Essentials of Economics 4th edition Krugman Solutions Manual

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Economic Models: Trade-offs and Trade

CHAPTER 2

1. Two important industries on the island of Bermuda are fishing and tourism. According to data from the Food and Agriculture Organization of the United Nations and the Bermuda Department of Statistics, in 2009 the 306 registered fishermen in Bermuda caught 387 metric tons of marine fish. And the 2,719 people employed by hotels produced 554,400 hotel stays (measured by the number of visitor arrivals). Suppose that this production point is efficient in production. Assume also that the opportunity cost of 1 additional metric ton of fish is 2,000 hotel stays and that this opportunity cost is constant (the opportunity cost does not change).

a. If all 306 registered fishermen were to be employed by hotels (in addition to the 2,719 people already working in hotels), how many hotel stays could Bermuda produce?

b. If all 2,719 hotel employees were to become fishermen (in addition to the 306 fishermen already working in the fishing industry), how many metric tons of fish could Bermuda produce?

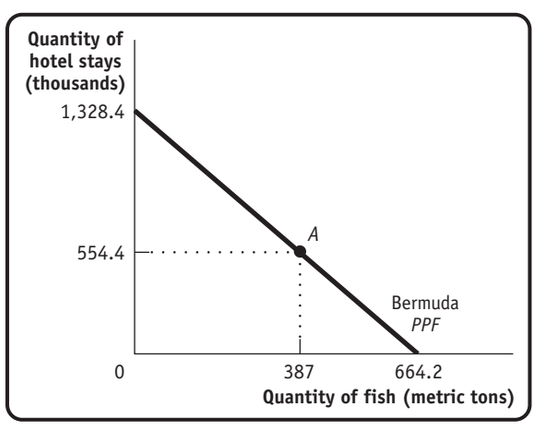
c. Draw a production possibility frontier for Bermuda, with fish on the horizontal axis and hotel stays on the vertical axis, and label Bermuda's actual production point for the year 2009.

Solution

1. a. Forgoing the production of 1 metric ton of fish allows Bermuda to produce 2,000 additional hotel stays. Therefore, forgoing the production of 387 metric tons of fish allows Bermuda to produce $2{,}000 \times 387 = 774{,}000$ additional hotel stays. If all fishermen worked in the hotel industry, Bermuda could produce $554{,}000 + 774{,}000 = 1{,}328{,}400$ hotel stays.

b. Forgoing the production of 2,000 hotel stays allows Bermuda to produce 1 additional metric ton of fish, so giving up 554,400 hotel stays allows Bermuda to produce $554{,}400/2{,}000 = 277.2$ additional metric tons of fish. If all hotel employees worked in the fishing industry, Bermuda could produce $387 + 277.2 = 664.2$ metric tons of fish.

c. The accompanying diagram shows the production possibility frontier for Bermuda. Note that it is a straight line because the opportunity cost is constant. Point *A* is Bermuda's actual production point.



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2. According to data from the U.S. Department of Agriculture's National Agricultural Statistics Service, 124 million acres of land in the United States were used for wheat or corn farming in a recent year. Of those 124 million acres, farmers used 50 million acres to grow 2.158 billion bushels of wheat and 74 million acres to grow 11.807 billion bushels of corn. Suppose that U.S. wheat and corn farming is efficient in production. At that production point, the opportunity cost of producing 1 additional bushel of wheat is 1.7 fewer bushels of corn. However, because farmers have increasing opportunity costs, additional bushels of wheat have an opportunity cost greater than 1.7 bushels of corn. For each of the following production points, decide whether that production point is (i) feasible and efficient in production, (ii) feasible but not efficient in production, (iii) not feasible, or (iv) unclear as to whether or not it is feasible.

a. Farmers use 40 million acres of land to produce 1.8 billion bushels of wheat, and they use 60 million acres of land to produce 9 billion bushels of corn. The remaining 24 million acres are left unused.

b. From their original production point, farmers transfer 40 million acres of land from corn to wheat production. They now produce 3.158 billion bushels of wheat and 10.107 bushels of corn.

c. Farmers reduce their production of wheat to 2 billion bushels and increase their production of corn to 12.044 billion bushels. Along the production possibility frontier, the opportunity cost of going from 11.807 billion bushels of corn to 12.044 billion bushels of corn is 0.666 bushel of wheat per bushel of corn.

Solution

2. **a.** This point is feasible but not efficient in production. Producing 1.8 billion bushels of wheat and 9 billion bushels of corn is less of both wheat and corn than is possible. They could produce more if all the available farmland were cultivated.

b. At this new production point, farmers would now produce 1 billion more bushels of wheat and 1.7 billion fewer bushels of corn than at their original production point. This reflects an opportunity cost of 1.7 bushels of corn per additional bushel of wheat. But, in fact, this new production point is not feasible because we know that opportunity costs are increasing. Starting from the original production point, the opportunity cost of producing 1 more bushel of wheat must be higher than 1.7 bushels of corn.

c. This new production point is feasible and efficient in production. Along the production possibility frontier, the economy must forgo 0.666 bushel of wheat per additional bushel of corn. So the increase in corn production from 11.807 billion bushels to 12.044 billion bushels costs the economy (12.044 – 11.807) billion bushels of corn × 0.666 bushel of wheat per bushel of corn = 0.158 bushel of wheat. This is exactly equal to the actual loss in wheat output: the fall from 2.158 billion to 2 billion bushels of wheat.

3. In the ancient country of Roma, only two goods, spaghetti and meatballs, are produced. There are two tribes in Roma, the Tivoli and the Frivoli. By themselves, the Tivoli each month can produce either 30 pounds of spaghetti and no meatballs, or 50 pounds of meatballs and no spaghetti, or any combination in between. The Frivoli, by themselves, each month can produce 40 pounds of spaghetti and no meatballs, or 30 pounds of meatballs and no spaghetti, or any combination in between.

a. Assume that all production possibility frontiers are straight lines. Draw one diagram showing the monthly production possibility frontier for the Tivoli and another showing the monthly production possibility frontier for the Frivoli. Show how you calculated them.

b. Which tribe has the comparative advantage in spaghetti production? In meatball production?

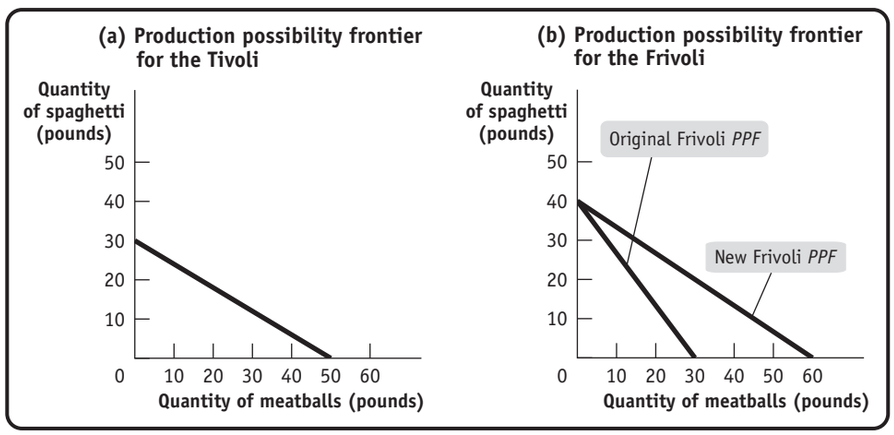
In A.D. 100 the Frivoli discover a new technique for making meatballs that doubles the quantity of meatballs they can produce each month.

c. Draw the new monthly production possibility frontier for the Frivoli.

d. After the innovation, which tribe now has an absolute advantage in producing meatballs? In producing spaghetti? Which has the comparative advantage in meatball production? In spaghetti production?

Solution

3. a. The accompanying diagram shows the production possibility frontier for the Tivoli in panel (a) and for the Frivoli as the line labeled "Original Frivoli *PPF*" in panel (b).



The production possibility frontier for the Tivoli was calculated as follows: the Tivoli can produce either 30 pounds of spaghetti and no meatballs, or they can produce no spaghetti but 50 pounds of meatballs. That is, the opportunity cost of 1 pound of meatballs is 3/5 of a pound of spaghetti: in order to produce 1 more pound of meatballs, the Tivoli have to give up 3/5 of a pound of spaghetti. This means that the slope of their production possibility frontier is –3/5. A similar argument for the Frivoli shows that their production possibility frontier has a slope of –4/3.

b. For the Tivoli, the opportunity cost of 1 pound of meatballs is 3/5 of a pound of spaghetti. For the Frivoli, the opportunity cost of 1 pound of meatballs is 4/3 pounds of spaghetti. That is, the Tivoli have a comparative advantage in meatball production because their opportunity cost is lower. For the Tivoli, the opportunity cost of 1 pound of spaghetti is 5/3 pounds of meatballs. For the Frivoli, the opportunity cost of 1 pound of spaghetti is 3/4 pound of meatballs. That is, the Frivoli have a comparative advantage in spaghetti production because their opportunity cost is lower.

c. The Frivoli's new production possibility frontier is the line labeled "New Frivoli *PPF*" in panel (b) of the diagram. Instead of producing 30 pounds of meatballs (if they produce no spaghetti), they can now produce 60 pounds.

d. Now the Frivoli have the absolute advantage in both meatball production and spaghetti production. The Frivoli's opportunity cost of meatballs has now fallen to 4/6 = 2/3; that is, for each pound of meatballs that the Frivoli now produce, they have to give up producing 2/3 of a pound of spaghetti. Since the Frivoli's opportunity cost of meatballs (2/3) is still higher than the Tivoli's (3/5), the Tivoli still have the comparative advantage in meatball production. The Frivoli's opportunity cost of spaghetti is 3/2 pounds of meatballs and the Tivoli's is 5/3 pounds of meatballs, so the Frivoli have the comparative advantage in spaghetti production.

4. One July, the United States sold aircraft worth $1 billion to China and bought aircraft worth only $19,000 from China. During the same month, however, the United States bought $83 million worth of men's trousers, slacks, and jeans from China but sold only $8,000 worth of trousers, slacks, and jeans to China. Using what you have learned about how trade is determined by comparative advantage, answer the following questions.

a. Which country has the comparative advantage in aircraft production? In production of trousers, slacks, and jeans?

b. Can you determine which country has the absolute advantage in aircraft production? In production of trousers, slacks, and jeans?

Solution

4. a. Since countries gain from specializing in production of the goods and services in which they have a comparative advantage, the United States must have the comparative advantage in aircraft production, and China must have the comparative advantage in production of trousers, slacks, and jeans.

b. Since trade has nothing to do with absolute advantage, we cannot determine from these data which country has an absolute advantage in either of these goods.

5. Peter Pundit, an economics reporter, states that the European Union (EU) is increasing its productivity very rapidly in all industries. He claims that this productivity advance is so rapid that output from the EU in these industries will soon exceed that of the United States and, as a result, the United States will no longer benefit from trade with the EU.

a. Do you think Peter Pundit is correct or not? If not, what do you think is the source of his mistake?

b. If the EU and the United States continue to trade, what do you think will characterize the goods that the EU exports to the United States and the goods that the United States exports to the EU?

Solution

5. a. Peter Pundit is not correct. He confuses absolute and comparative advantage. Even if the EU had an absolute advantage over the United States in every product it produced, the United States would still have a comparative advantage in some products. And the United States should continue to produce those products: trade will make both the EU and the United States better off.

b. You should expect to see the EU export those goods in which it has the comparative advantage and the United States export those goods in which it has the comparative advantage.

6. You are in charge of allocating residents to your dormitory's baseball and basketball teams. You are down to the last four people, two of whom must be allocated to baseball and two to basketball. The accompanying table gives each person's batting average and free-throw average.

Name	Batting average	Free-throw average
Kelley	70%	60%
Jackie	50%	50%
Curt	10%	30%
Gerry	80%	70%

a. Explain how you would use the concept of comparative advantage to allocate the players. Begin by establishing each player's opportunity cost of free throws in terms of batting average.

b. Why is it likely that the other basketball players will be unhappy about this arrangement but the other baseball players will be satisfied? Nonetheless, why would an economist say that this is an efficient way to allocate players for your dormitory's sports teams?

Solution

6. a. Let's begin by establishing the opportunity cost of free throws for each player. If you allocate Kelley to the basketball team, the team gains a player with a 60% free-throw average and the baseball team loses a player with a 70% batting average. That is, the opportunity cost of allocating Kelley to the basketball team is 7/6. Similarly, Jackie's opportunity cost of playing basketball is 1; Curt's opportunity cost of playing basketball is 1/3, and Gerry's opportunity cost of playing basketball is 8/7. Jackie and Curt have the lowest opportunity costs of playing basketball; that is, they have the comparative advantage in basketball. Therefore, they should be allocated to the basketball team. Kelley and Gerry have the comparative advantage in baseball and should therefore play on the baseball team.

b. It is likely that the basketball team will be unhappy with this arrangement. Both Jackie and Curt have an absolute disadvantage at playing basketball, compared to the other two players. (They also have an absolute disadvantage at playing baseball, but they are comparatively less bad at basketball than at baseball.) The baseball team is likely to be happy about this allocation because both Kelley and Gerry have an absolute advantage at playing baseball. However, if you are concerned with the total number of wins for the dormitory (as an economist would be concerned about efficiency), this allocation is the best one: it maximizes the overall chances of the dormitory winning at any sport.

7. The inhabitants of the fictional economy of Atlantis use money in the form of cowry shells. Draw a circular-flow diagram showing households and firms. Firms produce potatoes and fish, and households buy potatoes and fish. Households also provide the land and labor to firms. Identify where in the flows of cowry shells or physical things (goods and services, or resources) each of the following impacts would occur. Describe how this impact spreads around the circle.

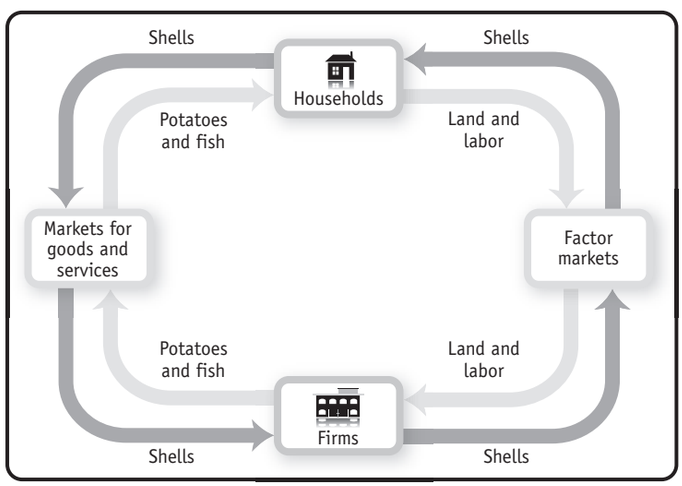
a. A devastating hurricane floods many of the potato fields.

b. A very productive fishing season yields a very large number of fish caught.

c. The inhabitants of Atlantis discover Shakira and spend several days a month at dancing festivals.

Solution

7. The accompanying diagram illustrates the circular flow for Atlantis.



a. The flooding of the fields will destroy the potato crop. Destruction of the potato crop reduces the flow of goods from firms to households: fewer potatoes produced by firms now are sold to households. An implication, of course, is that fewer cowry shells flow from households to firms as payment for the potatoes in the market for goods and services. Since firms now earn fewer shells, they have fewer shells to pay to households in the factor markets. As a result, the amount of factors flowing from households to firms is also reduced.

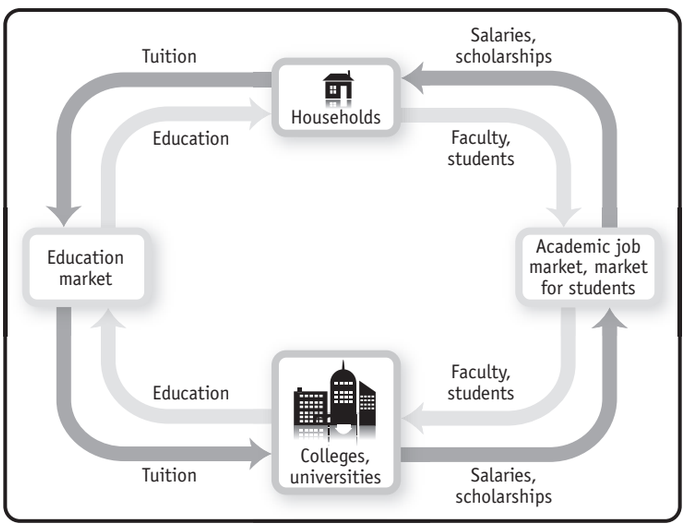
b. The productive fishing season leads to a greater quantity of fish produced by firms to flow to households. An implication is that more money flows from households to firms through the markets for goods and services. As a result, firms want to buy more factors from households (the flow of shells from firms to households increases) and, in return, the flow of factors from households to firms increases.

c. Time spent at dancing festivals reduces the flow of labor from households to firms and therefore reduces the number of shells flowing from firms to households through the factor markets. In return, households now have fewer shells to buy goods with (the flow of shells from households to firms in the markets for goods and services is reduced), implying that fewer goods flow from firms to households.

8. An economist might say that colleges and universities "produce" education, using faculty members and students as inputs. According to this line of reasoning, education is then "consumed" by households. Construct a circular-flow diagram to represent the sector of the economy devoted to college education: colleges and universities represent firms, and households both consume education and provide faculty and students to universities. What are the relevant markets in this diagram? What is being bought and sold in each direction? What would happen in the diagram if the government decided to subsidize 50% of all college students' tuition?

Solution

8. The accompanying diagram shows the circular flow for the education sector.



Colleges and universities buy faculty on the academic job market and attract students from the market for students. (Many colleges and universities actively try to attract good students by offering scholarships and the like.) They sell education to households in the market for education, and households buy education in that market from one (or sometimes several) of the sellers.

If the government subsidized half of all students' tuition, households would demand more education. As a result, colleges and universities would hire more faculty and accept more students, meaning that more money in terms of salaries and scholarships would flow from universities and colleges to the households.

9. Your dormitory roommate plays loud music most of the time; you, however, would prefer more peace and quiet. You suggest that she buy some earphones. She responds that although she would be happy to use earphones, she has many other things that she would prefer to spend her money on right now. You discuss this situation with a friend who is an economics major. The following exchange takes place:
He: How much would it cost to buy earphones?
You: $15.
He: How much do you value having some peace and quiet for the rest of the semester?
You: $30.
He: It is efficient for you to buy the earphones and give them to your roommate. You gain more than you lose; the benefit exceeds the cost. You should do that.
You: It just isn't fair that I have to pay for the earphones when I'm not the one making the noise.

a. Which parts of this conversation contain positive statements and which parts contain normative statements?

b. Construct an argument supporting your viewpoint that your roommate should be the one to change her behavior. Similarly, construct an argument from the viewpoint of your roommate that you should be the one to buy the earphones. If your dormitory has a policy that gives residents the unlimited right to play music, whose argument is likely to win? If your dormitory has a rule that a person must stop playing music whenever a roommate complains, whose argument is likely to win?

Solution

9. a. "It is efficient for you to buy the earphones" is a positive statement (it is either right or wrong); that is, it is about description. "You should do that" (that is, buy the earphones) is strictly speaking a normative statement; that is, it is about prescription (although you would find all economists agree that all trades that improve efficiency should be made). "It just isn't fair" is a normative statement—that is, it is about prescription—and you would likely find much disagreement about the fairness of the proposed trade.

b. One argument that your roommate should buy the earphones is that everyone has the right to peace and quiet. If your roommate therefore wants to listen to music, she should have to be responsible for making sure that others' peace and quiet is not disturbed. Your roommate might argue that since she has the right to play as much music as she wants, it is your responsibility to make sure that you are not disturbed—for instance, by buying her earphones. If the dormitory has a policy that establishes the right to unlimited music, your roommate's argument wins. If the rule is that there is a right to peace and quiet, your argument wins.

10. A representative of the American clothing industry recently made the following statement: "Workers in Asia often work in sweatshop conditions earning only pennies an hour. American workers are more productive and as a result earn higher wages. In order to preserve the dignity of the American workplace, the government should enact legislation banning imports of low-wage Asian clothing."

a. Which parts of this quote are positive statements? Which parts are normative statements?

b. Is the policy that is being advocated consistent with the preceding statements about the wages and productivities of American and Asian workers?

c. Would such a policy make some Americans better off without making any other Americans worse off? That is, would this policy be efficient from the viewpoint of all Americans?

d. Would low-wage Asian workers benefit from or be hurt by such a policy?

Solution

10. **a.** The positive statements are:

- workers in Asia . . . [are] earning only pennies an hour
- American workers are more productive
- American workers are more productive and as a result earn higher wages

The normative statement is:

- the government should enact legislation banning imports of low-wage Asian clothing

b. It is not. The statement about the productivity of American and Asian workers is about the absolute advantage that American workers have over Asian workers. However, Asian workers may still have a comparative advantage. And if that is the case, then banning imports would result in inefficiency.

c. If America channeled more of its productive resources into producing clothing, it would have to give up producing other goods. As a result, America would be able to consume less of all goods. And this would make some Americans clearly worse off. Therefore, this policy would not be efficient.

d. Low-wage Asian workers would also be hurt by this policy. The Asian country would channel its resources away from producing clothing toward producing other goods that it previously imported from America. But since it does not have the comparative advantage in those other goods, the Asian country would be able to consume less of all goods.

11. Are the following statements true or false? Explain your answers.

a. "When people must pay higher taxes on their wage earnings, it reduces their incentive to work" is a positive statement.

b. "We should lower taxes to encourage more work" is a positive statement.

c. Economics cannot always be used to completely decide what society ought to do.

d. "The system of public education in this country generates greater benefits to society than the cost of running the system" is a normative statement.

e. All disagreements among economists are generated by the media.

Solution

11. **a.** True. This is a positive statement. It has a factual answer; that is, it is either right or wrong. There has been some debate about whether the statement is actually true or false, but in principle there is only one answer.

b. False. This is a statement about what we should do, and this statement has no clearly right or wrong answer. Your view will depend on whether you think encouraging more work is a good or a bad idea.

c. True. Economics is best at giving positive answers, for instance, answers about what the most efficient way is of achieving a certain aim. The question of how society ought to be organized is mostly decided in the realm of politics.

d. False. This is a positive statement. In principle, it has an answer that is either right or wrong.

e. False. Some disagreements among economists arise from the fact that in building a model, one economist thinks that a certain abstraction from reality is admissible but another economist may think that that abstraction is not admissible. Some disagreements arise from the fact that economists sometimes disagree about values.

12. Evaluate the following statement: "It is easier to build an economic model that accurately reflects events that have already occurred than to build an economic model to forecast future events." Do you think this is true or not? Why? What does this imply about the difficulties of building good economic models?

Solution

12. True. With hindsight it is easier to see the important features of the situation that a model should have captured. For predictive purposes, a model needs to anticipate which features of reality are important (and so should be included) and which are unimportant (and so can be ignored). This is why the famed British economist John Maynard Keynes referred to economics as an art as well as a science.

13. Economists who work for the government are often called on to make policy recommendations. Why do you think it is important for the public to be able to differentiate normative statements from positive statements in these recommendations?

Solution

13. Positive statements are those based on fact—or at least on our best estimate of what the facts are. Therefore, these statements are also those that do not depend on the political views of the economist. Normative statements may sometimes be influenced by the economist's own values. Whether someone agrees with an economist's normative statement may depend on whether they share values. It is therefore important that the public be able to distinguish normative from positive statements.

14. The mayor of Gotham City, worried about a potential epidemic of deadly influenza this winter, asks an economic adviser the following series of questions. Determine whether a question requires the economic adviser to make a positive assessment or a normative assessment.

a. How much vaccine will be in stock in the city by the end of November?

b. If we offer to pay 10% more per dose to the pharmaceutical companies providing the vaccines, will they provide additional doses?

c. If there is a shortage of vaccine in the city, whom should we vaccinate first—the elderly or the very young? (Assume that a person from one group has an equal likelihood of dying from influenza as a person from the other group.)

d. If the city charges $25 per shot, how many people will pay?

e. If the city charges $25 per shot, it will make a profit of $10 per shot, money that can go to pay for inoculating poor people. Should the city engage in such a scheme?

Solution

14. **a.** Positive

b. Positive

c. Normative

d. Positive

e. Normative

15. Assess the following statement: "If economists just had enough data, they could solve all policy questions in a way that maximizes the social good. There would be no need for divisive political debates, such as whether the government should provide free medical care for all."

Solution

15. What is true is that if economists had enough data, they could predict precisely what the outcome would be of any proposed policy (such as free medical care). That is, economists can answer positive questions. But no amount of data can lead to a determination about what a society should do—that is a normative question. An economist can predict how much it will cost to provide free medical care and what effects different ways of raising taxes will have on people's behavior (for instance, a sales tax will reduce consumption behavior; an income tax may discourage workers from working as much as before). But whether this is a trade-off worth making is a question that can be answered only in political discourse.

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A Work It Out tutorial helps students solve this problem step by step.

16. Atlantis is a small, isolated island in the South Atlantic. The inhabitants grow potatoes and catch fish. The accompanying table shows the maximum annual output combinations of potatoes and fish that can be produced. Obviously, given their limited resources and available technology, as they use more of their resources for potato production, there are fewer resources available for catching fish.

Maximum annual output options	Quantity of potatoes (pounds)	Quantity of fish (pounds)
A	1,000	0
B	800	300
C	600	500
D	400	600
E	200	650
F	0	675

a. Draw a production possibility frontier with potatoes on the horizontal axis and fish on the vertical axis illustrating these options, showing points *A*–*F*.

b. Can Atlantis produce 500 pounds of fish and 800 pounds of potatoes? Explain. Where would this point lie relative to the production possibility frontier?

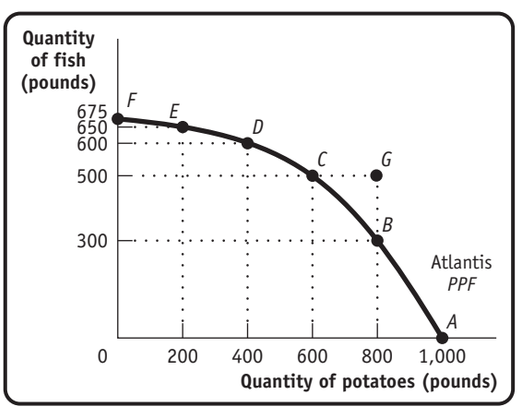
c. What is the opportunity cost of increasing the annual output of potatoes from 600 to 800 pounds?

d. What is the opportunity cost of increasing the annual output of potatoes from 200 to 400 pounds?

e. Can you explain why the answers to parts c and d are not the same? What does this imply about the slope of the production possibility frontier?

Solution

16. a. The accompanying diagram shows the production possibility frontier for Atlantis.



b. No, Atlantis cannot produce 500 pounds of fish and 800 pounds of potatoes. If it produces 500 pounds of fish, the most potatoes it can produce is 600 pounds. This point would lie outside the production possibility frontier, at point *G* on the diagram.

c. The opportunity cost of increasing output from 600 to 800 pounds of potatoes is 200 pounds of fish. If Atlantis increases output from 600 to 800 pounds of potatoes, it has to cut fish production from 500 pounds to 300 pounds, that is, by 200 pounds.

d. The opportunity cost of increasing output from 200 to 400 pounds of potatoes is 50 pounds of fish. If Atlantis increases output from 200 to 400 pounds of potatoes, it has to cut fish production from 650 pounds to 600 pounds, that is, by 50 pounds.

e. The answers to parts c and d imply that the more potatoes Atlantis produces, the higher the opportunity cost becomes. For instance, as you grow more and more potatoes, you have to use less and less suitable land to do so. As a result, you have to divert increasingly more resources away from fishing as you grow more potatoes, meaning that you can produce increasingly less fish. This implies, of course, that the production possibility frontier becomes steeper the farther you move along it to the right; that is, the production possibility frontier is bowed out. (Mathematicians call this shape *concave*.)

chapter 2

Economic Models: Trade-offs and Trade

Chapter Objectives

- Explain why models play a crucial role in economics.
- Present two simple but important models: the production possibilities frontier and comparative advantage.
- Present the circular-flow diagram.
- Explain the difference between positive and normative economics.
- Explain why economists do not always agree.

Chapter Outline

Opening Example: The Wright Brothers invented a wind tunnel to test models of airplanes. Boeing ran 15,000 hours of wind tunnel tests when it was developing its latest jet, the Dreamliner. Testing models is cheaper and safer than building full-scale versions. Economists use models in the same way.

I. Models in Economics: Some Important Examples

A. *Definition:* A **model** is a simplified representation of a real situation that is used to better understand real-life situations.

B. Models allow economists to see the effects of only one change at a time.

C. *Definition:* The **other things equal assumption** means that all other relevant factors remain unchanged.

D. Economic models make use of mathematical tools, especially graphs.

II. Trade-offs: The Production Possibility Frontier

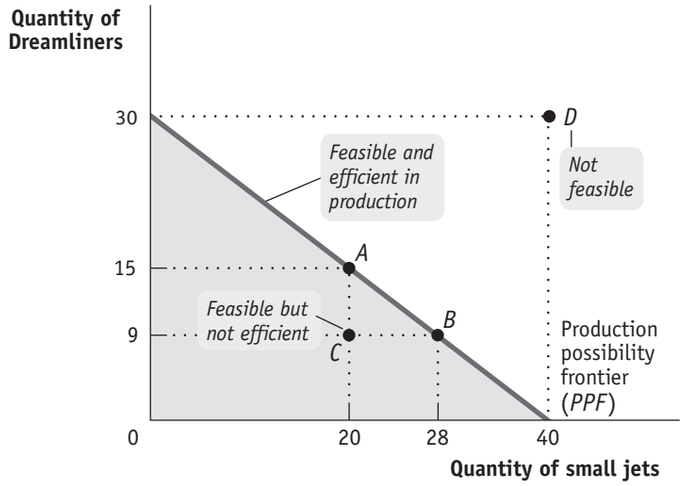
A. *Definition:* The **production possibility frontier** illustrates the trade-offs facing an economy that produces only two goods. It shows the maximum quantity of one good that can be produced with available resources and technology for any given production of the other.

B. The graph of the production possibilities frontier shows the possible combinations of two goods that can be produced given the scarce resources of the society.

C. A point inside the frontier is a feasible combination of two goods that can be produced, but does not use all resources fully; and a point outside the frontier is not feasible given the current amount of resources. See text Figure 2-1, shown next.

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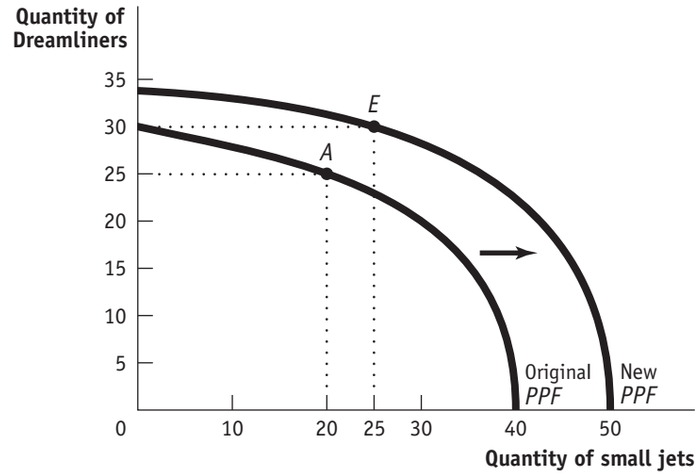
The Production Possibility Frontier



D. The production possibility model illustrates the concepts of:

1. Efficiency: Any point on the frontier represents an efficient use of resources, and any combination of goods inside the frontier represents a point of inefficiency.
   - **a.** If an economy produces on its production possibilities frontier, it is *efficient in production*.
   - **b.** An economy is *efficient in allocation* if it allocates resources so that consumers are as well off as possible.
2. Opportunity costs: The negative slope of the frontier means that an increase in the production of one good must require a sacrifice of some quantity of the other good.
3. The law of increasing costs: If the frontier is bowed out, the opportunity costs increase as more of one good is produced because resources are not easily transferable from the production of one good to another.
4. Economic growth: Over time as a society gains more resources, the production possibility frontier shifts outward. See text Figure 2-3, shown on the next page.
   - **a.** Economic growth comes from two basic sources: an increase in factors of production, and technology.
   - **b.** *Definition:* **Factors of production** are resources used to produce goods and services.
   - **c.** *Definition:* **Technology** is the technical means for producing goods and services.

Economic Growth



III. Comparative Advantage and Gains from Trade

A. *Definition:* An individual has a **comparative advantage** in producing a good if the opportunity cost of producing the good is lower for that individual than for other people.

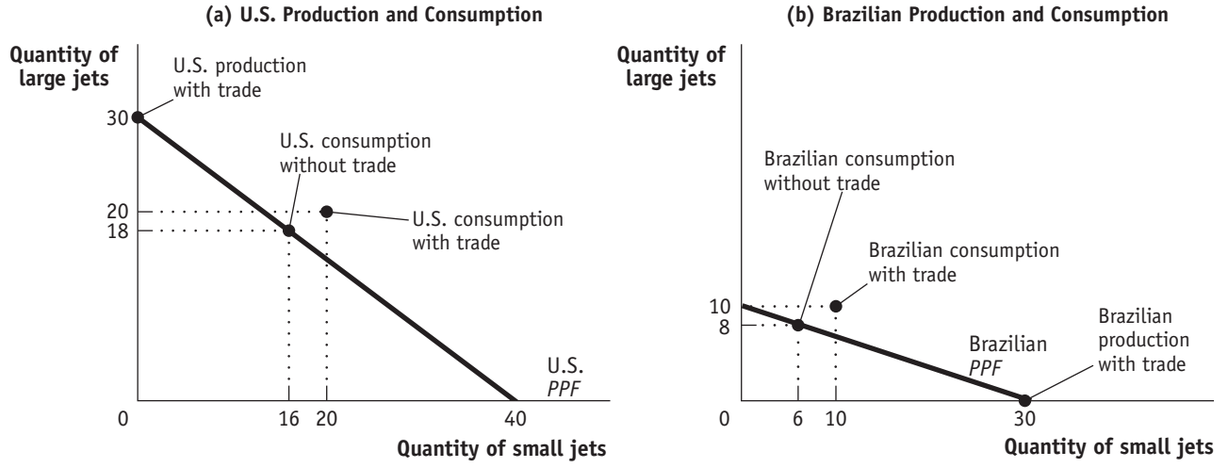
B. *Definition:* An individual has an **absolute advantage** in an activity if he or she can do it better than other people can. Having an absolute advantage is not the same thing as having a comparative advantage.

C. Comparative advantage, not absolute advantage, is the basis for the gains from trade.

D. The concepts of absolute advantage and comparative advantage apply to individuals, firms, and countries.

E. The gains from trade are illustrated in text Figure 2-5 (shown next), with a straight-line production possibility frontier for each of two countries:

Comparative Advantage and International Trade



F. Individuals or countries will engage in trade only if the price of the good each is obtaining from trade is less than its own opportunity cost of producing the good.

G. This example highlights two important lessons:

1. Both countries are able to produce more and consume more in total.
2. Each country has a comparative advantage in the production of something.

H. Although economists have a very positive view of international trade, politicians and the public sometimes have a negative view of international trade.

IV. Transactions: The Circular-Flow Diagram

A. *Definition:* Trade takes the form of **barter** when people directly exchange goods they have for goods they want.

B. *Definition:* The **circular-flow diagram** is a model that represents the transactions in an economy by flows around a circle.

C. *Definition:* A **household** is a person or a group of people who share their income.

D. *Definition:* A **firm** is an organization that produces goods for sale.

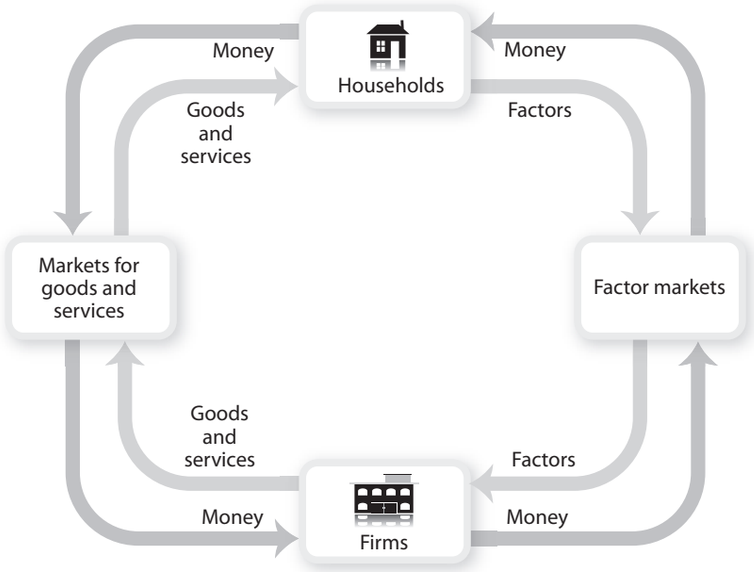
E. *Definition:* Firms sell goods and services that they produce to households in **markets for goods and services**.

F. *Definition:* Firms buy the resources they need to produce—**factors of production**—in **factor markets**.

G. *Definition:* **Income distribution** is the way in which total income is divided among the owners of the various factors of production.

H. The circular-flow diagram is a simplified picture of an economy, as demonstrated in text Figure 2-6, shown here.

Circular-Flow Diagram



I. The circular-flow diagram can help us understand how the economy manages to provide jobs for a growing population.

1. The number of jobs isn't fixed, because it depends on how much households spend; the amount households spend depends on how many people are working.

V. Positive versus Normative Economics

A. *Definition:* **Positive economics** is the branch of economic analysis that describes the way the economy actually works.

B. *Definition:* **Normative economics** makes prescriptions about the way the economy should work.

C. *Definition:* A **forecast** is a simple prediction of the future.

D. Models are especially helpful in answering "what if" questions such as, How will revenues change with a tax cut? The answer is a predictive one, not prescriptive; it does not tell you if the policy is good or bad.

E. Economists do engage in normative economics. Economic analysis can be used to show that some policies are clearly better than others, especially if one solution is more efficient than another. For example, most economists would favor subsidies to renters over rent-control laws as a more efficient solution to help low-income families obtain housing.

VI. When and Why Economists Disagree

A. Because economists used different models and make differing simplifying assumptions, they can arrive at different conclusions.

B. Many disagreements are eventually resolved by the accumulation of evidence.

C. Economic analysis is a method, not a set of conclusions.

Teaching Tips

Models in Economics

Creating Student Interest

Ask students why economists (and economics students) use simplified models. (Because the real world is too complex to consider everything at once. You want to use a more complicated model only if the benefits of added understanding exceed the costs of added difficulty and complexity.)

Construct a paper airplane during class. When you are finished, ask the students what you have made. Give your airplane a test flight. Have the class identify the ways the paper airplane is like a real airplane (for instance, it has wings, it flew). If they have trouble, remind them that they knew what it was, so there must have been some things in common! Have the class identify the ways it is not like a real airplane (size, weight, other details, it did not fly). The paper airplane can help an aerodynamics student learn the basic principles of flight (without the complexity of a 747), just as economic models can help students learn about the basic principles of economics. As understanding increases, so can the complexity of the models used.

An alternative to the paper airplane example is a simple smiley face drawn on the board or an emoticon used in text messages, :) or ☺. Use these representations to have the same discussion with students. How is the image like a real smiling face and how is it different? Why is it so useful in text messaging? (It is simplified and we all know what it means.) How might the level of complexity be increased for the smiley face model? (Add ears, hair.)

Presenting the Material

In this chapter students will be introduced to two economic models—the production possibilities frontier and the circular flow diagram—both of which make simplifying assumptions. For now, discuss another type of model they are all familiar with—the map. Maps are simplifications of reality that have more or less detail, depending on what the user wants

to know. Do you use the same type of map to drive from New York to California as you do to drive from point to point in a particular city? No, because for city driving you need to know about all of the roads, whereas for cross-country driving you are mainly interested in interstate highways.

Trade-offs: The Production Possibilities Frontier

Creating Student Interest

Introduce the production possibilities model by evoking the image of a person (or people) stranded on an island. This could be Robinson Crusoe, Gilligan, Tom Hanks in *Cast Away*, contestants on *Survivor*—have your students select the image that they can relate to the most. Present that as an example of the simplest economy you can imagine. Explain to students that you are going to build a model of the economy on the island. Have students list the limited resources available on the island (for example, trees, sand, water, fish, labor, entrepreneurship). Then have the class consider the immediate needs that must be met using these resources (food, shelter). Explain that the model will represent production in the island economy.

Presenting the Material

Use students "producing" grades as a simple example of a production possibility frontier. Put economics on the vertical axis of a graph and accounting on the horizontal axis. Students' time and energy are fixed for the moment, and putting more time into one subject involves a lower grade in the other subject. (Assuming that the student is equally efficient in "producing" both subjects, the production possibilities graph is a straight line.) Points on the frontier show the possible combinations of grades that the student can achieve.

Use an example of a country that can produce wheat or airplanes. Here are the points on the production possibility frontier:

Maximum annual output options	Wheat	Airplanes
A	1,000	0
B	800	150
C	600	250
D	400	325
E	200	375
F	0	400

Ask students: What is the opportunity cost of expanding production from 150 airplanes to 250 airplanes? (200 wheat.) Why is the production possibility graph negatively sloped? (Given scarcity, producing more of one good means producing less of the other.) Why is it bowed out from the origin? (Because of increasing opportunity cost.)

Comparative Advantage and Gains from Trade

Creating Student Interest

Ask students if they agree with the idea that, if it is cheaper to buy a product from another country than it is to make it yourself, you should buy it from the other country.

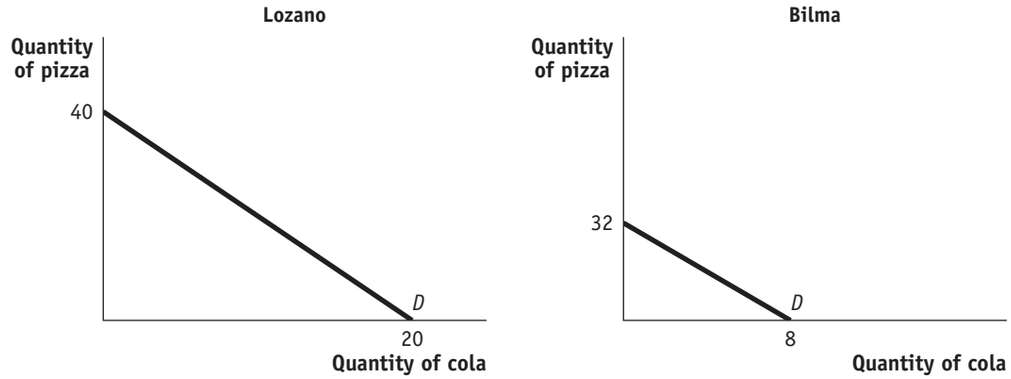
Provoke a discussion by asking students if the U.S. economy would be better off without importing so many clothing items from China. Get them to start thinking about the

idea that every action has a benefit and a cost. Who benefits from being able to import clothing from China? (Consumers, because the clothing is cheaper.) Who loses as a result of importing more clothing from China? (Domestic producers, because factories close and jobs are lost.)

Presenting the Material

Take some time to review the example in the text to illustrate comparative advantage and gains from trade. Next, you can work the example below. Explain to students that in this chapter we are ignoring dollars and will simply trade one good directly for another in order to keep things simple.

Give a simple example of two economies that can produce the following two goods, in the same time period, with a fixed amount of resources. Assume a straight line production possibility frontier.



Lozano has an absolute advantage in producing both goods because he can produce more of each individual good than Bilma. Carefully review the concept of opportunity cost and show students how to calculate it. Opportunity cost is what you give up relative to what you gain—for Lozano it is 40 pizzas relative to 20 colas, or 2 pizzas per cola. Since Bilma has a higher opportunity cost (4 pizzas per cola) it will produce the pizza.

Show students this can also be done in reverse by finding the opportunity cost of producing pizza. To illustrate the gains from trade, assume that Lozano initially produces and consumes 12 pizzas and 14 colas. Bilma initially produces 16 pizzas and 4 colas. With constant opportunity cost the two will completely specialize. A beneficial rate of exchange can be found between the two countries' opportunity costs, such as 3 pizzas for 1 cola. Assume they decide to trade 15 pizzas for 5 colas. This leaves Lozano with 15 pizzas (0 produced plus 15 that come from Bilma) and 15 colas (20 produced minus the 5 that go to Bilma). Bilma ends up with 17 pizzas (32 produced minus the 15 that go to Lozano) and 5 colas (0 produced plus the 5 that come from Lozano). They are both better off because they are able to consume more of both goods than they could without specialization and exchange.

Transactions: The Circular-Flow Diagram

Creating Student Interest

Use the example of a dollar in your pocket. Explain where the dollar came from. (It came from your bank account, it was put there by a direct deposit from your university.) Consider where the dollar will go. (You will buy lunch and leave it as a tip, it will become income for a waitress and then she will have money to spend.) Ask students to think about the last dollar they spent. Where did it come from and where did it go?

Presenting the Material

Identify and define the two major components of the circular-flow diagram first: households and firms. Then draw in the upper loop—the spending loop—of the circular-flow model. Use a concrete example of their spending money on clothes at a local store. Then add the bottom loop of the model, the factor market. Use a concrete example of their earning wages from a job.

Use your ample artistic skills to draw a house at the top of the board and a factory on the bottom. Tell the class these represent *households* and *firms*. Create the circular-flow diagram by asking students the following series of questions. (It will help some students to see the step-by-step construction of the diagram in addition to the completed diagram in the text.)

What do households get from the firms? (Goods and services.) Draw an arrow above the pictures from the firm to the households and label it "goods and services."

What do the firms get in exchange for the goods and services? (Payment/money.) Draw a line above the pictures back from the households to the firm and label it "$."

What do the households provide to the firms? (Worker/labor—add that they provide the other resources also.) Draw a line below the pictures from the household to the firm and label it "resources."

What do the households get from the firm in return for their labor/resources? (Payments—wages, rent, interest, profit.) Draw a line below the pictures back from the firm to the households and label it "wages, rent, interest, profit."

Point out that the top flow is the *product market* (market for products) and the bottom flow is the *factor market* (market for factors of production). You may want to link changes in the size of the flows to the business cycle discussed in Chapter 1. During expansions, the flow increases; during recessions, it decreases.

Positive versus Normative Economics

Creating Student Interest

Find an estimate of the average annual tuition at your institution. Write the estimate on the board and tell students you want them to know two things about this number (write them on the board): First, it is the average annual tuition at your institution. Second, this amount is too low. Tell them to write down the two statements. This should cause one or more students to express disagreement with at least one of the statements. If not, ask them if they agree with them or not (and why). Use the statements to lead into your presentation of positive versus normative in economics.

Ask students to make a clearly biased statement concerning the economy. Then ask them to make a perfectly objective statement.

Presenting the Material

After explaining the difference between *positive* and *normative,* quiz the class by asking them to determine if each of the following statements is positive or normative. If a student identifies the statement as positive, ask how the statement could be tested. Remind them that a positive statement need not be correct, it only needs to be testable. Also remind them that even if everyone agrees with a normative statement, it is still normative.

The price of gas is too high. (Normative: What is "too high"?)

The Federal Reserve lowered interest rates yesterday. (Positive: You can test this by going to the Federal Reserve's website or by looking at interest rates.)

The national debt should be reduced. (Normative: How can you know/test what "should" be done?)

Foreign imports are bad for the economy. (Normative: How do you define "bad"?)

Inflation is expected to rise. (Positive: You can survey people and see/test whether they *expect* inflation to rise.)

Common Student Pitfalls

- **Misunderstanding comparative advantage.** Students confuse absolute advantage with comparative advantage. Explain that absolute advantage means you can produce more than someone else can. Comparative advantage means that you can produce something at a lower opportunity cost than someone else.

  Use the example of two students working on a joint project. One student may be better at every task required to complete the project (have an absolute advantage in all tasks). However, it wouldn't be efficient to have the one student do everything for the project while the other does nothing. There must be a task that the other student is relatively good at (has a comparative advantage). The pair should identify that task and have the students specialize accordingly.

  Most students understand the basic idea behind comparative advantage, but many students struggle with the calculation of opportunity cost. They may need to see and work a few examples before the concept sinks in. Start with the example from the text, and then move on to other examples.

- **The use of the term *positive.*** Students may not understand the different use of the word *positive*. Make sure they understand that it is not being used in the same way they are familiar with (the opposite of negative). There are many places where economists use generally familiar words to mean something specific to their discipline. Prepare them to get used to learning the new meanings in these cases. In this context, "positive economics" explains the way the world works. It is factual and can therefore be tested.

Case Studies in the Text

Economics in Action

Rich Nation, Poor Nation—Much of our clothing is produced in other countries that are poorer than the United States. The case study explains that this is because the countries have a comparative advantage in producing clothing.

Ask students the following questions:

1. Why are some countries poor? (Their workers are not as productive as workers in richer economies.)
2. Why do consumers in the United States import so much cheap clothing from poor countries? (Despite their poverty, poor countries have a comparative advantage in producing clothing relative to the United States.)

Economists, Beyond the Ivory Tower—This EIA discusses the various roles that economists play in the business world, and in the federal government.

Ask students the following questions:

1. Why do companies in the private sector hire economists? (To forecast and predict what will happen to prices.)
2. Why does the government employ large numbers of economists? (To analyze the economic effects of government decisions.)

Global Comparison

Pajama Republics—Poor countries have low productivity in clothing manufacturing, but even lower productivity in other industries, thus they have a comparative advantage in clothing manufacturing.

Business Case

Efficiency, Opportunity Cost, and the Logic of Lean Production at Boeing—This business case explains the idea behind lean production, with reference to the experiences of Boeing and Toyota.

Activities

Creating a Production Possibilities Curve (15–25 minutes)

For this activity you will need two desks, paper (this can be in half-sheets), and two staplers—capital. You will also need four or six volunteers to participate in the activity—labor. Have another student take responsibility for graphing results of the activity on the board. This activity identifies the alternative combinations of output (called widgets and whatsits) that can be produced given the available resources (capital/desks, paper and staplers, and labor/students). That is, the students will generate a production possibilities frontier. Have the nonlabor students draw a production possibilities graph and label the axes. Then have the student grapher draw the graph.

Explain to students that the capital and labor will be used to produce widgets or whatsits. A widget is a piece of paper folded twice into a square and stapled. A whatsit is a piece of paper folded three times. Start by having the students use all their resources to produce widgets for 30 seconds. Count the number of widgets and whatsits produced (whatsits will equal 0). Have the students graph the data point. Next have the students use all their resources to produce whatsits. Count the production and graph the data point. Finally, have the students divide the resources in half. Have one half produce widgets and the other produce whatsits. Graph this third data point. Connect the points to show the production possibilities frontier.

Comparative Advantage (10–15 minutes)

Pair students and ask them to do two tasks in 30 seconds, such as drawing the same-sized Xs on a page, and turning the pages of a book. The first person does the task, while the other person records the quantity produced. Given the data for both goods for both partners, have the pairs calculate their opportunity cost of producing each good.

U.S. Comparative Advantage (2–3 minutes)

Make a list on the board or overhead with student answers to this question: What comparative advantages does the United States have? Then, point out that their answers are all the top exports of the United States.

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Pros and Cons of Trade (3–5 minutes)
Pair students and ask them to brainstorm the pros and cons of the following proposition: "The United States should limit imported textiles from China" or "The United States should prohibit the import of products from abroad that are made with child labor."

Tracing the Circular Flow (5–10 minutes)
Pair students and tell them they will trace the following events through the circular flow: (a) the introduction of a new technology that boosts productivity; (b) the decision of consumers to save more money; and (c) an increase in government spending.

Simulating the Circular Flow (15–30 minutes)
In a lecture, add banks, government, and exports and imports to the circular flow. Divide the class into the following groups: households, firms, workers, sellers of raw materials, sellers of capital goods, banks, exporters, and importers. Introduce an event into this hypothetical economy: Consumers decide to spend more money and save less. Give this event card to the household group. Have this group write down how it will affect them and pass it on to the next group they feel will be most immediately affected. The next group writes down its impact on them and passes it on. Make sure the event passes to each group. Have one group use the circular-flow diagram to illustrate on the board how the event affected the economy.

Positive or Normative? (3–5 minutes)
Read the following sentences to the class, and ask students to label each one as normative or positive:

- "More than 60% of women are in the labor market." (Positive)
- "Rent control laws should be implemented because they help to achieve equity or fairness in housing." (Normative)
- "Society should take measures to end gun violence." (Normative)
- "People who smoke pass on increased medical costs to the whole society." (Positive)
- "Single mothers are more than twice as likely as married mothers to be in poverty." (Positive)

Change It to Normative (5–10 minutes)
Pair students. Ask one student in each pair to write a positive economic statement of fact, and the other student to rewrite the statement as a normative one. Ask a few pairs to report.

Web Resources

The U.S. Census Bureau and the U.S. International Trade Commission have information about exports and imports. www.census.gov and https://dataweb.usitc.gov/

The National Association of Business Economists has the results of member surveys that indicate what economists currently agree and disagree on, as well as information on careers in economics. www.nabe.com

Appendix

Creating Student Interest

Have students discuss the relationship between calories consumed and weight. What is the independent variable? What is the dependent variable?

Presenting the Material

Give an example of data and how a graph is set up, then explain how to interpret the graph.

Year	Health expenditures as a percent of GDP
1950	4.5%
1960	5.3
1970	7.1
1980	8.9
1990	12.2
2000	13.4

(Source: *The Economics of Health and Health Care,* S. Folland, A. Goodman, and M. Stano. Prentice Hall, 2001.)

Ask students the following questions:

1. With health expenditures as a percent of GDP on the vertical axis of a graph and years on the horizontal axis of the graph, plot the data on the graph.
2. Is the line positively or negatively sloped? (It is positively sloped; as the years have increased, the percent share of GDP has increased.)
3. Is it a linear function? (No, the line is not a straight line.)
4. What does the graph not tell us? (It does not indicate what is causing the increase in health expenditures as a percent of GDP.)

Common Student Pitfalls

Students forget the basic setup of a graph: that each point on the graph refers to a specific quantity on the vertical axis and horizontal axis. Use a demand curve to illustrate: point A on the demand curve means that at a price of $1.00, consumers will buy 200 of the good, for example. You may want to point out which axis on the graph is referred to as the vertical axis and which is the horizontal axis.

Activity

Causal Relationships (5–10 minutes)

Ask students to think of some causal relationships between health expenditures and other variables. Identify the variables that may increase or decrease health expenditures. What is the dependent variable? (Health expenditures.) What independent variables can influence total health spending as a percent of the GDP? (Some possibilities: percentage of population over 55, government-mandated health programs, percentage of population who are smokers, degree of bureaucracy in medical care structure, etc.)

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SUGGESTED SOLUTIONS FOR BUSINESS CASE *QUESTIONS FOR THOUGHT*

This section offers suggested answers to the "Questions for Thought" that conclude each business case at the end of chapters.

Part 1: What is Economics? "How Priceline.com Revolutionized the Travel Industry"

1. Explain how each of the twelve principles of economics is illustrated in this case study.

Suggested Solution

1. Principle 1: People must make choices because resources are scarce. Neither money nor time is unlimited; they are both scarce resources. Priceline.com caters to customers who have chosen to sacrifice some of their preferences about convenience or quality in order to get a lower price.

   Principle 2: The opportunity cost of an item—what you must give up in order to get it—is its true cost. The true cost of an empty airplane seat or an empty hotel bed is the revenue the airline or hotel could have earned from the next best use of that seat or bed—namely, the revenue earned from a paying customer.

   Principle 3: "How much" is a decision at the margin. How much more a customer is willing to pay for a ticket to a destination depends upon how much time and inconvenience is saved by purchasing the higher priced ticket.

   Likewise, how much more a customer is willing to pay for a ticket purchased well in advance of his travel date depends upon how much more security he gains by advance planning rather than waiting to purchase. The same principle applies to decisions about the quality and location of hotels, and so on.

   Principle 4: People usually respond to incentives, exploiting opportunities to make themselves better off. Priceline.com was successful because its customers—travelers, airlines, and hotels—were exploiting opportunities to make themselves better off by using its services. Priceline.com also responded to incentives to make itself better off by expanding into new profitable markets such as Europe.

   Principle 5: There are gains from trade. Travelers gain from using Priceline.com's networks of hotels to find a hotel rather than doing the research themselves. They gain from using Priceline.com's services to book a flight rather than contacting each airline individually. Also, travelers gain by using the services of airlines and hotels, rather than transporting themselves or pitching a tent overnight to sleep in. Hotels, particularly in Europe, gain from using Priceline.com's network rather than trying to contact potential customers directly.

   Principle 6: Because people respond to incentives, markets move toward equilibrium. Expedia and Orbitz moved into the online travel service industry in order to exploit opportunities that had been pioneered by Priceline.com. In this way, the market for online travel services will move toward equilibrium until there are no more opportunities for new travel service companies to exploit.

   Principle 7: Resources should be used efficiently to achieve society's goals. Priceline.com exploited an opportunity to use resources more efficiently. It is inefficient to have empty hotel rooms and airline seats if someone is willing to pay some price to use them on short notice.

   Principle 8: Because people usually exploit gains from trade, markets usually lead to efficiency. It is inefficient to have planes flying with empty seats and hotels with unoccupied beds. Thus, introducing a market for those items—which is what Priceline.com did—improves efficiency.

   Principle 9: When markets don't achieve efficiency, government intervention can improve society's welfare. It would have been inefficient to have major airlines fail because of the public's temporary fear of flying. Vast resources would have been wasted as pilots and support staff lost their jobs, planes were mothballed, necessary trips cancelled, and so on. It improved efficiency for the government to step in and temporarily aid the airline industry so that it could survive the temporary downturn.

   Principle 10: One person's spending is another person's income. In the aftermath of the attacks of September 2001, as people stopped spending on items like travel the income of airline workers was severely reduced.

   Principle 11: Overall spending sometimes gets out of line with the economy's productive capacity. The overall economy went into a slump after the attacks of September 2001 as the economy's productive capacity exceeded its spending.

   Principle 12: Government policies can change spending. The $15 billion aid appropriation by Congress was spent on stabilizing the airline industry and prevented major airline failures.

"Efficiency, Opportunity Cost, and the Logic of Lean Production"

1. What is the opportunity cost associated with having a worker wander across the factory floor from task to task or in search of tools and parts?

Suggested Solution

1. The opportunity cost of a worker wandering across the factory floor is forgone output—the output that worker could have produced in the time spent wandering around.

2. Explain how lean manufacturing improves the economy's efficiency in allocation.

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