11 COMMON RESOURCES

An

Point out the differences in the way in which a business provides and finances its products and the way in which governments do the same. This will help [illegible] one can argue that government intervention is [illegible] necessary in order to achieve [illegible] providing goods and services.

WHAT'S NEW IN THE SEVENTH EDITION:

There are no major changes to this chapter.

LEARNING OBJECTIVES:

By the end of this chapter, students should understand:

- the defining characteristics of public goods and common resources.
- why private markets fail to provide public goods.
- some of the important public goods in our economy.
- why the cost–benefit analysis of public goods is both necessary and difficult.
- why people tend to use common resources too much.
- some of the important common resources in our economy.

CONTEXT AND PURPOSE:

Chapter 11 is the second chapter in a three-chapter sequence on the economics of the public sector. Chapter 10 addressed externalities. Chapter 11 addresses public goods and common resources—goods for which it is difficult to charge prices to users. Chapter 12 will address the tax system.

The purpose of Chapter 11 is to address a group of goods that are free to the consumer. When goods are free, market forces that normally allocate resources are absent. Therefore, free goods, such as playgrounds and public parks, may not be produced and consumed in the proper amounts. Government can potentially remedy this market failure and improve economic well-being.

KEY POINTS:

- Goods differ in whether they are excludable and whether they are rival in consumption. A good is excludable if it is possible to prevent someone from using it. A good is rival in consumption if one person's use of the good reduces other's ability to use the same unit of the good. Markets work best for private goods, which are both excludable and rival in consumption. Markets do not work as well for other types of goods.

- Public goods are neither rival in consumption nor excludable. Examples of public goods include fireworks displays, national defense, and the creation of fundamental knowledge. Because people are not charged for their use of the public good, they have an incentive to free ride, making private provision of the good untenable. Therefore,

governments provide public goods, basing their decision about the quantity of each good on cost–benefit analysis.

- Common resources are rival in consumption but not excludable. Examples include common grazing land, clean air, and congested roads. Because people are not charged for their use of common resources, they tend to use them excessively. Therefore, governments use various methods to limit the use of common resources.

CHAPTER OUTLINE:

I. The Different Kinds of Goods

A. When classifying types of goods in the economy, two characteristics should be examined.

1. Definition of **excludability: the property of a good whereby a person can be prevented from using it.**

2. Definition of **rivalry in consumption: the property of a good whereby one person's use diminishes other people's use**.

B. Using these two characteristics, goods can be divided into four categories.

1. Definition of **private goods: goods that are both excludable and rival in consumption**.

2. Definition of **public goods: goods that are neither excludable nor rival in consumption.**

3. Definition of **common resources: goods that are rival in consumption but not excludable.**

4. Definition of **club goods: goods that are excludable**

but not rival in consumption.

		Rival in consumption?	
		Yes	**No**
Excludable?	**Yes**	Private Goods • ice-cream cones • clothing • congested toll roads	Club Goods • fire protection • cable TV • uncongested toll roads
	No	Common Resources • fish in the ocean • the environment • congested nontoll roads	Public Goods • national defense • knowledge • uncongested nontoll roads

C. The boundary between the categories is sometimes fuzzy. Whether goods are excludable or rival in consumption is often a matter of degree.

D. Public goods and common resources each create externalities because they have value yet have no price because they are not sold in the marketplace. These external effects imply that market outcomes will be inefficient in the absence of government involvement or private resolutions to correct the externality.

Activity 1—Private Goods/Public Goods: A Demonstration

Type: In-class demonstration
Topics: Public and private goods
Materials needed: A candy bar
Time: 10 minutes
Class limitations: Works in any size class

Purpose

This example illustrates the difference between public and private goods.

Instructions
Ask for a volunteer. Give the volunteer a candy bar and ask him or her to eat it.

While the student eats the candy bar, explain that you do not want the student's enjoyment of the candy to be marred by taking notes. Offer to draw some beautiful artwork on the board to increase the volunteer's enjoyment.

Draw a picture on the board. A large poster or a slide of real artwork could be substituted. Ask the volunteer if he or she is enjoying the candy and the art. Ask the class if they get any enjoyment from the candy. Ask the class if they get any enjoyment from the art.

Points for Discussion
The candy bar is a private good. It is rival in consumption and excludable. Only the volunteer gets to enjoy the candy.

The "artwork" is neither rival in consumption nor excludable. The volunteer's enjoyment did not diminish the enjoyment of the rest of the class. The "artwork" is a public good.

II. Public Goods

A. Example: a fireworks display. It is not excludable because it would be nearly impossible to keep others from viewing it and it is not rival in consumption because one person's enjoyment does not preclude others from enjoying the fireworks.

B. The Free-Rider Problem

1. It would be difficult to sell tickets to the fireworks show because it is not excludable.

2. Thus, some individuals would get a benefit from the show without paying for it.

3. Definition of **free rider: a person who receives the benefit of a good but avoids paying for it.**

4. More than likely, private individuals or firms will not produce the fireworks show because it would not be profitable.

5. If the social value of the fireworks show is greater than the cost of producing it, it would be efficient for the fireworks show to be produced.

   a. The local government can sponsor the show and charge each of its citizens with part of the cost (in the form of a tax).

   b. If the tax is less than the value of the fireworks display to each individual, everyone is better off.

6. This is another demonstration of Principle #7: Governments can sometimes improve market outcomes.

B. Some Important Public Goods

1. National defense

2. Basic research

3. Fighting poverty

C. *Case Study: Are Lighthouses Public Goods?*

1. Lighthouses are used so that ships can mark specific locations and avoid treacherous waters.

2. Use of a lighthouse is both nonexcludable and nonrival in consumption.

3. Thus, most lighthouses are provided by the government.

4. In 19th-century England, lighthouses were operated more like private goods. The owners of local ports were charged with the service and if they did not pay, the owner of the lighthouse simply turned off the light and ships avoided stopping in that port.

D. The Difficult Job of Cost–Benefit Analysis

1. To decide whether or not it should fund a public good,

the government must conduct a study of the total benefits and costs of the good.

2. Definition of **cost-benefit analysis: a study that compares the costs and benefits to society of providing a public good.**

3. This is very difficult to do, because measuring how much individuals will value a specific good is problematic.

   a. Quantifying benefits is difficult using the results from a questionnaire.

   b. Respondents have little incentive to tell the truth.

4. This difficulty implies that the efficient supply of public goods is much more challenging than the efficient supply of private goods, because buyers of the private good reveal its value to the sellers.

5. *Case Study: How Much Is a Life Worth?*

   a. Example: the decision to place a stoplight at a busy intersection to reduce the risk of fatal accidents.

   b. The cost is known in dollar terms. But how can we put the value of a life in dollar terms?

   c. Some studies examine the value of the lifetime earnings the individual could have made, but this

implies that the life of someone who is disabled or retired has no monetary value.

d. Economists instead may look at the risks that individuals voluntarily take and those that they require compensation for. Workers in risky occupations are paid a wage premium to take these risks. This approach gives us an idea of the value that an individual places on his or her life. Studies have shown this value to be approximately $10 million.

III. Common Resources

A. Common resources are not excludable, but they are rival in consumption. This implies that policymakers need to be concerned about how much is used.

B. The Tragedy of the Commons

1. Definition of the **Tragedy of the Commons: a parable that illustrates why common resources get used more than is desirable from the standpoint of society as a whole.**

2. Example: small, medieval town where sheep graze on common land.

a. Over time, as the population grows, so does the number of sheep.

b. Given the fixed amount of land, the grass will begin to disappear because it is being overgrazed.

c. The townspeople will no longer be able to raise

sheep because the private incentives (using the land for free) outweigh the social incentives (using the land carefully).

d. This problem could have been prevented if the town had regulated the number of sheep each farmer could have or auctioned off the right to use the common land for grazing. Alternatively, the town could have divided the common property between its citizens, thus turning the land into an excludable commodity.

A more modern example is the overfishing of oceans, bays, and rivers, leading to dangerously low seafood populations in some areas. Other examples include excessive extraction of oil from a large pool beneath several different property owners' land, and congested highways.

C. Some Important Common Resources

1. Clean air and water

2. Congested roads

a. *In the News: The Case for Toll Roads* — This is a *Freakonomics* blog post arguing that drivers should pay more for using roads.

3. Fish, Whales, and Other Wildlife

a. *Case Study: Why the Cow is Not Extinct* — Elephants in Africa are common resources because no one owns them. This means that no one has an incentive to make sure that a sufficient number are preserved. This is

different from a cow, which is usually owned by a rancher. The rancher has an incentive to ensure that the cattle population on his ranch is maintained so that he can continue to earn a profit. Thus, governments could actually be more successful in making sure that the elephant is not extinct by allowing people to kill the elephants on their own property (thus making the elephants a private good). The landowners would then have some incentive to preserve the stock of elephants on their land.

Activity 2—Article on the Role of Government

Type: Take-home assignment
Topics: The role of government, market failure
Class limitations: Works in any size class

Purpose
This assignment gives students an opportunity to identify real-world market failures and consider how the government can address these issues. Categorizing a real problem will help students clearly distinguish the various types of market failure.

Instructions
This assignment is difficult for many students, particularly if they are unclear on the concept of market failure. Not every example of government action will be appropriate for this assignment. Students may find it easier to make a list of possible areas of market failures before looking for an article.

Ask the students to do the following:

1. Find an article in a recent newspaper or magazine that illustrates market failure.
2. Identify the type of market failure. Is it a problem of negative externalities, positive externalities, public goods, or common resources?
3. Explain how government action can improve economic efficiency.
4. Graph the market failure and explain the problem. Then show how the government action will change the situation.

IV. Conclusion: The Importance of Property Rights

A. With both public goods and common resources, the market outcome will be inefficient because of the lack of well-defined property rights.

B. This absence of property rights can lead to a market failure, which implies that in these situations, governments can improve the allocation of resources and increase economic well-being.

SOLUTIONS TO TEXT PROBLEMS:

Quick Quizzes

1. Public goods are goods that are neither excludable nor rival in consumption. Examples include national

defense, knowledge, and uncongested nontoll roads. Common resources are goods that are rival in consumption but not excludable. Examples include fish in the ocean, the environment, and congested nontoll roads.

2. The free-rider problem occurs when people receive the benefits of a good but avoid paying for it. The free-rider problem induces the government to provide public goods because the private market will not produce an efficient quantity on its own. The government uses tax revenue to provide the good, everyone pays for it, and everyone enjoys its benefits. The government should decide whether to provide a public good by comparing the good's costs to its benefits. If the benefits exceed the costs, society is better off.

3. Governments try to limit the use of common resources because one person's use of the resource diminishes others' use of it. This means that use of these goods results in a negative externality and people tend to use common resources excessively.

Questions for Review

1. An excludable good is one that people can be prevented from using. A good that is rival in consumption is one for which one person's use diminishes other people's use of the same good. Pizza is excludable, because a pizza producer can prevent someone who does not pay for the pizza from eating it. Pizza is also rival in consumption, because when one person eats it, no one else can eat it.

2. A public good is a good that is neither excludable nor rival in consumption. An example is national defense, which protects the entire nation. No one can be prevented from enjoying the benefits of it, so it is not excludable. An additional person benefiting from it does not diminish the value of it to others, so it is not rival in consumption. The private market will not supply the good, because no one would pay for it because they cannot be excluded from enjoying it even if they don't pay for it.

3. Cost–benefit analysis is a study that compares the costs and benefits to society of providing a public good. It is important because the government needs to know which public goods people value most highly and which have benefits that exceed the costs of supplying them. It is hard to do because quantifying the benefits is difficult to do from a questionnaire and because respondents have little incentive to tell the truth.

4. A common resource is a good that is rival in consumption but not excludable. An example is fish in the ocean. If someone catches a fish, that leaves fewer fish for everyone else, so it is rival in consumption. But the ocean is so vast, you cannot charge people for the right to fish, or prevent them from fishing, so it is not excludable. Thus, without government intervention, people will use the good too much, because they do not account for the costs they impose on others when they use the good.

Quick Check Multiple Choice

1. a
2. b
3. b
4. d
5. b
6. c

Problems and Applications

1. a. (1) Police protection is a club good because it is excludable (the police may ignore some neighborhoods) and not rival in consumption. You could make an argument that police protection is rival in consumption, if the police are too busy to respond to all crimes, so that one person's use of the police reduces the amount available for others. In that case, police protection is a private good.

   (2) Snow plowing is most likely a common resource. Once a street is plowed, it is not excludable. But it is rival in consumption, especially right after a big snowfall, because plowing one street means not plowing another street.

   (3) Education is a private good (with a positive externality). It is excludable, because someone who does not pay can be prevented from taking classes. It is rival in consumption, because the presence of an additional student in a class reduces the benefits to others.

   (4) Rural roads are public goods. They are not excludable and they are not rival in consumption because they are uncongested.

(5) City streets are common resources when congested. They are not excludable, because anyone can drive on them. But they are rival in consumption, because congestion means that every additional driver slows down the progress of other drivers. When they are not congested, city streets are public goods, because they are no longer rival in consumption.

b. The government may provide goods that are not public goods, such as education, because of the externalities associated with them.

2. a. The externalities associated with public goods are positive. Because the benefits from the public good received by one person do not reduce the benefits received by anyone else, the social value of public goods is substantially greater than the private value. Examples include national defense, knowledge, uncongested nontoll roads, and uncongested parks. Because public goods are not excludable, the free-market quantity is zero, so it is less than the efficient quantity.

b. The externalities associated with common resources are generally negative. Because common resources are rival in consumption but not excludable, the use of the common resources by one person reduces the amount available for others. Because common resources are not priced, people tend to overuse them ¾ their private cost of using the resources is less than the social cost. Examples include fish in the ocean, the environment, congested nontoll roads, the Town Commons, and congested parks.

3. a. Charlie is a free rider.

b. The government could solve the problem by sponsoring the show and paying for it with tax revenue collected from everyone.

c. The private market could also solve the problem by making people watch commercials that are incorporated into the program. The existence of cable TV makes the good excludable, so it would no longer be a public good.

4. a. If only a few people use the free wireless internet, it would not be excludable and not rival in consumption. Thus, it would be a public good.

b. Once a large number of people begin using the free internet service, it is a common resource. It is still not excludable, but it is now rival in consumption.

c. Overuse is likely to occur. One possible way to correct for this would be to make the good excludable by charging a fee for its use.

5. a. Within the dorm room, the showing of a movie is a public good. None of the roommates can be excluded from viewing the movie. Because one roommate's viewing does not affect the ability of another roommate to view the movie, the good is also not rival in consumption.

b. The roommates should rent three movies because the value of the fourth film ($6) would be less than the

cost ($8).

c. The total cost would be $8 ´ 3 = $24. If the cost were divided evenly among the roommates, each would pay $6. Judd values three movies at $18 so his surplus would be $12. Joel values three movies at $12 so his surplus would be $6. Gus values three movies at $6, so his surplus would be $0. Tim values three movies at $3 so his surplus is -$3. Total surplus among the three roommates would be $15.

d. The costs could be divided up by the roommates based on the benefits they receive. Because Judd values the movies the most, he would pay the greatest share. The problem is that this gives each roommate an incentive to understate the value of the movies to him.

e. Because they are going to pay equal shares, Judd has an incentive to tell the truth about the value he places on movies to ensure that the group rents three movies. He values each of the movies more than his cost per movie ($2).

f. The optimal provision of public goods will occur if individuals do not have an incentive to hide their valuation of a good. This means that each individual's cost cannot be related to his valuation.

6. a. Because knowledge is a public good, the benefits of basic scientific research are available to many people. The private firm doesn't take these external benefits into account when choosing how much research to undertake; it only takes into account

what it will earn.

b. The United States has tried to give private firms incentives to provide basic research by subsidizing it through organizations like the National Institute of Health and the National Science Foundation.

c. If it is basic research that adds to knowledge, it is not excludable at all, unless people in other countries can be prevented somehow from sharing that knowledge. So perhaps U.S. firms get a slight advantage because they hear about technological advances first, but knowledge tends to diffuse rapidly.

7. When a person litters along a highway, others bear the negative externality, so the private costs are low. Littering in your own yard (or perhaps your neighbors' yards) imposes costs on you, so it has a higher private cost and is thus rare.

8. a. The productivity of each fisherman declines as *N* rises because the fish in the town lakes are a common resource. The fish are not excludable but rival in consumption. The fish on the farm are private goods because they are excludable and rival in consumption.

b. Four million residents would fish in the lakes and one million would fish on the farm. Each fisherman would catch 2 fish, so 10 million fish would be produced.

c. The table below shows how total fish production varies with *N*:

# Fishermen at lakes (in millions)	Fish per fisherman at lakes	Total fish at lakes (in millions)	# Fishermen at farm (in millions)	Total fish at farm (in millions)	Total fish caught (in millions)
5	1	5	0	0	5
4	2	8	1	2	10
3	3	9	2	4	13
2	4	8	3	6	14
1	5	5	4	8	13
0	0	0	5	10	10

The greatest number of fish is produced when two million fishermen fish at the lake while the other three million fish at the farm. A total of 14 million fish would be caught.

d. The tax would have to be slightly larger than 1 (such as 1.01). Then only 2 fishermen would want to fish in the lake.

e. Everyone is better off because there are more fish for everyone and the tax has been provided back to the residents.

9. When the system is congested, each additional rider imposes costs on other riders. For example, when all seats are taken, some people must stand. Or if there isn't any room to stand, some people must wait for a train that isn't as crowded. Increasing the fare during rush hour internalizes this externality.

10. Recognizing that there are opportunity costs that are relevant for cost–benefit analysis is the key to answering this question. A richer community can afford to place a higher value on life and safety. So the richer community is willing to pay more for a traffic light, and that should

be considered in cost–benefit analysis.