Which one of the following is not considered to be “land?”
   a. bodies of water
   b. fertility of soil
   c. capital
   d. climate
3. Which one of the following words does not belong with the others?
   a. opportunity cost
   b. economic “bad”
   c. scarcity
   d. economic good

4. Which statement concerning a production possibilities curve is not true?
   a. A trade-off exists along such a curve.
   b. It is usually linear.
   c. Points inside it indicate inefficiency.
   d. A point outside it is currently impossible to attain.

5. When the production possibilities curve is bowed outward, it is because
   a. the additional cost of producing a good rises.
   b. of the law of decreasing additional cost.
   c. all resources are equally suited to the production of any good.
   d. All of the above.

6. When nations and individuals specialize,
   a. overall living standards rise.
   b. trade and exchange increase.
   c. people become more vulnerable to changes in tastes and technology.
   d. All of the above.

7. When a nation expands its capital stock, it is usually true that
   a. it must forgo output of some consumer goods in the present.
   b. the human capital stock must decline.
   c. fewer consumer goods will be available in the future.
   d. no opportunity cost exists for doing so.

   a. She has a comparative advantage in both jobs.
   b. She has an absolute advantage in both jobs.
   c. She has a comparative advantage in being a secretary.
   d. All of the above.
9. From 2:00 to 4:00 on a Thursday afternoon, Mr. Stapleton, a fast-food worker who earns the minimum wage, waits while his daughter is examined at a pediatrician’s office. Ms. Rodriguez, a successful marketing consultant who normally charges a fee of $100 per hour and who recently has turned down several potential clients, spends exactly the same amount of time waiting for her own daughter to be examined. The pediatrician charges Mr. Stapleton $100 for the office visit. Ms. Rodriguez also pays the pediatrician $100. We may conclude that during this two-hour period,
   a. both parents incurred identical child-raising costs.
   b. from an economic standpoint, it was irrational for Ms. Rodriguez to wait while the pediatrician examined her child.
   c. Ms. Rodriguez incurred a higher child-raising cost, because she otherwise could have been earning consulting fees during this time.
   d. Mr. Stapleton incurred a higher child-raising cost, because he otherwise could have been looking for a higher-paying job during this time.

### Matching

Choose the item in Column (2) that best matches an item in Column (1).

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) absolute advantage</td>
<td>(i) production possibilities curve</td>
</tr>
<tr>
<td>(b) efficiency</td>
<td>(j) specialization</td>
</tr>
<tr>
<td>(c) trade-offs</td>
<td>(k) capital</td>
</tr>
<tr>
<td>(d) comparative advantage</td>
<td>(l) ability to produce at a lower unit cost</td>
</tr>
<tr>
<td>(e) resource</td>
<td>(m) specializing in one’s comparative advantage</td>
</tr>
<tr>
<td>(f) economic good</td>
<td>(n) society cannot get all it wants at a zero price</td>
</tr>
<tr>
<td>(g) inefficiency</td>
<td>(o) highest-valued forgone alternative</td>
</tr>
<tr>
<td>(h) opportunity cost</td>
<td>(p) inside PPC</td>
</tr>
</tbody>
</table>
Working with Graphs

1. Given the following information, graph the production possibilities curve in the space provided and then use the graph to answer the questions that follow.

<table>
<thead>
<tr>
<th>Combination (points)</th>
<th>Laptop Computers (100,000 per year)</th>
<th>Wheat (100,000 tons per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>D</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>13</td>
</tr>
</tbody>
</table>

a. If the economy is currently operating at Point C, what is the opportunity cost of moving to Point D? To Point B?

b. Suppose that the economy is currently producing 1,200,000 laptop computers and 200,000 tons of wheat per year. Label this point in your graph with the letter G. At Point G the economy would be suffering from what? At Point G we can see that it is possible to produce more wheat without giving up any laptop computer production, or produce more laptop computers without giving up any wheat production, or produce more of both. Label this region in your graph. This region appears to contradict the definition of a production possibilities curve. What is the explanation for this result?

c. Suppose a new fertilizer compound is developed that will allow the economy to produce an additional 150,000 tons of wheat per year if no laptop computers are produced. Sketch in a likely representation of the effect of this discovery, assuming all else remains constant.
d. What sort of impact (overall) will this discovery have on the opportunity cost of more wheat production at an arbitrary point on the new production possibilities curve, as compared to a point representing the same level of output of wheat on the original curve?

2. Consider the graphs below, then answer the questions that follow.

![Graphs](image)

a. Which graph, (a) or (b), shows constant additional costs of producing additional laser printers? Why?
b. Which graph, (a) or (b), shows increasing additional costs of producing additional laser printers? Why?
c. Which graph seems more realistic, (a) or (b)? Why?

3. Graph the probable relationship between
   a. income and the amount spent on housing;
   b. annual rainfall in New York City and the annual value of ice cream sales in New Orleans;
   c. number of vegetarians per 10,000 people and meat sales per 10,000 people.

### Problems

1. If a nation wants to increase its future consumption, it must forgo some present consumption because it must allocate some resources to the production of capital goods. Suppose you want to increase your future consumption. Given a fixed lifetime income, what can you do?

2. Assume that Ms. Ramirez values her time at $250 per hour because she has the opportunity to do consulting and that Joe College values his time at $18 per hour. Assume that it costs $550 to
fly from their hometown to San Francisco and that the flight takes 6 hours. Assume that it costs $200 to take a bus and that the bus trip takes 24 hours.

a. What is the cheaper way to get to San Francisco for Ms. Ramirez? Why?
b. Which transportation is cheaper for Joe College? Why?

3. Suppose you have a friend currently working as a salesperson in a local store that sells digital devices. This friend is thinking about going back to school full-time to finish up work on her computer science degree. She explains to you that she earns $45,000 (after taxes) per year in her current job and that she estimates tuition will cost $4,800 per year. In addition she estimates fees, supplies, books, and miscellaneous expenses associated with attending school will run $2,400 per year. She wants to attend a university that is located directly across the street from the store where she currently works. She claims that she pays $1,050 per month for rent and utilities and that she spends about $600 per month on food, clothing, and related expenses.

Using what you have learned, calculate and explain to your friend the opportunity cost to her of another year back at school.

4. The Banerjee family consists of Mr. Banerjee, Mrs. Banerjee, and their daughter, Pramila. Assume that Mr. Banerjee can earn $60 per hour (after taxes) any time he chooses, Mrs. Banerjee can earn $10 per hour, and the family values homemaker activities at $12 per hour. Initially, Pramila earns no income.

a. Because the family requires income to purchase goods and services, who will be most likely to work in the marketplace?
b. Who will probably do the housework?
c. If the family must pay $6 per hour for lawn care, who will be assigned that work?
d. If Pramila can now earn $8 per hour on a job, who now might care for the lawn?
e. If wage rates in the marketplace for Mrs. Banerjee rise to $14 per hour, what is the family likely to do?
Answers

Completion Questions

1. land; labor; physical capital; human capital; entrepreneurship
2. a comparative
3. comparative
4. economic good; economic “bad”
5. opportunity cost
6. linear; bowed outward
7. rise
8. inside

True-False Questions

1. F Wants vastly exceed needs (which cannot be defined anyway) for everyone.
2. T
3. F An opportunity cost exists for all activities.
4. F A linear PPC implies a constant cost of production.
5. F All an economy need be is inefficient to be inside the PPC.
6. T
7. F People can earn more income in jobs for which they have a comparative advantage.
8. T
9. F An individual user may pay a zero price for a good, but that does not necessarily mean it is a noneconomic good.
10. T

Multiple Choice Questions

1. (d) 6. (d)
2. (c) 7. (a)
3. (b) 8. (b)
4. (b) 9. (c)
5. (a)

Matching

(a) and (l)  (c) and (k)
(b) and (m)  (f) and (n)
(c) and (i)  (g) and (p)
(d) and (j)  (h) and (o)
Working with Graphs

1. See the following graph.

![Graph showing production possibilities curve]

a. The move from Point C to Point D “costs” 300,000 laptop computers—that is, the economy must give up 300,000 laptop computers (1,200,000 – 900,000) to make such a move. The move from Point C to Point B “costs” 300,000 tons of wheat. Notice that in both cases there are gains (Point C to Point D involves 300,000 more tons of wheat, and Point C to Point B means 200,000 more laptop computers are produced), but we measure opportunity costs in terms of movements along a production possibilities curve and what has to be given up to make the choice reflected in the move.

b. See the preceding graph. Remember, the production possibilities curve shows all possible combinations of two goods that an economy can produce by the efficient use of all available resources in a specified period of time. Since Point G is not on the production possibilities curve, the statement contained in this portion of the question does not contradict the definition of the curve. Point G is inside the curve, which implies available resources are not being used efficiently.

c. See the preceding graph.

d. It will lower the opportunity cost of additional wheat production.

2. a. Graph (a) shows constant additional costs because the PPC is linear.

b. Graph (b) shows increasing costs because the PPC is bowed out.

c. Graph (b) is more realistic because it is likely that the production of laser printers and digital cameras requires specialized resources.

3. a. The graph should be upward sloping from left to right.

b. There should be no systematic relationship between these two variables.

c. The graph should be downward sloping from left to right.
Problems

1. If you want to increase your future consumption—for retirement, say—then you will have to save more out of your current income. The principal and interest that accrue will permit you to purchase more goods in the future than you otherwise would have been able to. Note that by doing so you—as an individual—must forgo some present consumption in order to increase your future consumption. In that sense, what is true for the nation is also true for an individual.

2. a. Plane. Flying costs her $550 plus 6 hours times $250 per hour, or $2,050, while taking a bus would cost her $200 plus 24 hours times $250 per hour, or $6,200.
   b. Bus. Taking the bus costs him a total of $632, while his total cost of flying is $658.

3. The opportunity cost of another year back at school for your friend is as follows:
   
<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forgone after-tax salary</td>
<td>$45,000</td>
</tr>
<tr>
<td>Tuition costs</td>
<td>4,800</td>
</tr>
<tr>
<td>Expenses associated with school</td>
<td>2,400</td>
</tr>
<tr>
<td>Total opportunity costs</td>
<td>$52,200</td>
</tr>
</tbody>
</table>

4. a. Mr. Banerjee
   b. Mrs. Banerjee or Pramila
   c. Pramila
   d. The family (or perhaps Pramila) will hire someone to care for the lawn.
   e. Mrs. Banerjee may enter the labor force and the family may hire someone to do housework.
Glossary

Absolute advantage The ability to produce more units of a good or service using a given quantity of labor or resource inputs. Equivalently, the ability to produce the same quantity of a good or service using fewer units of labor or resource inputs.

Comparative advantage The ability to produce a good or service at a lower opportunity cost compared to other producers.

Consumption The use of goods or services for personal satisfaction.

Division of labor The segregation of resources into different specific tasks. For instance, one automobile worker puts on bumpers, another doors, and so on.

Economic goods Goods that are scarce, for which the quantity demanded exceeds the quantity supplied at a zero price.

Efficiency The case in which a given level of inputs is used to produce the maximum output possible. Alternatively, the situation in which a given output is produced at minimum cost.

Entrepreneurship The component of human resources that perform the functions of raising capital, organizing, managing, and assembling other factors of production, making basic business policy decisions, and taking risks.

Goods All things from which individuals derive satisfaction or happiness.

Human capital The accumulated training and education of workers.

Inefficient point Any point below the production possibilities curve, at which the use of resources is not generating the maximum possible output.

Labor Productive contributions of humans who work.

Land The natural resources that are available from nature. Land as a resource includes location, original fertility and mineral deposits, topography, climate, water, and vegetation.

Law of increasing additional cost The observation that the opportunity cost of additional units of a good generally increases as people attempt to produce more of that good. This accounts for the bowed-out shape of the production possibilities curve.

Opportunity cost The highest-valued, next-best alternative that must be sacrificed to attain something or to satisfy a want.

Physical capital All manufactured resources, including buildings, equipment, machines, and improvements to land that are used for production.

Production Any activity that results in the conversion of resources into products that can be used in consumption.

Production possibilities curve (PPC) A curve representing all possible combinations of maximum outputs that could be produced assuming a fixed amount of productive resources of a given quality.

Scarcity A situation in which the ingredients for producing the things that people desire are insufficient to satisfy all wants at a zero price.

Services Mental or physical labor or assistance purchased by consumers. Examples are the assistance of physicians, lawyers, dentists, repair personnel, housecleaners, educators, retailers, and wholesalers; items purchased or used by consumers that do not have physical characteristics.

Specialization The organization of economic activity so that what each person (or region) consumes is not identical to what that person (or region) produces. An individual may specialize, for example, in law or medicine. A nation may specialize in the production of coffee, e-book readers, or digital cameras.

Technology The total pool of applied knowledge concerning how goods and services can be produced.