

# 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.

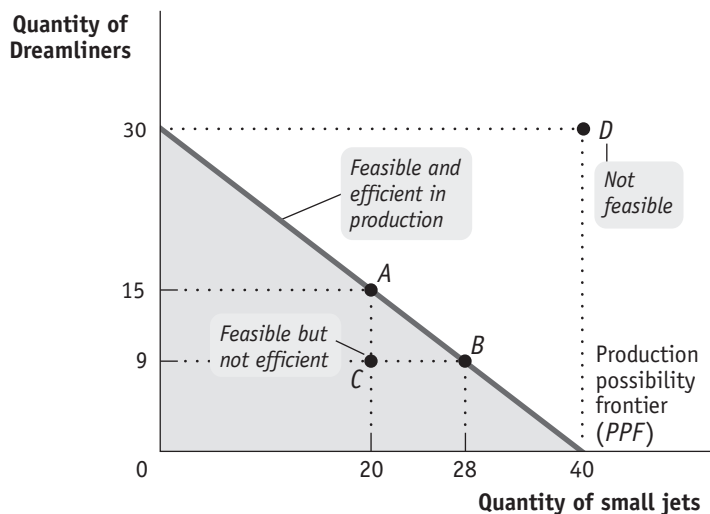
#### I. Models in Economics: Some Important Examples

- 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

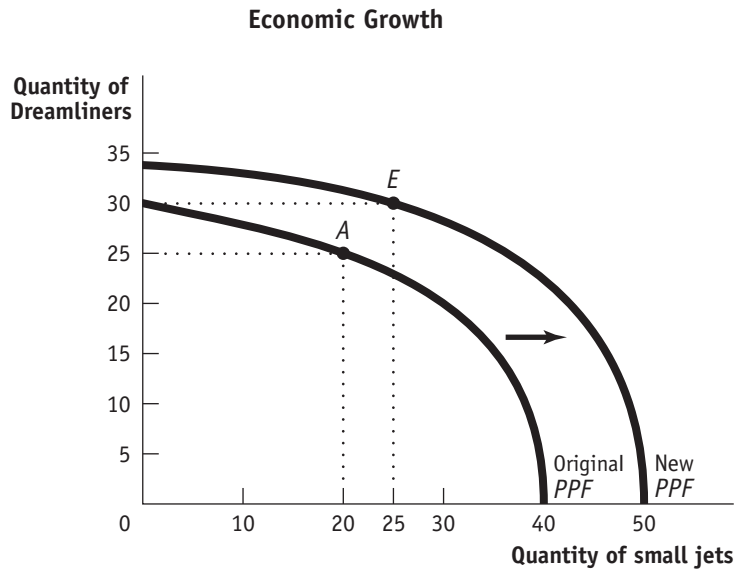
- A. *Definition:* The **production possibility frontier** illustrates the trade-offs facing an economy that produces only two goods. It shows the maximum quantity of one good that can be produced with available resources and technology for any given production of the other.
- B. The graph of the production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

The Production Possibility Frontier



D. The production possibility model illustrates the concepts of:

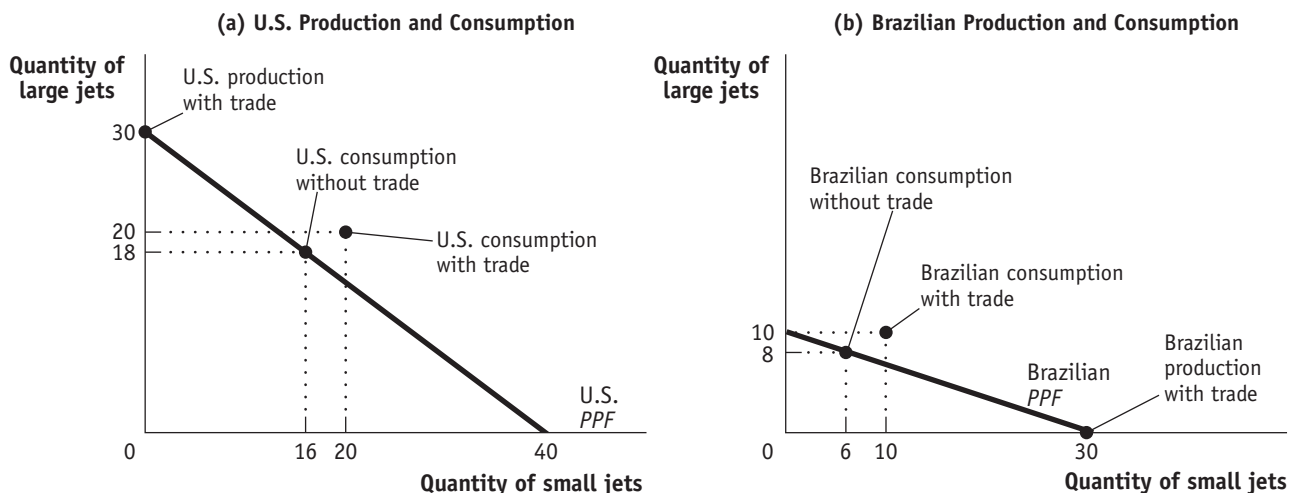
1. **Efficiency:** Any point on the frontier represents an efficient use of resources, and any combination of goods inside the frontier represents a point of inefficiency.
  - a. If an economy produces on its production possibilities frontier, it is *efficient in production*.
  - b. An economy is *efficient 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.



### 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

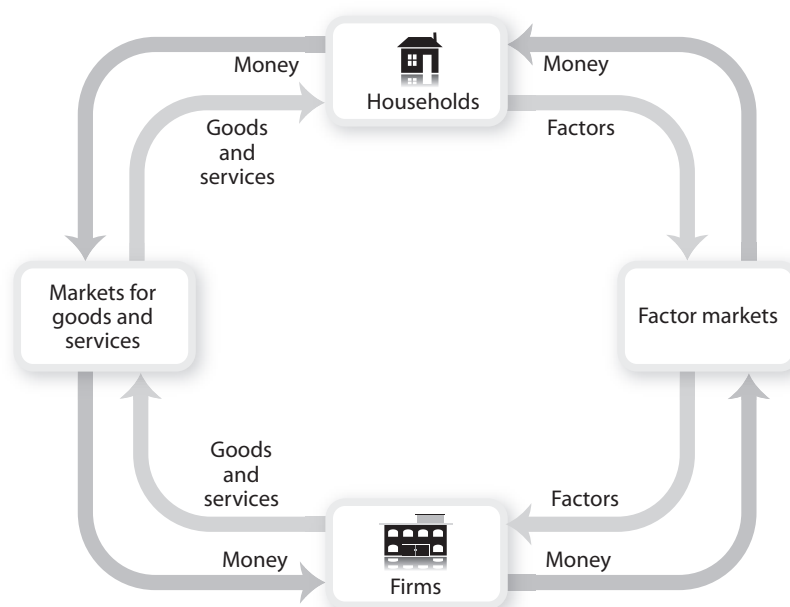


- F. Individuals or countries will engage in trade only if the price of the good each is obtaining from trade is less than its own opportunity cost of producing the good.
- G. This example highlights two important lessons:
  1. Both countries are able to produce more and consume more in total.
  2. Each 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.

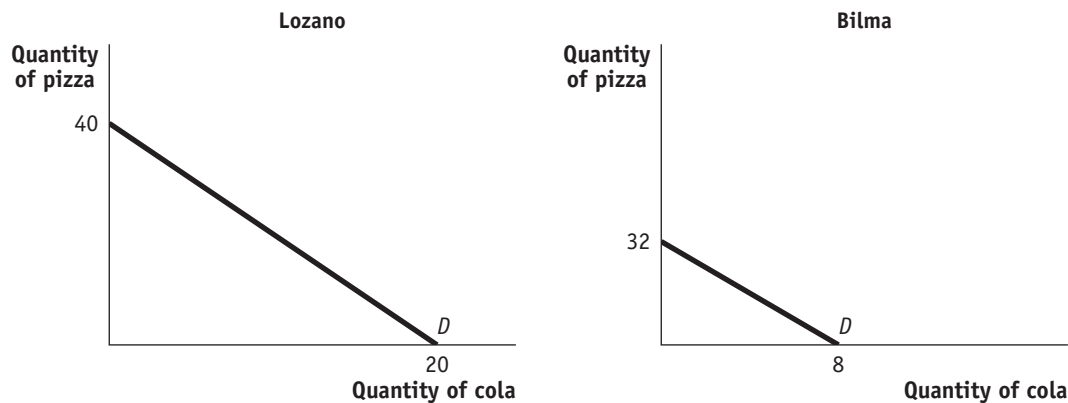
Provoke a discussion by asking students if the U.S. economy would be better off without importing so many clothing items from China. Get them to start thinking about the idea

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.)

## For Inquiring Minds

*The Model That Ate the Economy*—This FIM discusses a model used by financial traders on Wall Street, beginning in 2000, to estimate the likelihood of losing money on mortgage-backed securities (MBS). As subsequent economic events proved, the model seriously underestimated the risk of buying the MBS.

*When Economists Agree*—This FIM notes that although economists often disagree, there are some statements that they generally agree on. One statement of agreement: Trade restrictions reduce economic welfare.

## 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.

**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](http://www.census.gov) and [www.dataweb.usitc.gov](http://www.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](http://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.)

