

## Chapter 2

### Check Your Understanding

- When can an economy increase the production of one good without reducing the output of another?  
**Answer:** When there are unemployed resources, and the economy is operating within the production possibilities frontier.
- In which of the three basic questions facing any society does technology play the greatest role?  
**Answer:** Technology will be most important in the how to produce question.
- Explain the important difference between a straight line PPF and the PPF that is concave to (bowed away from) the origin.  
**Answer:** A straight line PPF curve has constant opportunity costs, whereas the bowed out (concave to the origin) curve has increasing opportunity costs as the production of one good is increased.
- How would unemployment be shown on the PPF?  
**Answer:** Any time the economy is operating inside the PPF, some resources will be unemployed, thus any point inside the PPF represents unemployment.
- List three factors that can contribute to an economy's growth.  
**Answer:** Economies can grow through increases in the quality or quantity of labor, land, capital, and entrepreneurial activity. Increases in resources expand the PPF outward. Improvements in technological progress can increase growth in an economy.
- How can a country that does not have an absolute advantage in producing goods still benefit from trade?  
**Answer:** All countries can benefit from trade as long as they specialize in the production of the good in which they have a comparative advantage. All countries have a comparative advantage in producing something because comparative advantage deals with relative abilities rather than absolute abilities.

### Apply the Concepts

- China has experienced levels of economic growth in the last decade that have been about 5 times that of the United States (10% versus 2% per year in the United States). Has China's high growth rate eliminated scarcity in China?  
**Answer:** No. Scarcity still exists in China. Growth alone does not eliminate scarcity: The PPF shifts outward, but still there are tradeoffs between products, and time is still a limited resource for us all. As rich as America is, we still face scarcity. Economic growth typically does improve standards of living, and the level (or degree) of scarcity declines.
- Describe how a country producing more capital goods rather than consumption goods ends up in the future with a PPF that is larger than a country that produces more consumption goods and fewer capital goods.  
**Answer:** Capital goods are those goods used to produce other goods. Producing more capital goods represents an investment in the economy. This investment leads to the ability of the country to produce more goods and services in the future.
- The United States has an absolute advantage in making many goods, such as short-sleeved cotton golf shirts. Why do Indonesia and Bangladesh make these shirts and export them to the United States?  
**Answer:** Indonesia and Bangladesh, while smaller, have a comparative advantage in the production of shirts, making it profitable for both countries to specialize and ship shirts to the United States.
- Why is it that America uses heavy street cleaning machines driven by one person to clean the streets, while China and India use many people with brooms to do the same job?  
**Answer:** Both China and India have huge labor resources relative to available capital, therefore the job is done with a lot of labor and a little capital. The United States has less labor relative to capital, thus wages are higher, and capital is substituted for labor.
- If specialization and trade as discussed in this chapter lead to a win-win situation in which both countries gain, why is there often opposition to trade agreements and globalization?

**Answer:** While trade is typically beneficial to both countries in the aggregate, individuals and groups within each country lose when their product faces competition from a country with a comparative advantage.

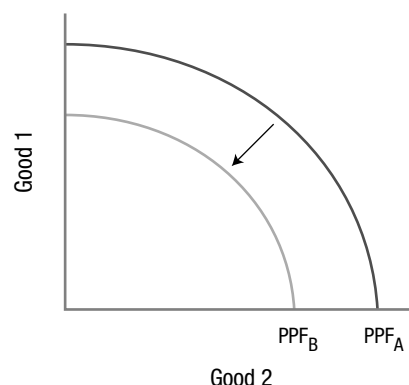
12. American attitudes about the tradeoff between the environment and economic growth shown in *By the Numbers* at the beginning of the chapter changed significantly when the economy entered a recession. However, during the recession in 2009, Americans were roughly equally split between their concerns for the environment and economic growth. What would you expect to find in a similar survey in a relatively poor developing nation?

**Answer:** People living on \$1 to \$2 a day in poor developing nations would probably be more focused on economic growth and undoubtedly find it difficult to fret about the environmental impacts. Once their income reaches a reasonable level, more of their attention would turn to protecting and improving the environment.

### In the News

13. According to a March 8, 2012, *New York Times* report, the 2011 earthquake in Japan that triggered a devastating tsunami led to a near complete shutdown of Japan's nuclear energy industry, which generates one-third of the country's total electricity. The resulting energy crisis caused severe supply disruptions in nearly all industries. How do natural disasters such as the tsunami in Japan affect a country's ability to achieve economic growth? Illustrate your answer using a PPF.

**Answer:** A natural disaster reduces the productive capacity of a country. In Japan, the loss of power prevented many factories from operating at full capacity, and many workers who were hurt in the disaster were unable to work. The loss of productive capacity is represented by the PPF shifting inward (from  $PPF_A$  to  $PPF_B$ ), indicating a reduction in the maximum amount of goods that can be produced.



14. The recession of 2007–2009 and its slow recovery led to severe budget cuts in state governments across the United States. Public colleges and universities, which are highly subsidized by state governments, saw dramatic cuts in their budgets, making it more difficult for students to attend and/or complete their degrees. The *Chronicle of Higher Education* of January 17, 2012, argued that cuts to higher education will “imperil competitiveness” in America. How might the cost savings from reduced educational spending end up costing states even more in the future?

**Answer:** Investments in education result in an increase in long-term productivity through a more productive workforce. By reducing education subsidies, a government can use the savings for other short-term expenditures. However, the consequences of these cost savings may be felt in the long run if the United States continues to lose competitiveness with other countries that are increasing investment in education.

### Solving Problems

15. Political commentators often make the argument that growth in another country (most notably China) is detrimental to the economic interests of the United States. Look back at Tables 2 to 4 in the Gains from Trade section of the chapter. Then, assume that Mexico doubles in size, and make those

changes to Table 2. Reconstruct Tables 3 and 4 given Mexico's greater capacity. Has the United States benefited by Mexico being able to produce more?

**Answer:**

**Table 2 Initial Consumption-Production Pattern**

	United States	Mexico	Total
Oil	20	20	40
Chips	20	8	28

**Table 3 Production after Mexico Specializes in Producing Crude Oil**

	United States	Mexico	Total
Oil	0	40	40
Chips	40	0	40

**Table 4 Final Consumption Patterns after Trade**

	United States	Mexico	Total
Oil	20	20	40
Chips	26	14	40

Both Mexico and the United States are better off.

16. The table below shows the potential output combinations of oranges and jars of prickly pear jelly (from the flower of the prickly pear cactus) for Florida and Arizona.
- Compute the opportunity cost for Florida of oranges in terms of jars of prickly pear jelly. Do the same for prickly pear jelly in terms of oranges.
  - Compute the opportunity cost for Arizona of oranges in terms of jars of prickly pear jelly. Do the same for prickly pear jelly in terms of oranges.
  - Would it make sense for Florida to specialize in producing oranges and for Arizona to specialize in producing prickly pear jelly and then trade? Why or why not?

Florida		Arizona	
Oranges	Prickly Pear Jelly	Oranges	Prickly Pear Jelly
0	10	0	500
50	8	20	400
100	6	40	300
150	4	60	200
200	2	80	100
250	0	100	0

**Answer:**

- Florida's opportunity cost of oranges:  $2/50 = .04$ , or .04 jar of prickly pear jelly for each orange. The opportunity cost of a jar of prickly pear jelly:  $50/2 = 25$ , or 25 oranges must be given up for each jar of prickly pear jelly.
- Arizona's opportunity cost of oranges:  $100/20 = 5$ , or 5 jars of prickly pear jelly for each orange. The opportunity cost of a jar of prickly pear jelly:  $20/100 = .2$ , or .2 orange must be given up for each jar of prickly pear jelly.

- c. Total combined output for both states will rise to 250 oranges and 500 jars of prickly pear jelly. This is larger than the sum of any two combinations available to both states. They will be able to share the excess through trade.

## Using the Numbers

17. According to By the Numbers, in which period (1960 to 1985 or 1985 to 2010) did corn and soybean production increase faster in terms of yield per acre?

**Answer:** Production of corn and soybeans increased faster from 1960 to 1985.

18. According to By the Numbers, in the period between 1990 and 2012, in how many years did the U.S. trade balance improve from the previous year and in how many years did the trade balance deteriorate (assume the trade balance deteriorated from 1989 [not shown in the figure] to 1990)?

**Answer:** The U.S. trade balance improved in 6 of the 23 years: 1991, 1995, 2001, 2007, 2008, 2009 (although years 1995 and 2008 were only very slight improvements). In all other years, the U.S. trade balance deteriorated.

## Chapter 3

### Check Your Understanding

1. Product prices give consumers and businesses a lot of information besides just the price. What are they?

**Answer:** Price can be a reflection of quality (albeit imperfectly), and provide businesses with information about levels of demand. Prices provide consumers with relative comparisons between products.

2. Describe the determinants of demand. Why are they important?

**Answer:** The determinants of demand are consumer tastes and preferences; income; prices of related goods; the number of buyers; and expectations regarding future prices, income, and product availability. When a determinant changes, the demand curve shifts.

3. As the world population ages, will the demand for cholesterol drugs increase, decrease, or remain the same? Assume there is a positive relationship between aging and cholesterol levels. Would this cause a change in demand or a change in quantity demanded?

**Answer:** Increase; change in demand.

4. Describe some of the reasons why supply changes. Improved technology typically results in lower prices for most products. Why do you think this is true? Describe the difference between a change in supply and a change in quantity supplied.

**Answer:** Supply will rise if any of the six determinants of supply changes. Improved technology increases productivity, resulting in more output for lower costs. A change in quantity supplied results from a change in price, while a change in supply results from a change in one or more of the determinants.

5. If a strong economic recovery boosts average incomes, what would happen to the equilibrium price and quantity for a normal good? How about an inferior good?

**Answer:** When incomes increase, demand for normal goods increases, which would increase both the equilibrium price and quantity. Meanwhile, demand for inferior goods decreases, which would decrease the equilibrium price and quantity.

6. Suppose the market for tomatoes is in equilibrium, and events occur that simultaneously shift both the demand and supply curves to the right. Is it possible to determine how the equilibrium price and/or quantity would change?

**Answer:** When both the demand and supply curves shift to the right, the overall equilibrium quantity will increase because both shifts result in a higher quantity. However, it is not possible to determine the overall effect on equilibrium price without additional information on the magnitudes of the changes, because an increase in demand pushes prices higher, while an increase in supply pushes prices lower.

# Production, Economic Growth, and Trade

# 2

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## Chapter Overview

The focus of this chapter is on the basic economic choices that must be made and on the framework for making such choices. Growth is presented in the context of a choice between the present and the future, and policies to enhance growth are discussed. International trade is analyzed and connected to growth.

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## Chapter Outline

### Basic Economic Questions and Production

#### Basic Economic Questions

##### Economic Systems

#### Resources and Production

##### Land

##### Labor

##### Capital

##### Entrepreneurial Ability

#### Production and Efficiency

#### *Checkpoint:* Basic Economic Questions and Production

##### Production Efficiency

##### Allocative Efficiency

### Production Possibilities and Economic Growth

#### Production Possibilities

##### Full Employment

##### Opportunity Cost

##### Increasing Opportunity Costs

#### Economic Growth

##### Expanding Resources

##### Technological Change

#### Summarizing the Sources of Economic Growth

#### *Issue:* Will Renewable Energy Be the Next Innovative Breakthrough?

#### *Checkpoint:* Production Possibilities and Economic Growth

## Specialization, Comparative Advantage, and Trade

## Absolute and Comparative Advantage

## The Gains from Trade

*Issue:* Do We Really Specialize in That? Comparative Advantage in the United States and China

## Limits on Trade and Globalization

*Checkpoint:* Specialization, Comparative Advantage, and Trade

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 Ideas for Capturing Your Classroom Audience

- Talk about students' possessions: Where was your shirt made? What about your shoes? For a fun illustration of global trade, go to the Web site [http://money.cnn.com/2008/04/03/smbusiness/birds\\_feathers.fsb](http://money.cnn.com/2008/04/03/smbusiness/birds_feathers.fsb). Here you will learn more about where Big Bird's feathers come from and the feather trade in general.
- Bring the global economy into your classroom. Visit the Web site of the *CIA Factbook* to discuss the United States and other countries in terms of resources (like population, education, health) and technology. The site includes data on Internet service providers and mobile phone use. The page for the United States (available at <https://www.cia.gov/library/publications/the-world-factbook/geos/us.html>) also has the menu box from which to access other countries.

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 Chapter Checkpoints
Basic Economic Questions and Production

*Question:* The one element that really seems to differentiate entrepreneurship from the other resources is the fact that entrepreneurs shoulder the *risk* of failure of the enterprise. Is this important? Explain.

*The point is to check that students can:* differentiate between entrepreneurship and other types of resources. The question asks whether or not it seems “right” that entrepreneurs shoulder the risk of failure of the enterprise. Students may see this as a normative question. Some may make the observation that entrepreneurs (if successful) are compensated for undertaking the risk.

Production Possibilities and Economic Growth

*Question:* Taiwan is a small, mountainous island with 23 million inhabitants, little arable land, and few natural resources, while Nigeria is a much larger country with seven times the population, 40 times more arable land, and tremendous deposits of oil. Given Nigeria's sizable resource advantage, why is Nigeria's total annual production only half the size of Taiwan's?

*The point is to check that students can:* appreciate that the resources an economy has matter as much as how much of them it has. Moreover, students should understand that having a variety of resources provides an economy with more flexibility. Students will likely have some intuition that being too dependent on a few things involves a degree of risk.

### *Specialization, Comparative Advantage, and Trade*

**Question:** Why do Hollywood stars (and many other rich individuals)—unlike most people—have full-time personal assistants who manage their personal affairs?

*The point is to check that students can:* apply the concept of opportunity cost to the use of time. Student comments may lead to a discussion about what someone's time is "worth" in terms of social value, but the point of the question is really about available alternatives and their compensation. Students are also likely to point out that people with high incomes can afford to hire others.

### Debate the Issues

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#### **Issue: Will Renewable Energy Be the Next Innovative Breakthrough?**

An excellent resource on renewable energy is the Web site of RenewableEnergyWorld.com at <http://www.renewableenergyworld.com/rea/tech/home>.

For more information about William Baumol, visit <http://economics.about.com/cs/nobelwinners/p/baumol.htm>. To learn more about his work on innovation, read "A Conversation with Will Baumol on Capitalism, Innovation and Growth" by Antonio Guarino and Maurizio Iacopetta, available at <http://www.homepages.ucl.ac.uk/~uctpagu/baum-inter.pdf>. The authors interviewed Baumol, and this site is the transcript of the interview. (You can contact the authors for a tape.)

#### **Issue: Do We Really Specialize in That? Comparative Advantage in the United States and China**

Learn more about the production of soybeans and other crops on the Web site of the Environmental Protection Agency at <http://www.epa.gov/oecaagct/ag101/cropmajor.html>.

Another great resource is the Web site of the United Soybean Board at <http://www.unitedsoybean.org/>.

For a twist on the issue's introduction (for instance, most people associate soy with Asian food products, but the United States is a key producer), see the story from *The Economist* that discusses how China (estimated to be only 5% Christian) is home to one of the world's largest producers of Bibles. It is found at <http://www.economist.com/news/china/21574529-china-has-become-one-largest-producers-bibles-world-beginning-was>.

### Examples Used in the End-of-Chapter Questions

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Questions 7 and 10 reference the economies of India and China. Students can learn more about the tremendous growth in these two nations and the role that has been played by technology by reading "A New World Economy," by Pete Engardio (*BusinessWeek*, August 22, 2005). The article is available online (along with other linked materials) at <http://www.businessweek.com/stories/2005-08-21/a-new-world-economy.htm>.

Question 14 can be related back to the previous chapter. Ask how the recent recession affected relative costs and benefits of a college education and the choice between public and private colleges and universities.

## Economics Is Everywhere

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The following short synopsis, selected from the many vignettes in *Economics Is Everywhere* by Daniel S. Hamermesh (packaged for free with any Worth Principles text), corresponds to the material covered in this chapter of the text. The question that accompanies each vignette appears as an essay-type question in the Hamermesh text; for use with the Chiang text, those questions are adapted to a multiple-choice format and are also assignable in LaunchPad. The correct answers are indicated and feedback is provided here.

1.6 Describes the tradeoff people make between spending time with their family and spending time working (earning more money in the process).

Q: Draw a production possibilities frontier (PPF) that shows the tradeoff between family time and income (place income on the vertical axis and time on the horizontal axis). How would that frontier change if people do more telecommuting?

- a. The PPF would shift to the right.
- b. The PPF would shift to the left.
- c. The horizontal intercept would decrease making the PPF flatter.
- d. The vertical intercept would decrease making the PPF steeper.

A: Correct: a. The entire frontier would shift out to the right. The assumption made here is that commuting time is reduced. What will people do with that time? It is possible that a telecommuter may be able to work more and have more family time. While changes in the intercepts are also possible, the examples given in this question are incorrect.

20.2 Tells a story about two people working on a project to remove old wood fencing. It tells how they divided up the tasks by ability and notes how skills (and therefore productivity) changed with practice.

Q: Removing wood fencing requires three steps: dragging the wood, hammering the nails from the sharp ends so that their heads stick out, and removing the nails from the wood by pulling from the head end. In dividing up these tasks between two people, the person who should do the hammering is the one who has:

- a. an absolute advantage in hammering.
- b. a comparative advantage in hammering.
- c. no absolute advantage in any of the three steps.
- d. the absolute advantage in any two of the three steps.

A: Correct: b. The person with the comparative advantage in a task or occupation should be the one to do it. That's the efficient solution and the reason why specialization and trade can be mutually beneficial.

## For Further Analysis

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### Analyzing the Gains from Trade and the Effect of Growth

This example can be used as an in-class small group exercise or as an individual in-class exercise. It is designed to complement the text's material on comparative advantage and the gains from trade by incorporating Figure 7 and allowing students to work through the data presented in Tables 1–3. A shift in a production possibilities curve is also included.



**Learning objectives:** review of the definitions of absolute advantage and comparative advantage; application of the analysis of comparative advantage and the gains from trade; analysis of the causes and effects of growth; and reinforcement of critical thinking skills.

### Web-based Exercise

Students can investigate the differences between the Chinese and Indian economies in terms of the degree of government intervention. Indeed, some have wondered whether India's comparatively greater degree of democracy may have caused it to lag behind China economically. Possible sources include "Why India's Economy Lags Behind China's," by Ramtanu Maitre, *Asian Times*, June 27, 2003 (online at [http://www.atimes.com/atimes/South\\_Asia/EF27Df04.html](http://www.atimes.com/atimes/South_Asia/EF27Df04.html)) and "The Tiger in Front," *The Economist*, March 3, 2005.

*Points to be noted include the following:* China has been more successful than India in attracting foreign direct investment (FDI), which refers to foreign firms' building productive capacity in China. China has also been growing at a much faster rate. However, both of those statistics have been criticized for likely being subject to measurement errors. Observers have also pointed out that China's relative success may be in large part due to its greater amounts of investment in its infrastructure, including transportation and communication.

### Tips from a Colleague

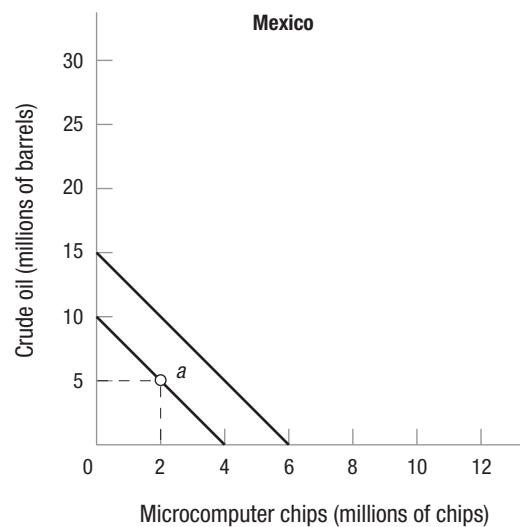
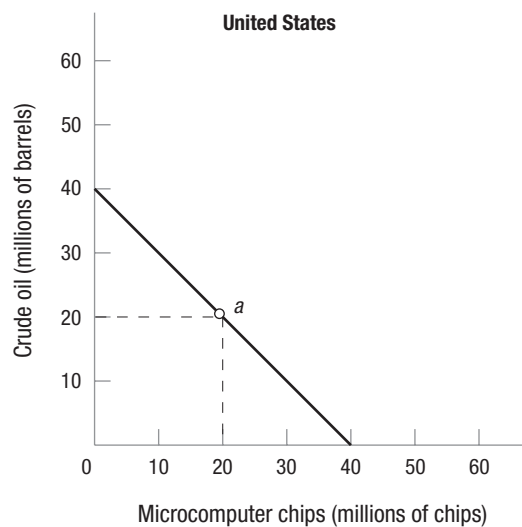
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Use the material in the opening pages to reinforce the information on resources and technology and their impacts on specialization and trade. Most students will have heard of Nokia and will identify it with electronics. Did you know they started out as a paper mill? See the Nokia story at <http://www.nokia.com/global/about-nokia/about-us/the-nokia-story>.



## HANDOUT 2-1

Date \_\_\_\_\_ Name \_\_\_\_\_ Class \_\_\_\_\_ Professor \_\_\_\_\_



## Analyzing the Gains from Trade and the Effect of Growth

The figure illustrates the production possibilities for the United States and Mexico, each of which can produce crude oil and microcomputer chips. Use the figure to answer the following questions:

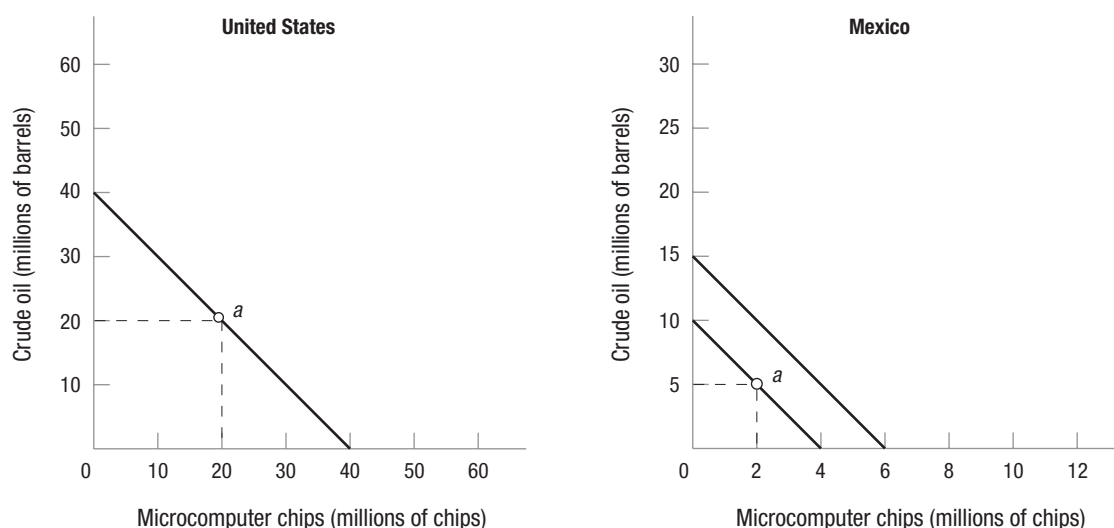
- 1) Which country has the absolute advantage in crude oil? Which country has it in microcomputer chips? Explain.
- 2) Which country has the comparative advantage in crude oil? Which country has it in microcomputer chips? Explain.

HANDOUT 2-1 (continued)

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- 3) Suppose that each country is producing and consuming the combination of the two goods represented by the point labeled  $a$  on its production possibilities curve. Suppose further that Mexico specializes in the production of oil and then trades 5 million barrels of oil to the United States in exchange for 3.5 million computer chips. Illustrate the new combination of the two goods that can now be consumed by each country. Label the points on the graphs as  $b$ .
- 4) Explain why each country is better off at  $b$  than it was at  $a$ .
- 5) Suppose that Mexico experiences growth such that its production possibilities curve now has the endpoints of 15 on the vertical axis and 6 on the horizontal axis. Draw the new production possibilities curve for Mexico.
- 6) Explain what may have caused this growth.
- 7) Has Mexico's absolute advantage changed as a result of growth? Has its comparative advantage changed? Explain why or why not.

## ANSWERS TO HANDOUT 2-1



## Analyzing the Gains from Trade and the Effect of Growth

The figure illustrates the production possibilities for the United States and Mexico, each of which can produce crude oil and microcomputer chips. Use the figure to answer the following questions:

- 1) Which country has the absolute advantage in crude oil? Which country has it in microcomputer chips? Explain.

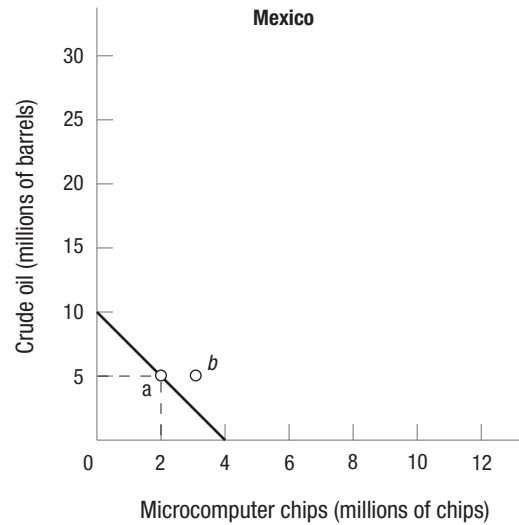
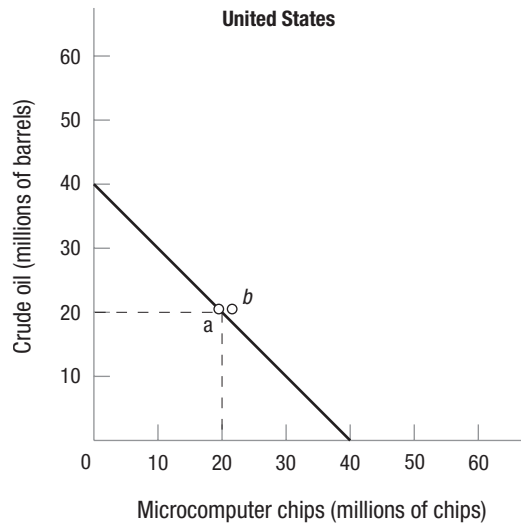
*The United States has the absolute advantage in both crude oil and microcomputer chips because it can produce more of each good than Mexico can.*

- 2) Which country has the comparative advantage in crude oil? Which country has it in microcomputer chips? Explain.

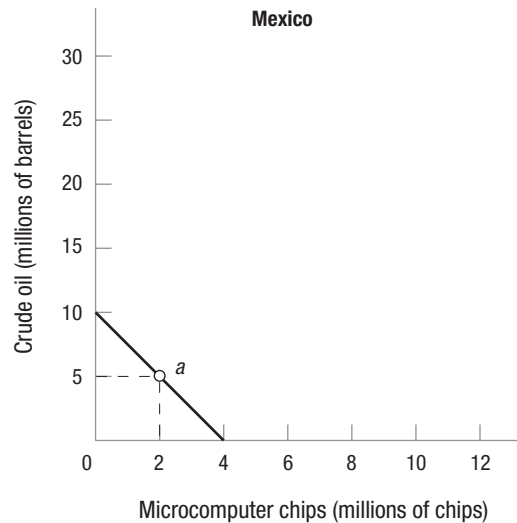
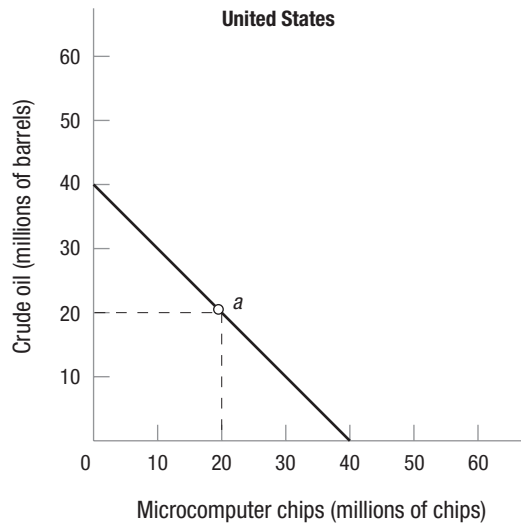
*The United States has the comparative advantage in microcomputer chips because producing 1 million more chips means sacrificing 1 million barrels of crude oil. For Mexico to produce 1 million more chips means sacrificing 2.5 million barrels of crude oil. Using the same reasoning, Mexico has the comparative advantage in crude oil because producing 1 million barrels more oil means sacrificing 0.40 million of chips. For the United States to produce 1 million barrels more crude oil means sacrificing 1 million of chips.*

- 3) Suppose that each country is producing and consuming the combination of the two goods represented by the point labeled "a" on its production possibilities curve. Suppose further that Mexico specializes in the production of oil and then trades 5 million barrels of oil to the United States in exchange for 3.5 million computer chips. Illustrate the new combination of the two goods that can now be consumed by each country. Label the points on the graphs as "b."

## ANSWERS TO HANDOUT 2-1 (continued)



- 4) Explain why each country is better off at *b* than it was at *a*.  
*Each country is better off at b than it was at a because the combinations of the two goods represent increased amounts of one good without a decreased amount of the other good.*
- 5) Suppose that Mexico experiences growth such that its production possibilities curve now has the endpoints of 15 on the vertical axis and 6 on the horizontal axis. Draw the new production possibilities curve for Mexico.



- 6) Explain what may have caused this growth.  
*This growth could be the result of an expansion in resources or improvements in technology. The quantity or quality of labor may have changed in such a way as to allow greater production of both goods.*

ANSWERS TO HANDOUT 2-1 (continued)

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- 7) Has Mexico's absolute advantage changed as a result of growth? Has its comparative advantage changed? Explain why or why not.

*No; even with the growth Mexico still does not have the absolute advantage in either chips or crude oil because the United States still can produce more of both. Nor has its comparative advantage changed; even with the increased amounts of both goods that can be produced the opportunity cost of each good has not changed.*

*[OPTIONAL: Consider a change in resources and/or technology such that Mexico's PPF changes in slope. That would affect the comparative advantage because the opportunity costs would now be different.]*

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