

SOLUTIONS MANUAL

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Chapter 2

Scarcity and the World of Trade-Offs

■ Overview

This chapter introduces the central concept of economics, scarcity. It is the existence of scarcity that requires people to make choices both individually and collectively. Along with the concept of scarcity the chapter introduces the tools that economists use to analyze choice. These are the concepts of opportunity costs, trade-offs, and the production possibilities model. The production possibilities model is used not only to analyze trade-offs, but also to illustrate economic growth and the implications of an inefficient use of resources. Specialization is introduced along with a discussion of the basis for trade, comparative advantage.

■ Learning Objectives

After studying this chapter students should be able to

- Evaluate whether even affluent people face the problem of scarcity.
- Understand why economics considers individuals' "wants" but not their "needs."
- Explain why the scarcity problem induces people to consider opportunity costs.
- Discuss why obtaining increasing increments of any particular good typically entails giving up more and more units of other goods.
- Explain why society faces a trade-off between consumption goods and capital goods.
- Distinguish between absolute and comparative advantage.

■ Outline

- I. Scarcity:** Scarcity is a situation in which the ingredients for producing the things that people desire are insufficient to satisfy all wants at a zero price. It exists in all societies and at all income levels because human wants exceed what can be produced with the limited resources and time that nature makes available.
 - A. What Scarcity Is Not:** Scarcity is not a shortage. It is also not poverty. High incomes do not reduce scarcity.
 - B. Scarcity and Resources:** Resources or factors of production are inputs used in the production of things that people want. Production is any activity that results in the conversion of resources into products that can be used in consumption.
 - 1. Land:** Land is often called the natural resource, and consists of all the gifts of nature.
 - 2. Labor:** Labor is the human resource that includes all productive contributions made by individuals who work, involving both mental and physical activities.
 - 3. Physical Capital:** Capital is all manufactured resources that are used for production. It also includes improvements to natural resources, such as irrigation ditches.

4. **Human Capital:** The accumulated training and education workers receive that increases their productivity.
 5. **Entrepreneurship:** Human resources that perform the functions of organizing, managing, and assembling the other factors of production to create and operate business ventures, and takes the risks associated with introducing new methods and other types of new thinking that could lead to more monetary income.
- C. **Goods versus Economic Goods:** All things from which individuals derive satisfaction or happiness.
1. **Economic Goods:** Goods that are scarce. The quantity of such goods desired exceeds the quantity that is available at a zero price.
 2. **Services:** Mental or physical labor or help purchased by consumers. They can be viewed as intangible goods.
- II. **Wants and Needs:** Needs are not objectively definable. Perhaps the best way to view a need is as an absolute necessity to stay alive. Wants refer to desired goods and are unlimited.
- III. **Scarcity, Choice, and Opportunity Cost:** Scarcity requires choices be made. When one choice is made, then another is given up.
- A. **Valuing Forgone Alternatives:** Only the individual can determine the value of each choice that is available.
 - B. **Opportunity Cost:** The highest valued, next-best alternative that must be sacrificed for the choice that was made. *In economics, cost is always a forgone opportunity.*
- IV. **The World of Trade-Offs:** Whenever you engage in any activity using any resource you are trading off the use of that resource for one or more alternative uses. For example, the more time devoted to studying economics, the less time that can be devoted to studying mathematics. Thus, a higher grade in economics has a “cost” of a lower history grade. (See Figure 2-1.)
- A. **Graphical Analysis:** How Figure 2-1 is set up is explained.
 - B. **The Production Possibilities Curve (PPC):** A curve representing the maximum possible combinations of total output that could be produced assuming a fixed amount of resources of a given quality. A movement from one point to another on the PPC shows that some of one good must be given up to have more of another. (See Figure 2-1.)
- V. **The Choices Society Faces:** The production possibilities curve does not in practice have constant trade-offs of one good for another and is typically a curve that is bowed outward. (See Figure 2-2.)
- A. **A Two-Good Example**
 - B. **Production Trade-Offs (See Figure 2-2.)**
 - C. **Assumptions Underlying the Production Possibilities Curve:**
 1. Resources are fully employed.
 2. Production takes place over a specific time period—for example, one year.
 3. Resources are fixed in both quantity and quality.
 4. Technology does not change over this period of time.
 - a. Technology is defined as society’s pool of applied knowledge concerning how goods and services can be produced.
 - D. **Being Off the Production Possibilities Curve:** Any point outside the PPC cannot be reached for the time period assumed. Any point inside the PPC is attainable, but resources are not being fully utilized. (See Figure 2-2.)

- E. Efficiency:** The case in which a given level of inputs is used to produce the maximum output possible. It is also a situation in which a given output is produced at a minimum cost. An economy is efficient when it is on its PPC. An inefficient point is any point below the production possibilities curve.
- F. The Law of Increasing Additional Cost:** The fact that the opportunity cost of additional units of a good generally increases as society attempts to produce more of that good. This accounts for the bowed-out shape of the production possibilities curve. (See Figure 2-3.)
 - 1. Increasing Additional Costs:** As society takes more and more resources and applies them to the production of any one item, the opportunity cost increases for each additional unit produced. This law is illustrated by the PPC being bowed outward.
 - 2. Explaining the Law of Increasing Additional Cost:** The more highly specialized resources are, the more bowed outward the PPC will be.

VI. Economic Growth and the Production Possibilities Curve: Economic growth is illustrated by an outward shift of the production possibilities curve. (See Figure 2-4.)

VII. The Trade-Off Between the Present and the Future

- A. Why We Make Capital Goods:** Capital goods are one of society's resources. Producing more of them allows a society to produce more of all types of goods.
- B. Forgoing Current Consumption:** When existing resources are used to produce capital goods, we are forgoing current consumption. When we forgo consumption to invest in capital goods, we are waiting to consume what will be produced from the use of those capital goods then.
- C. The Trade-Off Between Consumption Goods and Capital Goods:** To have more consumer goods in the future, we must produce capital goods today. The more capital goods that are produced today, the less consumer goods that are produced today. In the future there will be more consumption goods as the economy grows. (See Figure 2-5.)

VIII. Specialization and Greater Productivity: Specialization means working at a relatively well-defined, limited activity. It means the organization of economic activity so that what each person or region consumes is not identical to what each person or region produces.

- A. Comparative Advantage:** The ability to produce a good or service at a lower opportunity cost compared to other producers. This is the basis for specialization.
- B. Absolute Advantage:** The ability to produce more units of a good or service using a given quantity of labor or resource inputs. This is the ability to produce the same quantity of a good or service using fewer units of labor or resource inputs. This is not the basis for specialization.
- C. Scarcity, Self-Interest, and Specialization:** Persons who are making decisions that further their self-interest will make choices that maximize the benefits net of opportunity cost. The result is that they choose their comparative advantage and end up specializing.
- D. The Division of Labor:** The segregation of a resource into different specific tasks.

IX. Comparative Advantage and Trade Among Nations: The analysis of absolute advantage, comparative advantage, and specialization applies equally to nations.

- A. Trade Among Regions:** Specialization along lines of comparative advantage in agricultural products in the plains states and industrial products in the northeastern states and resulting trade between them allows each region to have higher incomes and living standards. The result would be the same if the plains states and the northeastern states were separate countries.
- B. International Aspects of Trade:** A producer in one part of the United States must adapt to improvements in production along lines of comparative advantage by those in another part. Producers in the United States will try to raise political barriers to trade with foreign producers by arguing about "unfair" competition and loss of U.S. jobs.

■ Points to Emphasize

Graphing

Graphs are usually difficult for students to grasp. It is worthwhile spending some time going over basic graphing techniques and terminology from the Appendix to Chapter 1 before getting into this chapter. These pictures of relationships between variables may simply create confusion rather than clarify the issue being presented. This confusion results when students are trying to figure out where the graph comes from and what it means to refer to an inverse or positive relationship, while at the same time trying to make sense of the actual economic analysis.

Scarcity

This is the central concept in economics. All economic analysis derives from this condition. Stress that scarcity arises because at any given time people want more than their resources will allow them to produce. The classic way to define scarcity is that wants are unlimited while resources are limited. Resources or inputs are anything that can be used to produce things people want. It is important to stress that scarcity is a relative concept. Even though not everyone has “unlimited” wants, they usually want more than they can have at the moment. As income rises, so do wants. Studies by Simon Kuznets and Milton Friedman provide evidence of this fact. Kuznets found that between 1869–1929, real national income rose by a factor of 4, but the APC remained constant. Friedman reported in *The Theory of the Consumption Function* that the APC remains constant even cross-sectionally as income goes from lower levels to higher levels out of permanent income. Also, poverty in the United States is defined at levels that would be considered affluent by people in most countries.

Resources

Resources or inputs are things that produce goods and services. At any given time, resources are fixed. Generally, students will agree that this is so. Thus, at any given time, the amount of goods and services that can be produced is limited. Over time, resources have increased. Indeed, 150 years ago petroleum was not even a resource. Today, it is one of the most important resources. Advances in technology allow society to use things that were previously not resources. Over time, an increase in resources does not allow society to eliminate scarcity, because at any given time, resources are fixed while wants are not.

Choice

After the scarcity problem is analyzed, the problem of choice should be presented. Because of scarcity, that is wants are greater than the means to satisfy these wants (resources), people are forced to choose means of satisfying these wants. The concepts of opportunity cost, trade-offs, and the production possibilities curve are introduced. These concepts are often difficult for students to grasp. The production possibilities curve can be especially troublesome if actual numbers are not presented along with the graph. A successful method of presenting this model is to use a table of combinations of two goods and fully develop the model before introducing the graph.

Specialization and Comparative Advantage

After the tools for analyzing choice are developed, the chapter discusses specialization based on comparative advantage. The relationship between these two is essential to develop because it is the basis for exchange. A convincing case can be made on an intuitive level, that if each person, region, and country specializes in producing those things that they can produce relatively most efficiently, then it is possible to increase output without increasing the total amount of resources. Then a more formal demonstration can be given. A result of specialization is that trade occurs because each economic unit ends up producing more of something than they want. In some cases, they produce something that they do not consume at all. Higher incomes and living standards result from specialization and trade based on comparative advantage.

■ For Those Who Wish to Stress Theory

Production Possibilities Curve

An in-depth analysis of the production possibilities curve (PPC) can be especially valuable. In particular:

1. Rigorously define the PPC: The PPC shows the maximum possible combinations of output of two goods that can be produced by given resources and technology in a given time period.
2. Consider the PPC when inputs are equally suited to producing both of the goods. The x and y intercepts define the maximum quantities of each good that can be had. By connecting these two points, a linear PPC is derived.
3. Note that when some resources are better suited to either output, there are two important differences in the PPC.
 - a. It is no longer linear. Instead, it is now concave to the origin due to increasing resource cost. As we move from producing all x to all y , we initially produce units of y by releasing greater percentages of resources more suited to production of y and smaller percentages of resources more suited to the production of x . Since only 100 percent of resources exist, we must eventually release greater percentages of y -suited resources and smaller percentages of x -suited resources to produce additional units of x .
 - b. The new PPC lies above the linear PPC except at the x and y intercepts, because the new curve accounts for the fact that inputs are more suitable to producing x or y .

■ Further Questions for Class Discussion

1. In recent years, online news sites such as the ones at MSNBC and Yahoo have designed a business model in which they collect stories from the online pages of newspapers and wire services such as the Associated Press (AP) and allow free access to the articles for visitors to their Web sites. The effect has been to decrease newspaper and wire service revenues and profits. As a result, newspapers and organizations such as the AP have begun to charge or discuss plans to charge visitors to access to their Web sites or to download their stories. Most users of the news sites of both the newspapers and sites such as Yahoo and MSNBC argue that they should not be charged for access to these companies' Web sites. An interesting question for students is why they believe that access to news should be free. Then ask them if, in fact, any given news story is a free good or an economic good in the sense that economists use those terms. Obviously, news stories are economic goods because scarce resources are used to produce them. Since those resources have alternative uses, there is an opportunity cost for using them to research and produce news stories.
2. Does the federal government face a scarcity constraint? In discussions of the federal government, each interest group wants more spent on its programs and speaks as if the government has virtually unlimited funds for its program that has some supposed beneficial social impact. The problem is that the government has fewer funds to allocate than are desired by all of the interest groups. Thus, wants exceed the ability of the federal government to finance all of these wants—a clear case of scarcity. The government does indeed face a scarcity constraint in the form of a limited budget with which to accomplish its goals. The way this constraint is manifested is in wrangling about budget priorities. The opportunity cost of more for one program means less for others.

3. Students will usually agree that specialization along lines of comparative advantage and then trade is beneficial. Point out Adam Smith's statement in *The Wealth of Nations* that no "prudent master [will] make at home what it will cost him more to make than to buy." Consider outsourcing where American firms have foreign firms produce certain goods or services for them instead of producing them in the United States. Ask why this is a problem if the foreign firms in fact have comparative advantage. If trade along lines of comparative advantage allows U.S. companies to buy these goods and services more cheaply than they can produce them, then why should we want to restrict trade in them? There will be a reallocation of jobs in the United States as those displaced by outsourcing, find jobs in activities in which the United States has a comparative advantage. This will usually generate controversy.
4. A major political issue revolves around tax policy and its effect on investment and economic growth. How might increases in taxes on business profits affect economic growth? (*Hint*: Investment is inversely related to expected after-tax profits on new investment.) Use the production possibilities model to explain your answer. Other things being equal, an increase in taxes on profits will reduce investment spending by decreasing expected after-tax profits. Investment represents new capital formation, and thus less capital will be produced. The rate of economic growth will be reduced by higher business taxes, other things being equal.

■ Answers to Questions for Critical Analysis

France is the Sleeping Giant (p. 30)

It lowers it as compared to the curve's location without the six week vacation requirement.

Airlines Confront the Opportunity Cost of Legroom on Planes (p. 31)

This was an alternative use of space that was more valuable to the airlines since that space did not generate revenue when it was used for storage but did when two additional passengers purchased those seats on a flight.

Time as a Determinant of Comparative Advantage (p. 40)

The service could be delivered more quickly (i.e., in less time) than that same service could be delivered by other methods. The result would be faster and thus cost saving to buyers of the service if the value of time is included in total cost.

■ Adam Smith (1723–1790): Scottish Economist

"I have never known much good done by those who affected to trade for the public good," Adam Smith once remarked. If he put little stock in good intentions, Smith did invest heavily in demonstrating that selfish intentions could lead to public good. In *The Theory of Moral Sentiments* (1759), his first book, Smith tried to show how altruism could come out of self-interest. In his second, more famous book, he attempted to reveal how the self-interest of private individuals could be transformed by the sleight of an invisible hand (the unfettered market) into social harmony and public benefit, producing the wealth of the nation in the best of all possible ways. The result of this effort was *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776), perhaps the most influential economics treatise ever written; one that has set the tone for capitalist ideology for more than two centuries.

As the title indicates, Smith attempted to examine the sources of the wealth of nations. He proposed that first on the list of sources was the division of labor. Smith's pin factory example of dramatic increases in productivity possible through the division of labor has made its mark on virtually every textbook written on the subject since. He went on to point out that the division of labor does not occur because individuals possess an overall perception of its ultimate benefit to society. Rather, the division of labor occurs simply because it is in each individual's self-interest to specialize and to exchange: "The natural effort of every individual to better his own condition, when suffered to exert itself with freedom and security, is so powerful a principle, that it is alone, and without any assistance . . . capable of carrying on the society to wealth and prosperity."

In addition to Smith's famous "invisible hand" theme, the theme of individual economic freedom was quite strong in *The Wealth of Nations*. He believed that any governmental attempt to guide or to regulate actions of individuals in the economic marketplace would end up doing more harm than good. Smith was especially harsh on legally protected monopolies. Smith's critics contend that his model may have fit England at the time he wrote his treatise, but it does not fit industrialized Western countries today—where the state plays a large role and large corporations have replaced shopkeepers. Nonetheless, for many, *The Wealth of Nations* remains a laissez-faire bible, and Smith remains a central figure in the development of economic thought.

■ You Are There

Stopping Students' Thursday Night Parties with Friday Classes (p. 41)

1. There are two possibilities. (1) The university would have to offer fewer classes during the week or if the same number were offered during the week, it would have to employ more faculty to teach these classes. (2) If this university was the only one in Iowa to have Saturday classes, it might experience a decrease in enrollment as students chose to attend other state universities in Iowa.
2. Because drinking alcohol often results in hangovers, requiring students to enroll in 8:00 AM classes would increase the opportunity cost of drinking the night before. The opportunity cost of drinking on weeknights would be that students who overslept because they felt too bad or actually went to class in a condition that made it difficult to pay attention would experience lower grades. Thus there would be a trade-off of lower grades for each night spent drinking during the week.

■ Issues and Applications

Is Daylight Saving Time Efficient? (p. 42)

1. Incurring a higher expense to produce the same number of items means using more resources to produce that number of items since more resources means higher expenses other things held constant. Producing the fewer items at the same expense means using resources to produce the less than the maximum that they could produce.
2. It would be possible to move clocks ahead by less than one hour. As a result it might be possible that the saving in electricity from using less electric lights, less would more than offset the additional use of air-conditioning in the evening.

■ Answers to Even-Numbered Problems

- 2-2. The opportunity cost of attending the concert is the next-best use of the time spent at the concert. If bad weather extends the amount of time spent on an evening at the concert, then there is an additional opportunity cost in the form of the next-best uses of that additional time.
- 2-4. Each additional 10 points earned in economics costs 10 additional points in biology, so this PPC illustrates *constant* additional opportunity costs. It does not satisfy the law of increasing relative cost.
- 2-6. Each additional 10 points earned in economics costs a greater number of biology points. For instance, the opportunity cost to the student of increasing points earned in economics from 60 to 70 is 8 points forgone in biology, but the opportunity cost of increasing economics points from 90 to 100 rises to 20 points forgone in biology. Thus, the new PPC illustrates the law of increasing relative cost.
- 2-8. C
- 2-10. A
- 2-12. Combination F entails production of less human capital than combination C, so choosing combination F today would result in a smaller output shift in the production possibilities curve than would be experienced if combination C were chosen instead.
- 2-14. Yes, you and your roommate should specialize in the task in which you have a comparative advantage. You should specialize in folding laundry and your roommate in preparing meals. If you fold a basket of laundry, you must forgo the time that it would take to prepare two meals. For your roommate to fold a basket of laundry, the time that it takes to prepare three meals must be given up. Suppose that you “trade” folding a basket of laundry for preparing 2.5 meals. You gain 0.5 meals, which is equivalent to one-half hour of meal preparation time. Hence, you save one-half hour for every basket of laundry you fold for your roommate in exchange for an hour of meal preparation time.
- 2-16. a. If the two nations have the same production possibilities, then they face the same opportunity costs of producing consumption goods and capital goods. Thus, at present neither has a comparative advantage in producing either good.
- b. Because country B produces more capital goods today, it will be able to produce more of both goods in the future. Consequently, country B’s PPC will shift outward by a greater amount next year.

■ Selected References

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