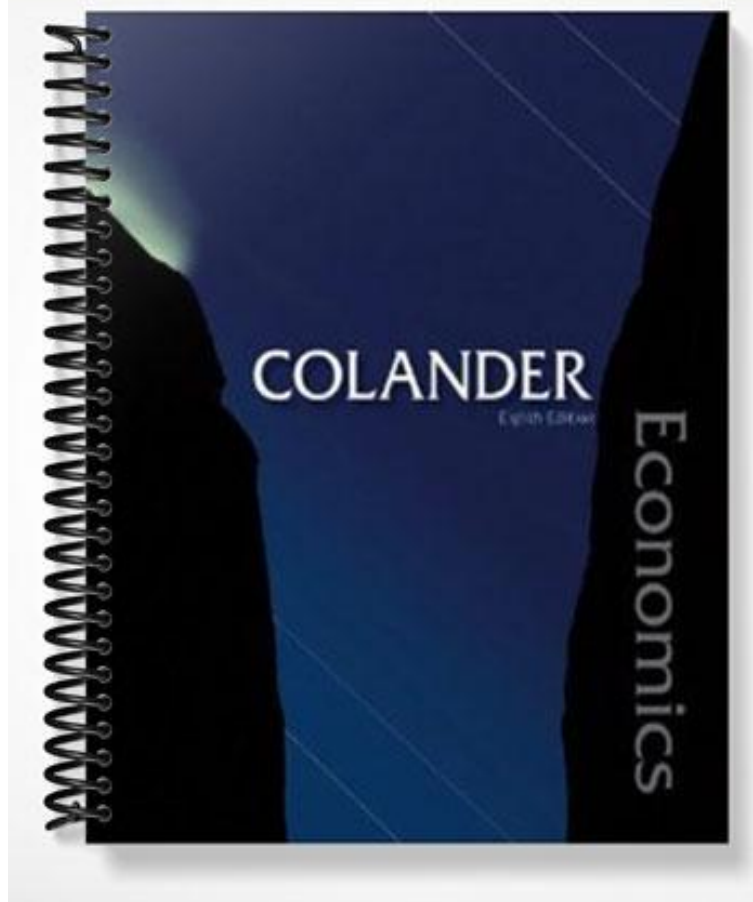


SOLUTIONS MANUAL



Chapter Two

The Production Possibility Model, Trade, and Globalization

Learning Objectives

After you teach the material in this chapter, your students should be able to do the following:

1. Demonstrate opportunity cost with a production possibility curve.
2. State the principle of increasing marginal opportunity cost.
3. Relate the concept of comparative advantage to the production possibility curve.
4. State how, through comparative advantage and trade, countries can consume beyond their production possibilities.
5. Explain how globalization and outsourcing are part of a global process guided by the law of one price.

Teaching Objectives

To help your students achieve the Learning Objectives above, you should anticipate common student difficulties with the material and be prepared to do the following:

- Connect the negative slope of the PPC with the concept of tradeoffs, and the bowed-outward shape with the concept of increasing marginal costs. (LO1)
- Relate the principle of increasing marginal opportunity cost to the use of resources. Students often at first think increasing marginal costs are counterintuitive, thinking that the more that one does something, the better one gets, or thinking about something like “economies of scale.” Talking about resources is a good way to help students understand this. Paper airplanes can be a good example. If the student were to make one paper airplane, he or she would have no problem finding a piece of paper to use. However, to make a million paper airplanes, the student would have to use some paper that has significant value, like a diploma or pages from their senior yearbook. Costs go up on the margin because people are smart; they do things at the lowest cost first. They don’t reach immediately for that diploma when making their *first* airplane. (LO2)

- Connect comparative advantage to the PPC via the concept of productive efficiency. To be productively efficient, an economy must not only use all of its resources, but must also use them *correctly*. This correct use is related to using resources in a way that is consistent with comparative advantage. With respect to guns and butter, it may be helpful to name this essential: cows. If the economy wants to move from producing only guns to producing *some* butter, ask students what resources should be moved from gun production to butter production. Cows. They're great at making butter but terrible at making guns. (LO3)
- Defend the idea that two countries can both consume outside of their production possibilities through specialization and trade based on comparative advantage, if necessary, by giving an example where one country has the absolute advantage in the production of both goods. Students might wrongly assume that it is absolute advantage that matters. Be prepared to provide an example where one country can produce more of both goods than can the other country, just to show that it is only comparative advantage that matters. The U.S. can benefit from trading even with a smaller economy that cannot produce more of any good than can the U.S. (LO4)
- Discourage students from wanting to say, at least at this point, whether globalization and trade are ultimately "good" or "bad"; the law of one price is morally ambiguous. It is simply the way a global economy works, and the pressures are real and need to be addressed. (LO5)

Changes to the 8th Edition

The following summarizes the ways in which this chapter has been updated since the 7th edition. Professors used to teaching from the previous edition will want to review this section to be sure they are up-to-date.

- The only significant update in this chapter is that the new language of "precept" and "theorem" is used. *Laissez-faire* is identified as a precept.

For Professors New to Colander

Every book presents material in slightly different ways, so it is helpful to note some of the names, notations, definitions or symbols that Colander uses as compared to other books. It will be easier for your students connect material presented in the lecture to material covered in the text if you note the following:

- Colander refers to the central model of this chapter as the “Production Possibility Curve” and “PPC” instead of “Production Possibility Frontier” and “PPF.”
- Colander distinguishes between *efficiency* (achieving a goal using as few outputs as possible) and *productive efficiency* (getting the most out of available resources), recognizing the important reality that maximizing total output is not a necessary goal. Other goals are possible. The achievement of goals at least cost is “efficient” whether or not the goals implied or required “productive efficiency.”

Chapter Outline

This is meant to be an outline and summary of what your students read in this chapter in the text, both in terms of concepts and examples. Headings and subheadings are tagged with the number of the learning objective (LO) to which the material in that section most closely relates and the associated PowerPoint slide numbers, so you may also use this to help you outline your lecture. Material followed by a ★ is new to the 8th edition.

- The Production Possibility Model, Trade, and Globalization
 - The three main coordination problems are reviewed, and students are reminded about the concept of opportunity cost, which will be central in this chapter to understand production possibilities.
- The Production Possibilities Model (LO1) [PPT Slides 3 & 4]
 - Production Possibility Table: “a table that lists a choice's opportunity costs by summarizing what alternative outputs you can achieve with your inputs.”
 - Output: “a result of an activity.”
 - Input: “what you put into a production process to achieve an output.”
- A Production Possibility Curve for an Individual (LO1) [PPT Slides 5 & 6]
 - An example is given wherein a student has one input, 20 hours of time per week, to use to produce two goods, a grade in an economics course and a grade in a history course. All 20 hours devoted to economics results in a grade of 100%; each hour less than 20 reduces the score by 3 percentage points. All 20 hours devoted to history results in a grade of 98; each hour less than 20 reduces the score by 2 percentage points.
 - Production Possibility Curve (PPC): “a curve measuring the maximum combination of outputs that can be obtained from a given number of inputs.”
 - The PPC for the study-time example from this section is graphed. It slopes downward from left to right, showing the trade-off between grades in economics and grades in history.
 - Two important points about the PPC: “1. There is a limit to what you can achieve, given the existing institutions, resources, and technology. 2. Every choice you make has an opportunity cost. You can get more of something only by giving up something else.”
- Increasing Marginal Opportunity Cost (LO2) [PPT Slide 7]

- The Principle of Increasing Opportunity Cost: “In order to get more of something, one must give up ever-increasing quantities of something else.”
- A PPC displaying increasing marginal opportunity costs is bowed-outward. This is because some resources are better at producing certain kinds of goods.
- A bowed-outward PPC showing the trade-off between “guns” (defense goods) and “butter” (domestic needs) is given numerically and graphically.
- Comparative Advantage (LO3) [PPT Slide 8]
 - Comparative Advantage: “the ability to be better suited to the production of one good than to the production of another good.”
 - When producing small amounts of a good, those resources with the comparative advantage in the production of those goods are used first. As more of the good is produced, eventually resources that have the comparative advantage in another good must be used. Therefore, as more of one good is produced, increasing amounts of other goods must be given up.
 - An example is given wherein the U.S. decides to produce more wheat. Land newly devoted to wheat will necessarily be less fertile than land previously devoted to wheat, so the increases in wheat production will require greater amounts of land.
 - An example of relief pitchers is also given: as the manager uses relief pitchers, he does so in decreasing order of talent.
- Efficiency (LO3) [PPT Slides 9 & 10]
 - Productive efficiency: “achieving as much output as possible from a given amount of inputs or resources.”
 - Inefficiency: “getting less output from inputs that, if devoted to some other activity, would produce more output.”
 - An interior point (A) on the graph of a PPC in Figure 2-3(a) is shown to be inefficient because society could produce just as much butter but with more guns (B) or just as many guns but with more butter (C).
 - Efficiency: “achieving a goal using as few inputs as possible.” Points B and C are efficient.

- A point (D) that is beyond the PPC in Figure 2-3(a) is unattainable.
- Neutral technological change, is presented in Figure 2-3(b) as a movement outward of the PPC on both axes; it is distinguished from biased technological change—a movement outward of the PPC that is anchored on one of the axes—which is shown in Figure 2-3(c).
- Distribution and Productive Efficiency (LO3) [PPT Slide 11]
 - Questions of distribution cannot be ignored when considering real-world situations.
 - The term “efficiency” refers to a specific goal, so it may not be the same as productive efficiency. Stated differently, producing more may not be efficient if “more” is not one of society's goals.
 - On the basis of the assumption that people prefer more to less and that the distributional effects of a policy are acceptable, many economists talk about efficiency and productive efficiency as identical.
- Examples of Shifts in the PPC (LO1)
 - Four situations and four PPCs are given for the student to practice identifying shifts in the PPC. The first is a neutral decrease in production possibility; the second is a biased increase in production possibility; the third is a neutral increase in production possibility; the fourth is a biased decrease in production possibility.
- Trade and Comparative Advantage (LO4) [PPT Slide 12]
 - The bowed outward shape of the PPC is reviewed again within the guns/butter framework.
 - “A society wants to be on the frontier of its production possibility curve.” This requires that resources be allocated in a way that is consistent with comparative advantage.
 - Adam Smith, *The Wealth of Nations*, and the invisible hand are introduced to explain how a society can achieve the correct allocation of resources: “As long as people trade, Smith argues, the market will guide people, like an invisible hand, to gravitate toward those activities for which they have a comparative advantage.”
 - This can take place without the need for government intervention.
- Markets, Specialization, and Growth (LO4) [PPT Slide 13]

- Markets that facilitate trade can lead to growth through specialization and competition, which “pushes individuals to find better ways of doing things.”
- World per capita income over the past 2,000 years is presented graphically to show how the increase in markets and trade at the end of the 18th century caused the growth rate of the world economy to rise sharply.
- The Benefits of Trade (LO4) [PPT Slides 14 & 15]
 - When people freely trade, and there is competition in trades, then every individual drives the best bargain he or she can, so all individuals in trade benefit as much as they possibly can.
 - This leads to the precept of *laissez-faire*: “an economic policy of leaving coordination of individuals' actions to the market.” ★
 - A two-country/two-good example is presented to show the benefits of trade based on comparative advantage. The example has the following specifics: the two countries are Pakistan and Belgium; the two goods are Textiles and Chocolate; Pakistan can produce a maximum of 4,000 yards of Textiles or 1 ton of Chocolate; it currently produces 2,000 yards of Textiles and 0.5 tons of Chocolate; Belgium can produce a maximum of 1,000 yards of Textiles or 4 tons of Chocolate; it currently produces 500 yards of Textiles and 2 tons of Chocolate. Obviously, Pakistan has the comparative advantage in Textiles, and Belgium has the comparative advantage in Chocolate. If they specialize and split everything in half, each country ends up with 2,000 yards of Textiles and 2 tons of Chocolate. It is easy to see how Pakistan and Belgium can end up with more of both goods than each could produce without specializing and trading.
 - The final point of consumption for the two countries lies beyond their individual PPCs.
- Comparative Advantage and the Combined PPC (LO4) [PPT Slide 16]
 - The combined PPC for the two countries in the above example is constructed by first asking how much of each good would be produced if the countries produced the same good (points F and G for Textiles and Chocolate respectively), then by asking how much of each good would be produced if the countries specialized according to comparative advantage (point H).

- “[T]he slope of the combined production possibility curve is determined by the country with the lowest opportunity cost.” As the number of countries increases, the PPC will be smoother and look more and more like the bowed-outward PPC introduced earlier.
- U.S. Textile Production and Trade (LO4, LO5) [PPT Slide 17]
 - Comparative advantage can change: the U.S. used to have a comparative advantage in producing textiles, but it no longer does. Now, Bangladesh does. The U.S. has the comparative advantage in things like computer software and airplanes.
- Outsourcing, Trade, and Comparative Advantage (LO5)
 - Outsourcing [PPT Slide 18]
 - Outsourcing: “the relocation of production once done in the United States to foreign countries.”
 - Insourcing: “the relocation of production done abroad to the United States.”
 - “If one country has the comparative advantage in producing one set of goods, the other country will have a comparative advantage in the other set of goods.” There is more to production than just labor costs.
 - Globalization [PPT Slide 19]
 - Globalization: “the increasing integration of economies, cultures, and institutions across the world.”
 - Globalization has two effects on firms: potential profits are much greater because markets are larger, but it is much harder to “win” because of the increased amount of competition.
- U.S. Comparative Advantage Today and Tomorrow
 - The United States has the comparative advantage in goods that require creativity and innovation, such as information technology, biotechnology, film, art, advertising, and nanotechnology.
- Exchange Rates and Comparative Advantage [PPT Slide 20]
 - If new industries in which the United States has a comparative advantage don't develop fast enough, then exchange rates or foreign wages will have to adjust to balance comparative advantages, which would hurt U.S. households and consumers.

- Law of One Price [PPT Slide 21]
 - The Law of One Price: “the wages of workers in one country will not differ significantly from the wages of (equal) workers in another institutionally similar country.”
 - The U.S. has been thus far able to avoid the “One Price” result because of its sufficiently strong comparative advantage along with foreigners' desire to hold U.S. financial assets.
- Globalization and the Timing of Benefits of Trade
 - Trade makes both countries better off. The axis on which the debate over trade and globalization spins is the timing of the benefits of trade to the U.S. The U.S. has already consumed many of the benefits of trade.
- Conclusion
 - The PPC summarizes: opportunity cost, comparative advantage, efficiency, and how trade leads to efficiency.
 - “Economists continually point out that seemingly free lunches often involve significant hidden costs.”

Additional Textbook Material

This section briefly summarizes the content of various additional material found throughout this chapter of the textbook.

- A Reminder, “Production Possibility Curves” — This box summarizes the PPC, covering its Definition, its Shape, Shifts in the PPC, and the meaning of Points In, Out, and On.
- Added Dimension, “Choices in Context” — This piece discusses the importance of sequence in decision-making. Starting one path often lowers the marginal cost of other choices along that path, but raises the marginal cost of choices along other paths. A decision tree is used to illustrate the concept. This idea is stated differently as “all decisions are made in context”.
- Real-World Application, “Made in China?” — American icons Ken and Barbie were never produced in the U.S. Though originally produced in Japan, Ken and Barbie are now produced all over the world, with several countries contributing to the production process according to its comparative advantage. Countries involved include Japan, China, Saudi Arabia, Taiwan, and the United States. Of the \$15 retail cost of a Barbie doll, \$12 is related to non-manufacturing activities, many of which take place in the United States.

- Real-World Application, “Insourcing into the United States” — Costs of production do not include only labor, which is why some global firms choose to produce in the United States. Novartis moved its research headquarters to Cambridge, Massachusetts because of that city's academic biomedical research facilities. Toyota also insources production to the United States to reduce transportation costs and because U.S. labor is relatively cheaper than Japanese labor. Lenovo, a Chinese computer manufacturer, has established sales offices in the United States.
- Added Dimension, “The Developing Country's Perspective on Outsourcing” — From the point of view of developing countries, the most important question about globalization might be: “Is it fair that U.S. workers don't work as hard as we do but earn much more?” Developing countries are trying to challenge U.S. comparative advantage in research, development, artistic, and other high-tech jobs by trying to encourage top scientists and engineers to stay in their countries.

Check for Understanding

These questions can be assigned as short writing assignments, used for group activities, or incorporated into your lecture. The questions are labeled with the learning objective they test.

- Why is the production possibility curve downward-sloping? What would it mean if it were upward-sloping? (LO1)
 - Answer: The production possibilities curve is downward-sloping because economies face tradeoffs. In order to produce more of one thing, resources must be taken away from the production of another thing. If the PPC were upward-sloping, that would mean that the economy was able to produce more of everything (or “both goods”), but if this is the case, then the economy must not have been producing efficiently to begin with. An upward-sloping PPC is illogical.
- Does the opportunity cost of studying increase at the margin? If you were to study for only one hour per week, when would you do it? What if you were going to study for a total of 15 hours per week? (LO2)
 - Answer: Students should have no problem thinking of one hour per week that they wouldn't mind using for studying. Coming up with 15 hours, however, ought to be harder. Because students are reasonable, they will use the least valuable time for marginal increases in study time. Going from zero hours to one hour of study time comes at little cost; going from 14 hours to 15 hours would be very costly, because studying would be interfering with family, work, or sleep time.
- According to Adam Smith, why do people end up doing the things for which they have a comparative advantage? (LO3)

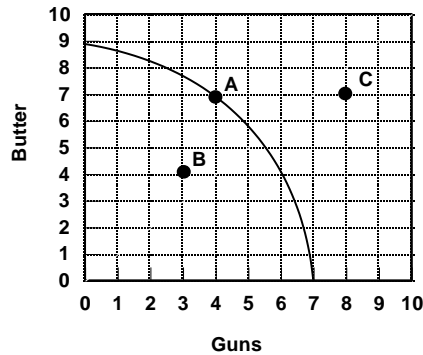
- Answer: Because people are trading intentionally in order to end up with more, people have a natural tendency to figure out how they can make trades that are best for them. When individuals find out which activities they have a comparative advantage in, they can increase the value of potential trades to their trading partners, which means that they can increase their opportunities to trade and increase value of what they get from the trade.
- Suppose a household decides to divide up the chores in such a way that each person does each chore once a month. Does this sound like the best way to divide up chores? (LO4)
- Answer: If the household divided chores up according to comparative advantage, everyone could be better off. This is because they would still have a clean house, with each chore getting done just as often, but each person would have to put in less effort. Comparative advantage in this case might be related to how quickly a person can do the chore, or how little they mind a certain chore. (Some people really hate to clean bathrooms; others really hate vacuuming.)
- Should we fight to keep manufacturing jobs in the United States? (LO5)
- Answer: This question is obviously a difficult one, and student answers may vary, but if manufacturing jobs are leaving the United States, it may well be that the U.S. no longer has the comparative advantage in manufacturing. This means that the U.S. has the comparative advantage in the production of something *else*, and the U.S. should try to discover what that is and produce that instead, so that it can take advantage of the benefits of trade.

Answers to the Problem Set

The following are the correct answers to the problem set that follows on the next two pages, along with the learning objective associated with each question. The problem set is designed to be photocopied directly from this book and distributed for student use.

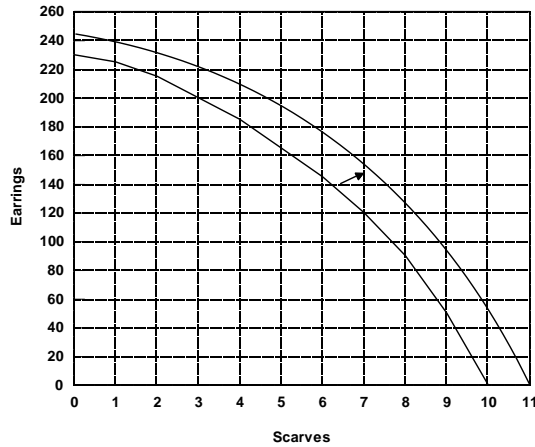
1. (LO1, LO2)
 - a. Decreasing butter production by 3 from 12 to 9 pounds.
 - b. Decreasing butter production by 4 from 9 to 5 pounds.
 - c. Opportunity costs of producing guns increase as more guns are produced. This is called the principle of increasing marginal opportunity cost.
2. (LO1, LO2)
 - a. It would shift in along the axis labeled “agricultural goods.”
 - b. It would shift out along the axis labeled “manufacturing goods.”
 - c. It would shift in along both axes.
3. (LO2, LO3)
 - a. See graph; b. See graph; c. See graph.

- d. Point B is inefficient because it is inside the production possibility curve. One could increase the number of guns while still produce the same amount of butter, or vice versa.



4. (LO2, LO3)

Parts a & b together:



5. (LO4, LO4)

- True. If the U.S. exchange rate falls, the dollar value of foreign wages will rise. That is, the relative wages of U.S. workers will decline, which will help the U.S. regain its comparative advantage.
- False. Because trade restrictions restrict the flow of goods and services, they keep the law of one price from equalizing wages and prices internationally.
- False. A country that has a comparative advantage in producing one set of goods means that the other country has to have a comparative advantage in the other set of goods.

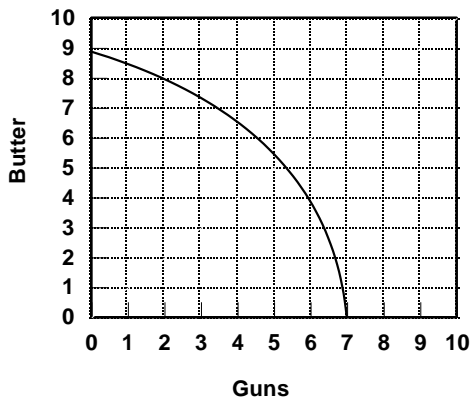
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CHAPTER TWO PROBLEM SET

Give the best answer to each of the following questions.

1. Refer to Figure 2-2 in the textbook to answer the following:
 - a. What is the opportunity cost of increasing gun production from 7 to 9 guns?
 - b. What is the opportunity cost of increasing gun production from 9 to 11 guns?
 - c. What is happening to the opportunity cost of producing guns as more are produced?
2. Explain how a production possibility curve for agriculture goods and manufacturing goods would shift after each of the events described below:
 - a. A drought in the Midwest reduces agricultural yield per acre.
 - b. Advances in computer technology lower the cost of producing manufactured goods but do not affect the cost of producing agricultural goods.
 - c. Civil war disrupts the production of all goods equally in the United States.
3. On the graph, below, label one example of each of the following:



- a. Efficient production. Label it point A.
- b. Inefficient production. Label it point B.
- c. Unattainable production. Label it point C.
- d. Why is point B inefficient?

4. A clothing accessory company produces scarves and earrings. Below are the production possibility combinations it can produce with the resources that it has.

Scarves	Earrings
10	0
9	50
8	90
7	120
6	145
5	165
4	185
3	200
2	215
1	225
0	230

- a. Draw the production possibility curve in the space below.

- b. Suppose technological advances increase production of both earrings and scarves by 10% without increasing costs. Demonstrate the effect of this innovation on the production possibility curve you drew above.

5. Briefly explain why the following statements are either TRUE or FALSE:

- a. One way for the United States to regain a comparative advantage in the production of goods is for the U.S. exchange rate to decline.
- b. Trade restrictions facilitate the impact of the law of one price on wages and prices internationally.
- c. Wages in China are lower than in the United States. Therefore, China has a comparative advantage in the production of all goods.