# *The Economy Today 17th edition Schiller Solutions Manual*

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# CHAPTER 1: Economics: The Core Issues
# SOLUTIONS MANUAL

## Learning Objectives for Chapter 1

***After reading this chapter, you should know***
**LO1-1** What scarcity is.
**LO1-2** How scarcity creates opportunity costs.
**LO1-3** What the production possibilities curve represents.
**LO1-4** The three core economic questions that every society must answer.
**LO1-5** How market and government approaches to economic problems differ.

## Questions for Discussion

1. What opportunity costs did you incur in reading this chapter? If you read another chapter today, would your opportunity cost (per chapter) increase? Explain. **LO1-2**

   **Answer:** Opportunity cost is what you must give up to get the next-best alternative. In this case, opportunity costs include the things you could have done with your time instead of reading this chapter. The most desired activity you give up is the value of the opportunity cost.

   As you first begin to read, you first give up the alternative activities that have the least value to you. As you spend more time studying, you begin giving up activities that have increasing value to you. For example, the first hour of studying may have resulted in you not watching a TV show. The second hour of studying may result in you not using your PlayStation 5, which you believe offers more satisfaction than the first TV show that you gave up, and so on.

2. How much time *could* you spend on homework in a day? How much do you spend? How do you decide? **LO1-2**

   **Answer:** You theoretically could spend 24 hours a day doing homework. However, in reality, there is a limit to the amount of time in which you can effectively complete your homework. Most students spend substantially less than 24 hours per day because there are competing needs for their time, such as work, sleep, and social time.

   A person decides how much time to spend on homework based on the perceived payoff (an improvement in learning or an improvement in your course grade) and compares this to the value of what must be given up to complete the homework. Those activities that are perceived as giving the most benefit are usually the activities completed first. At some point, the perceived benefit from completing additional homework is less than the benefit from other activities, and you stop working on homework.

3. What's the real cost of a "free lunch," as mentioned in the discussion of "Opportunity Costs"? **LO1-2**

   **Answer:** There is no such thing as a "free lunch." Every time we use scarce resources in one way, we give up the opportunity to use them in other ways. A free lunch's opportunity cost is what could be produced or consumed otherwise with those resources that were used for the lunch.


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4. How might a nation's production possibilities be affected by the following? **LO1-3**
   a. Discovery of a new oil field.
   b. A decrease in immigration.
   c. An increase in military spending.
   d. More job training.

   **Answer:** In general, a nation's production possibilities curve will shift due to a change in resources, a change in the quality of resources, or a change in technology.

   a. Discovery of a new oil field is an example of a change in resources, which causes an increase in a country's production possibilities. Discovering a new oil field allows a country to have a greater capacity in the long run, leading to more output.

   b. A decrease in immigration is an example of a decrease in resources for a nation. A decrease in immigration certainly is a decrease in the number of laborers, which would necessarily decrease the production possibilities. These immigrants also have varying levels of skills and education (human capital) that also will decrease the production possibilities of a nation.

   c. An increase in military spending will, in general, simply move the economy from one point on the production possibilities curve to a different point on the curve since this is nothing more than a trade-off in the government spending pattern. If the increase in spending results in new research and development that improves technology that has civilian applications, then the production possibilities could potentially increase over time.

   d. An increase in job training makes workers more productive. This increased productivity means that more output can be produced with the existing number of workers, which would increase a nation's production possibilities curve.

5. What benefits might we get from Mars exploration? Will those benefits exceed the opportunity costs? **LO1-2**

   **Answer:** Students can discuss some of the possible benefits, which include scientific discovery, the possibility of technical advancements and how these advancements may benefit us on Earth, global collaboration between countries to complete a mission, the potential for human settlement, business and job growth in the space industry, potential use of Mars resources in production, etc. Students also need to explain that any investment in Mars exploration means we cannot use those same resources (workers, capital) for other uses (i.e., opportunity costs). Students then need to discuss whether those benefits exceed the opportunity costs.

6. Who would go to college in a completely private (market) college system? How does government intervention change this FOR WHOM outcome? **LO1-4**

   **Answer:** Financial aid and guaranteed student loans make college accessible to more people. Many states also subsidize in-state students with low tuition so that more individuals can afford school. In a completely private system, without access to adequate funds, many people with the intellectual ability would not be able to go to college.

7. Why do people around the world have so much faith in free markets (World View "Market Reliance vs. Government Reliance?")? **LO1-5**


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**Answer:** Market-based incomes based on private property may motivate higher productivity; thus, more should be produced in total. Incomes and standards of living are higher in market-based economies. Also, free markets give people more freedom in their choices and ensure property rights over what they have produced and the incomes they earn.

8. What is the connection between North Korea's missile program and its hunger problem (World View "North Korea's Missile Tests Deepen Hunger Crisis")? **LO1-2**

   **Answer:** North Korea is a relatively small country: Its population of 26 million ranks 50th in the world. Yet North Korea maintains an extremely large army and continues to develop a nuclear weapons capability. To do so, it must allocate as much as 20 percent of all its resources to feeding, clothing, and equipping its military forces. As a consequence, there aren't enough resources available to produce food. Currently Korea's farmers can't feed the country's population. This is an example of a "guns versus butter" choice. When North Korea uses more resources for missiles (guns), it necessarily has fewer resources available to produce food (butter).

9. Explain why there are limits to output and how these limits force economies to make trade-offs. **LO1-1**

   **Answer:** There's a limit to the amount of output an economy can produce in a given time period because available resources and technology are scarce. As long as resources are scarce, their use entails an opportunity cost, which means an economy can obtain additional quantities of any particular good only by reducing the potential production of another good. For example, if a country desires to produce more trucks, a trade-off in the form of a reduction in the production of another good must happen.

10. If climate change was in fact the greatest threat to society, should all our resources be used to combat it? What percentage of our output should be devoted to the pursuit of a carbon-neutral economy? **LO1-2**

    **Answer:** In general, no, not all resources should be used for a single use. One must always remember the opportunity costs for using a resource. Students' answers for the second part will vary, but students should explain their reasoning using the concepts of scarcity, opportunity cost, and trade-offs.

## Problems for Chapter 1

1. According to Table 1.1 (or Figure 1.1), calculate the opportunity cost of producing the second 10 trucks (= trucks 11–20). **LO1-2**

   **Answer: 7 tanks**

   **Feedback:** A production possibilities curve (PPC) describes the various output combinations that could be produced in a given time period with available resources and technology.

   Opportunity cost is the most desired goods or services that are forgone to obtain something else. In this case, the opportunity cost to produce more trucks is fewer tanks. To calculate opportunity cost, identify how many tanks must be given up to produce the additional trucks.

   If this economy desires to produce its *second 10* trucks, this implies the economy is producing just 10 trucks and wants to now produce 20 trucks. In other words, current production is truck production = 10,



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tank production = 45, or at point *E.* The economy wants to change its production so that there would be 20 trucks.

To produce the second 10 trucks, tank production must decrease because some resources must be diverted from tank production to truck production (new production: truck production = 20, tank production = 38, or at point *D*). The opportunity cost of these second 10 trucks is the number of tanks the economy must give up when moving from point *E* to point *D* (= 45 tanks − 38 tanks = 7 tanks).

The opportunity cost of the second 10 trucks is 7 tanks.

2.

a. Compute the opportunity cost in forgone consumer goods (millions of pounds of butter) for each additional unit of military output produced (number of planes): **LO1-3**

| | | | | | | |
|---|---|---|---|---|---|---|
| Military output | 0 | 1 | 2 | 3 | 4 | 5 |
| Consumer goods output | 100 | 95 | 80 | 60 | 35 | 0 |
| Opportunity cost | — | — | — | — | — | — |

b. As military output increases, are opportunity costs increasing, decreasing, or remaining constant?

**Answers:**

**a.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Military output** | **0** | **1** | **2** | **3** | **4** | **5** |
| **Consumer goods output** | **100** | **95** | **80** | **60** | **35** | **0** |
| **Opportunity cost** | **—** | **5** | **15** | **20** | **25** | **35** |

**b. As military output increases, opportunity costs are increasing.**

**Feedback:**

a. When military production is increased from 0 to 1 plane, the production of consumer goods falls from 100 to 95 million pounds of butter. The opportunity cost to produce one more plane in terms of butter given up is 5 million pounds of butter (= 100 million pounds of butter − 95 million pounds of butter = 5 million pounds of butter).

When military production is increased from 1 to 2 planes, the production of consumer goods falls from 95 to 80 million pounds of butter. The opportunity cost to produce one more plane in terms of butter given up is 15 million pounds of butter (= 95 million pounds of butter − 80 million pounds of butter = 15 million pounds of butter).

When military production is increased from 2 to 3 planes, the production of consumer goods falls from 80 to 60 million pounds of butter. The opportunity cost to produce one more plane in terms of butter given up is 20 million pounds of butter (= 80 million pounds of butter − 60 million pounds of butter = 20 million pounds of butter).

When military production is increased from 3 to 4 planes, the production of consumer goods falls from 60 to 35 million pounds of butter. The opportunity cost to produce one more plane in terms of butter given up is 25 million pounds of butter (= 60 million pounds of butter − 35 million pounds of butter = 25 million pounds of butter).

When military production is increased from 4 to 5 planes, the production of consumer goods falls from 35 to 0 million pounds of butter. The opportunity cost to produce one more plane in terms of butter given up is 35 million pounds of butter (= 35 million pounds of butter − 0 million pounds of butter = 35 million pounds of butter).



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b. In this example, opportunity costs increase as we increase the production of military goods. This is due in large part because it is difficult to move resources from one industry to another. In the economy, the resources used to produce butter do not transform into manufacturing planes easily. Farmers who make butter may not have the same skills for plane manufacturing. As we continue to transfer resources (land, labor, capital, and entrepreneurship) from one industry to the other, an economy usually must give up more butter for each plane produced. This is the concept of increasing opportunity costs.

3. According to Figure 1.2, how much food production is sacrificed when North Korea moves from point *P* to point *N*? **LO1-3**

   **Answer: G – C units of food**

   **Feedback:** Point *P* indicates that North Korea is producing a combination of G units of food and H units of military output per year. Moving along the PPC from point *P* to point *N*, North Korea now produces a combination of C units of food and D units of military output per year. Therefore, military output increases by D − H and food output decreases by G − C.

4. a. If the average North Korean farmer produces 1,500 pounds of food per year, what is the opportunity cost, in pounds of food, of North Korea's army (World View "World's Largest Armies")? **LO1-2**
   b. If a person needs at least 500 pounds of food per year to survive, how many people could have been fed with the forgone food output?

   **Answers:**
   **a. 1,800,000,000 pounds of food per year**
   **b. 3,600,000 people**

   **Feedback:**
   a. According to the World View, North Korea has 1,200,000 active military members. If all of these soldiers were instead farmers, 1,800,000,000 pounds of food could have been produced (= 1,200,000 farmers × 1,500 pounds of food per year).

   b. This food could have fed 3,600,000 people per year (= 1,800,000,000 pounds of food ÷ 500 pounds of food per person).

5. What is the opportunity cost (in civilian output) of a defense buildup that raises military spending from 3.7 to 3.9 percent of a $27 trillion economy? **LO1-2**

   **Answer: $54 billion**

   **Feedback:** If a $27 trillion economy allocates 3.7 percent to defense spending, the country will spend $999 billion on defense (= 3.7% × $27 trillion = 0.037 × $27,000,000,000,000 = $999,000,000,000 = $999 billion).

   If defense spending increases to 3.9 percent, defense spending would now be equal to $1,053 billion (= 3.9% × $27 trillion = 0.039 × $27,000,000,000,000 = $1,053,000,000,000 = $1,053 billion).

   The opportunity cost of this increase in defense spending is $54 billion of other output produced (= $1,053 billion − $999 billion = $54 billion).

6. According to Figure 1.3, what percent of output consists of nonmilitary goods in **LO1-5**


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a. Ireland?
b. Russia?

**Answers:**
**a. 99.7 percent**
**b. 95.7 percent.**

**Feedback:**
a. According to the figure, Ireland devotes 0.3 percent of its output to the military. This means that 99.7 percent of its output consists of nonmilitary goods (= 100% of output − 0.3% devoted to military).

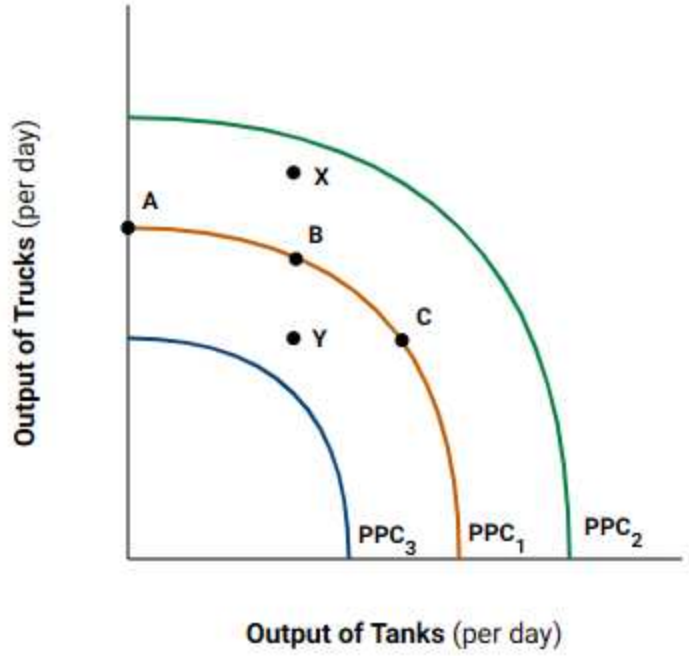
b. According to the figure, Russia devotes 4.3 percent of its output to the military. This means that 95.7 percent of its output consists of nonmilitary goods (= 100% of output − 4.3% devoted to military).

7. According to the figure below (similar to Figure 1.4), **LO1-3**
a. At which point(s) is this society producing some of each type of output but producing inefficiently?
b. At which point(s) is this society producing the most output possible with the available resources and technology?
c. At which point(s) is the output combination unattainable with available resources and technology?
d. Show the change that would occur if the resources of this society increased. Label this curve $PPC_2$.
e. Show the change that would occur with a huge natural disaster that destroyed one-third of production capacity. Label this curve $PPC_3$.

**Answers:**
**a. Y**
**b. A, B, C**
**c. X**
**d. $PPC_1$ to $PPC_2$**
**e. $PPC_1$ to $PPC_3$**


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**Feedback:**

a. Point Y. A production possibilities curve shows potential output, not necessarily actual output. If we're inefficient, actual output will be less than potential. Points inside the PPC represent the incomplete use of available resources. Point Y is inside the PPC.

b. Points A, B, and C. Efficiency is making the most of available resources and maximizing output. Every point on the PPC (A, B, C) is efficient and represents the maximum use of our production capabilities.

c. Point X. Points outside the PPC (X) are unattainable with available resources and technology.

d. $PPC_1$ to $PPC_2$. $PPC_2$ is an example of a curve that shifted out from the original PPC. If this society's population increases dramatically, technology advances, the stock of capital increases, or any combination of an increase in resources occurs, then the economy's production possibilities will increase. This increase in resources would shift the PPC outward, resulting in economic growth.

e. $PPC_1$ to $PPC_3$. $PPC_3$ is an example of a curve that shifted in from the original PPC. A huge natural disaster that destroyed vast amounts of infrastructure or caused a loss of lives means there has been a decrease in resources and the economy's production possibilities will decrease. This decrease in resources would shift the PPC inward, resulting in economic contraction.

8. You have only 20 hours per week to use for either study time or fun time. Suppose the relationship between study time, fun time, and grades is shown in this table: **LO1-3**

| | | | | | |
|---|---|---|---|---|---|
| Fun time (hours per week) | 20 | 18 | 14 | 8 | 0 |
| Study time (hours per week) | 0 | 2 | 6 | 12 | 20 |
| ***Grade point average*** | ***0*** | ***1.0*** | ***2.0*** | ***3.0*** | ***4.0*** |

a. Draw the (linear) production possibilities curve on a graph that represents the alternative uses of your time.

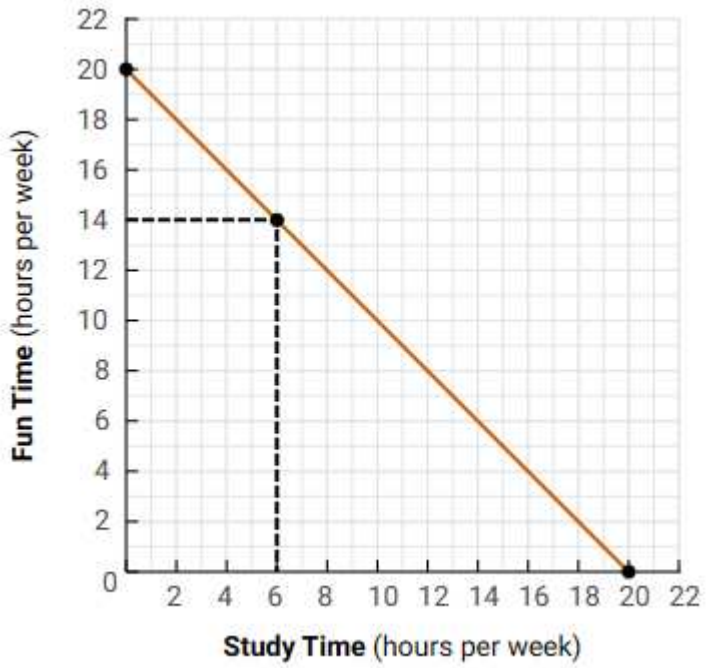


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b. On the same graph, show the combination of study time and fun time that would get you a 2.0 grade point average.
c. What is the cost, in lost fun time, of raising your grade point average from 2.0 to 3.0?
d. **(Connect only content)** What is the opportunity cost of increasing your grade point average from 3.0 to 4.0?

**Answers: a, b. See the graph on the next page.**




**c. 6 hours of fun time**
**d. (Connect only content) 8 hours of fun time**

**Feedback:**
a. Graph study time (in hours per week) on the *x*-axis, ranging from 0 to 20. Graph fun time (in hours per week) on the *y*-axis, ranging from 0 to 20. The amount of fun time corresponding to study time is 20 minus the amount of study time per week.

b. A 2.0 grade point average would require 6 hours of study time per week. This corresponds to 6 on the *x*-axis (study time) and 14 on the *y*-axis (fun time).

c. The opportunity cost of raising your grade point average from 2.0 to 3.0 is that you must give up 6 hours of fun time. It takes 6 hours of studying to obtain a grade point average (GPA) of 2.0, whereas it takes 12 hours to obtain a GPA of 3.0. Thus, you must sacrifice 6 more hours of fun time to raise your GPA to 3.0.

d. The opportunity cost of raising your grade point average from 3.0 to 4.0 is giving up 8 hours of fun time. It takes 12 hours of studying to obtain a GPA of 3.0, whereas it takes 20 hours to obtain a GPA of 4.0. Therefore, it is necessary to sacrifice 8 additional hours of fun time to raise your GPA to 4.0.

9. According to the World View "Market Reliance vs. Government Reliance?" which nation has **LO1-5**
a. The highest level of faith in the market system?


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b. The lowest level of faith in the market system?

**Answers:**
**a. Germany**
**b. France**

**Feedback:**
a. Germany: 68 percent polled agree that the free enterprise system and free market economy is the best system on which to base the future of the world.

b. France: Only 31 percent felt that the market system is the best. French people distrust market signals to a larger extent than people in the other polled countries.

10. According to the World View "World's Largest Armies," what percent of the total population is serving in the military in **LO1-1**
    a. The United States (population = 332 million)?
    b. North Korea (population = 26 million)?
    c. China (population = 1.412 billion)?

    **Answers:**
    **a. 0.42 percent**
    **b. 4.62 percent**
    **c. 0.14 percent**

    **Feedback:**
    a. The percentage of the population serving in the military in the United States is 0.42 percent (= number of active military ÷ population = 1,390,000 ÷ 332,000,000 × 100 = 0.42%).

    b. The percentage of the population serving in the military in North Korea is 4.62 percent (= number of active military ÷ population = 1,200,000 ÷ 26,000,000 × 100 = 4.62%).

    c. The percentage of the population serving in the military in China is 0.14 percent (= number of active military ÷ population = 2,000,000 ÷ 1,412,000,000 × 100 = 0.14%).

11. ***Policy Decisions:*** What is the opportunity cost of investing $1 trillion in clean energy technology? **LO1-2**

    **Answer: (1) The land used to produce the clean energy technology that could have been used to produce something else and (2) the goods and services given up to devote resources to producing the clean energy technology.**

    **Feedback:** Opportunity cost is the most desired goods or services that are forgone to obtain something else. The opportunity cost of investing $1 trillion in clean energy technology is the use of those resources and what could be produced by those resources if they were used to produce something else.

    Remember, economists think in terms of real resources, not money. Paper money doesn't build solar panels; it takes real factors of production—land, labor, capital, and entrepreneurship. Those resources—worth trillions of dollars—could be used to produce something else.


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