

# Solutions to Chapter 2 Text Problems

## Questions for Review

1. A positive economic statement is one that can be tested and validated; a positive economic statement is based on fact and tells “what is.” A normative economic statement cannot be tested or validated; a normative economic statement is often one of opinion and tells what “should be.”

An example of a positive economic statement: China’s GDP grew at an average rate of 5% from 2000 to 2012.

An example of a normative economic statement: Those who are unemployed should be given job training and assistance in finding a new job instead of unemployment insurance.

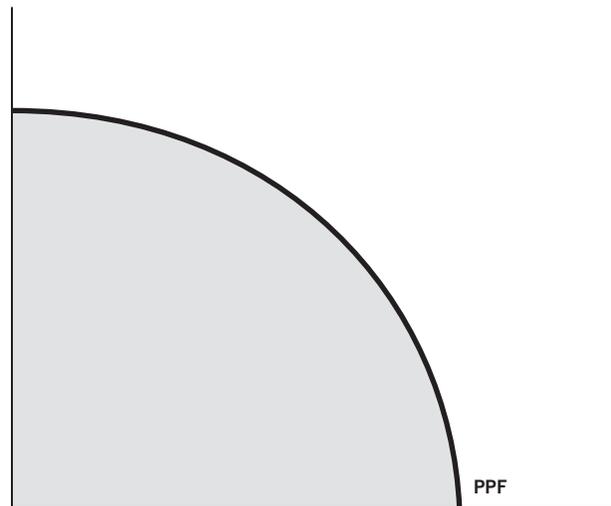
**Hints and Common Errors:** It’s easy to confuse the definitions of positive and normative. Here’s one way to remember. When you think of “positive,” think of scientific tests for diseases that either come back positive or negative. These are *tests*, and the absence or presence of a disease can be tested and validated; for example, “She tested *positive* for smallpox.” When you think of “normative,” think of the word “normal.” Everyone has his or her own idea of what is normal and what is not—this is something that cannot be tested or validated and is a statement of what *should* be.

Also, note that a positive statement need not be factually true as long as it can be tested. For example, consider the statement “All dogs have five legs.” This is obviously not true, but it is still a positive statement. It can be tested and found false by finding just one dog that does not have five legs.

2. No. It is extremely difficult to build a model that is completely realistic. First, all relevant variables would have to be included—in many cases, this would make the model cumbersome and difficult to understand, which would decrease the model’s usefulness. Second, even if all relevant variables were included, assumptions would have to be made about exactly how one variable affects the model; if any of these assumptions were incorrect, then the model would not make very good predictions.

So, while it is important to think about how realistic a model is, it’s also important to consider how adding variables might affect what kinds of assumptions need to be made, the simplicity of the model, and the model’s predictive power.

3. There are different ways to draw production possibilities frontier curves. Yours should look something like the following:



The efficient points are along the frontier. The inefficient points are inside of the frontier (the gray-shaded area). The possible points are the frontier and all points inside of it, and the infeasible points are the points outside the frontier (the white area).

4. The production possibilities curve bows outward from the origin because of the increasing opportunity cost of production. As you produce more of one good, it becomes harder and harder to produce an extra unit because you have already used the best resources for that unit.

Almost any two goods should reflect this increasing opportunity cost. What is more important is your explanation—*why* do these two goods have increasing opportunity cost? Consider the following example of a society that produces only two goods: corn and diamonds. The first 20 diamonds that they produce come from land that is very suitable for producing diamonds. This land, because it is full of diamonds, is not very suitable for growing corn. Therefore, the opportunity cost of the first 20 diamonds is only five ears of corn. After this, in order to produce another 20 diamonds, you have to use land that is not quite as good at producing diamonds as the first parcel of land. This land is a bit more suitable for growing corn, so in order to produce the next 20 diamonds, you give up 15 ears of corn. As you produce more and more diamonds, you use land that is less and less suitable for diamonds and

more and more suitable for corn, so your opportunity cost of diamonds is increasing.

5. No, even if you have an absolute advantage in everything, you should not undertake everything on your own. What matters is your comparative advantage, and even if you have an absolute advantage in everything, other people will have a comparative advantage in some goods. The person with the comparative advantage in one good should produce that good. If each person (or country) produces the good in which he or she has the comparative advantage, then he or she can produce more in total than if the two workers each produced both goods. When people specialize, more can be produced, and this gain can be split. Everyone is better off.
 

**Hints and Common Errors:** Remember that comparative advantage is a comparison word—it means that if one person has the comparative advantage in one good, then the other person, by definition, has the comparative advantage in the other good. It's similar to saying, "Kelly is taller than Alex" or "Kelly is better at being tall than Alex." Then, by definition, "Alex is shorter than Kelly" or "Alex is better at being short than Kelly." Comparative advantage works the same way. Suppose Kelly and Alex run a bakery that sells pies and cookies. If Kelly has the comparative advantage in baking pies, then this means that Alex has the comparative advantage in making cookies.
6. To determine which of two workers has a comparative advantage in a task, you look at each worker's opportunity cost. The worker with the *lower opportunity cost* is the one with the comparative advantage in that task. For example, suppose two workers can make either gift cards or hot dogs. The opportunity cost of one gift card is the number of hot dogs the worker could have made instead. Whoever gives up fewer hot dogs to make one gift card is the worker with the comparative advantage in gift cards. Intuitively, that worker is better at making gift cards because it costs her less (in units of hot dogs) to make each gift card. This means that the other worker would have the comparative advantage in making hot dogs.
7. To make a trade, all you need is for one worker (or country) to have a comparative advantage. Even if one of the workers has the absolute advantage in both goods, there can still be gains in trade if each worker has a comparative advantage. This is most easily seen using an example.

Suppose Bert and Ernie can make chocolate chip cookies or lemonade, and the following table

indicates the time it takes for each to complete these two tasks:

	One Batch of Chocolate Chip Cookies	One Glass of Lemonade
Bert	60 minutes	30 minutes
Ernie	45 minutes	15 minutes

Ernie has the absolute advantage in both cookies and lemonade (he's faster at both), but Bert has the *comparative* advantage in cookies (Bert gives up only two glasses of lemonade compared to Ernie's three). Without trade, suppose Bert spends 30 minutes a day baking cookies and 90 minutes a day making lemonade, while Ernie spends 45 minutes a day baking cookies and 75 minutes a day making lemonade. This means that together they produce 1.5 batches of cookies and 8 glasses of lemonade. If they specialize and trade, they can produce 2 batches of cookies and 8 glasses of lemonade, which means they have created an extra one-half batch of cookies. There is value from trade here, even though one person has the absolute advantage in both goods!

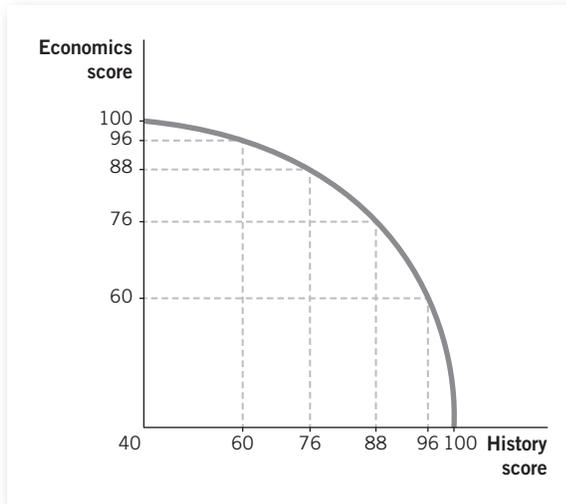
8. The most important factor for economic growth is investment in capital goods. The more we spend today on capital goods, the more we can produce in the future. If we build more factories and machinery today, we're able to produce more products tomorrow. However, this comes at a cost—less consumption today. Other important factors are technology and changes in resources.

## Study Problems

1. a. Michael's opportunity cost is 2 sculptures for each painting he produces. How do we know this? If he devotes all of his time to sculptures, he can produce 10. If he devotes all of his time to paintings, he can produce 5. The ratio 10:5 is the same as 2:1. Michael is therefore twice as fast at producing sculptures as he is at producing paintings. Angelo's opportunity cost is 3 sculptures for each painting he produces. If he devotes all of his time to sculptures, he can produce 6. If he devotes all of his time to paintings, he can produce 2. The ratio 6:2 is the same as 3:1.
  - b. For this question, we need to compare Michael's and Angelo's relative strengths. Michael produces 2 sculptures for every painting, and Angelo produces 3 sculptures for every painting. Because Michael is only twice as good at producing sculptures, his opportunity

cost of producing each painting is 2 sculptures instead of 3. Therefore, Michael is the low-opportunity-cost producer of paintings.

- c. If they specialize, Michael should paint and Angelo should sculpt. You might be tempted to argue that Michael should just work alone, but if Angelo does the sculptures, Michael can concentrate on the paintings. This is what comparative advantage is all about.
2. a.



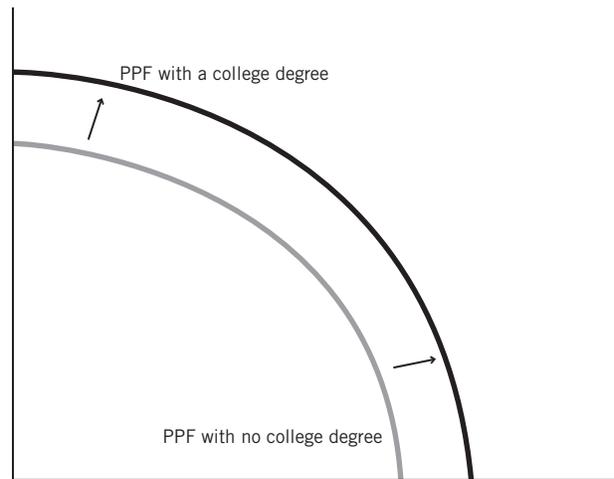
- b. Yes, because it is not a straight line.
- c. The opportunity cost is that the student's grade falls from 96 to 76 in history.
3. Your economics professor should probably not take time out of his or her teaching schedule in order to mow the lawn. Suppose your professor can produce either economics lessons or mowed lawns; his or her opportunity cost of mowing the lawn is the income that he or she gives up by mowing the lawn instead of teaching. If your professor hires his or her neighbor's 16-year-old son to mow the lawn instead, then they both gain from this trade. Your professor has a comparative advantage in producing quality economics lectures, so the professor should teach. The professor pays the neighbor's son to mow the lawn instead, and both are better off.

**Hints and Common Errors:** Another way to think about this question is to think about how much your professor values his or her time. Suppose the professor is paid for each hour that he or she teaches, and suppose that he or she can mow the lawn in an hour. If the amount that the professor is paid is greater than the amount it would cost to hire someone to mow the lawn, then it makes more sense for the professor to teach.

Of course, the question specifically refers to your professor taking time out of his or her teaching schedule to mow the lawn. It is possible

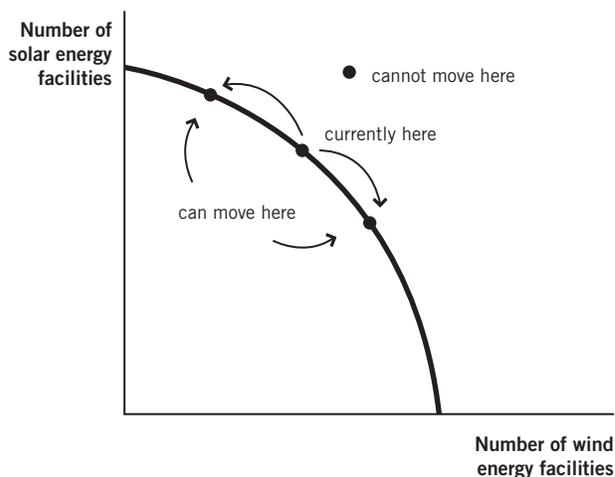
that the value of his or her time varies according to the time of year. In the summer, when your professor does not teach, his or her value of time might be much lower, and he or she may choose to mow the lawn instead. This also applies to your own time. You might take a part-time job in the summer that pays \$20/hour but not be willing to take that same job during the school year. You may value your time more during the school year because you need to study for your classes and raise your own human capital stock. Your opportunity cost of working might be higher during the school year than in the summer.

4. a. Positive  
b. Positive  
c. Normative  
d. Normative  
e. Normative
5. Your decision to invest in a college degree today adds to your capital stock. You are investing in your human capital so that you will be able to produce and earn more in the future. This shifts out your future PPF. With a college degree, you can get a job that allows you to earn and buy more.



6. A new fertilizer that doubles potato production will shift the entire PPF out along the potato axis but not along the carrot axis. Nevertheless, the added ability to produce more potatoes means that less acreage will have to be planted in potatoes and more land can be used to produce carrots. This makes it possible to produce more potatoes and carrots at many points along the production possibilities frontier. Figure 2.3 has a nice illustration if you are unsure how this process works.
7. Assuming that resources are already being efficiently used in other programs (i.e., there is nowhere to take money from other programs without affecting the programs' success), and assuming that the politician cannot raise the funds from another source, it will be impossible

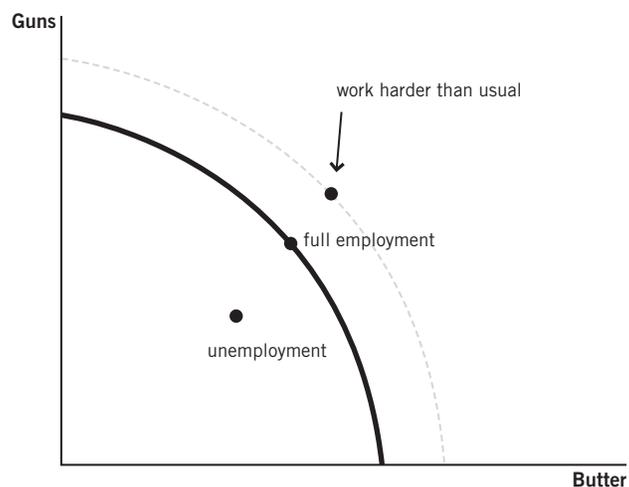
to build additional facilities for the solar and wind power programs. You are already at the frontier of the PPF and utilizing all of your resources efficiently. You can move *along* the frontier and create either more wind power *or* more solar power but not both. To create more of both, you would have to be at a point outside of the PPF, which is infeasible.



8. a. Rachel gives up 2 pies for every loaf she makes. Joey gives up 1 pie for every loaf he makes.
  - b. Rachel
  - c. Joey
  - d. Joey should make the bread and Rachel the pies.
  - e. Rachel makes 2 pies per loaf and Joey makes 1 pie per loaf. So any trade between 2:1 and 1:1 would benefit them both.
9. Unemployment would be a point inside the frontier. There are resources (people) that are not being used efficiently. If jobs were provided to those who are unemployed, then it would be possible to increase production in one sector without having to give up production in another. For example, suppose the unemployed were hired to build a bullet train from Seattle to Los Angeles. The bullet train would be produced without having to give up production in the food or manufacturing sectors. Therefore, full employment would be a point on the frontier. At full employment, it would be impossible to gain more of one good without giving up another good (assuming no technological advances).

If, in a time of crisis, people pitch in and work much harder than usual, then the production

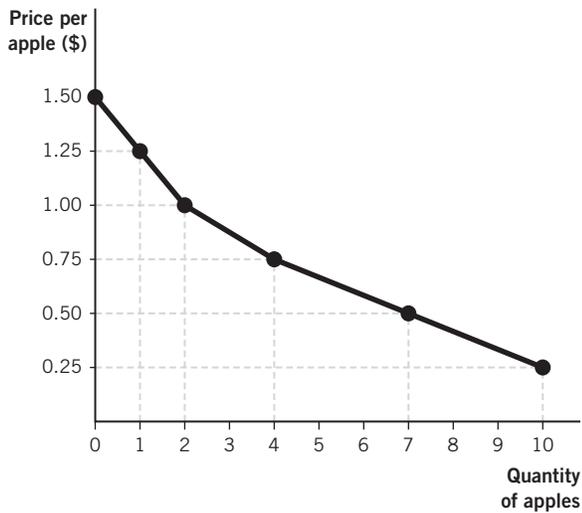
possibilities frontier shifts out. The economy is able to produce more of everything because everyone is working much harder. Note, however, that this shift may not be sustainable over time.



10. The following lines illustrate the opportunity costs and trade-offs in the poem.
- Line 2: "And sorry I could not travel both  
Line 13: Oh, I kept the first for another day!  
Line 19: I took the one less traveled by,"
- To be clear, you could also include the following two lines.
- Line 4: "And looked down one as far as I could  
Line 6: Then took the other, as just as fair,"
11. Despite what you might think, the opportunity cost is *not* \$200. You would be giving up \$200 in enjoyment if you go to the Maroon 5 concert, but you would also have to pay \$135 to see Taylor Swift, whereas the Maroon 5 ticket is free. The difference between the satisfaction you would have experienced at the Taylor Swift concert (\$200) and the amount you must pay for the ticket (\$135) is the marginal benefit you would receive from her concert. That amount is  $\$200 - \$135 = \$65$ . You are not as big a Maroon 5 fan, but the ticket is free. As long as you think the Maroon 5 concert is worth more than \$65, you will get a larger marginal benefit from seeing Maroon 5 perform than from seeing Taylor Swift perform. Therefore, the opportunity cost of using the free ticket is \$65.

## Appendix Study Problems

1. a. The following table plots the data provided in the table:



- b. The relationship between the price of apples and the quantity demanded of apples is negative. From the table, we can see that as the price of apples increases from \$0.25 to \$1.50, the quantity demanded of apples falls from 10 to 0. Graphically, you can see that the relationship is negative because the slope is negative and the line is downward sloping.

2. The slope is calculated by using the formula:

$$\text{Slope} = \frac{\text{change in } y}{\text{change in } x} = \frac{\$40 - \$20}{20 - 50} = \frac{\$20}{-30} = -0.6667$$

3. This sentence confuses correlation with causation. Here, there is a correlation. Ice cream sales increase; simultaneously, the number of people who drown also increases. However, this is not enough to prove causation—that the ice cream *caused* drowning. There are other explanations that also make sense. For example, it is possible that there is a third factor changing that causes both of these two events. In this case, it is more likely that hot weather causes both ice cream sales to increase and more people to swim—and, therefore, drown.

**Hints and Common Errors:** One of the reasons economists build models is so they can see the change that occurs when *just one variable* changes. It's not enough to look at correlations; correlation doesn't prove causation, and causation is especially important when thinking about policies. Think about a policy that is based on the sentence in this question. If it is true that ice cream sales cause drowning, then a reasonable policy would be to ban the sale of ice cream. However, we all know that this would not actually cause fewer people to drown.