

Principles of Economics

Chapter 11:

Public Goods and Common Resources



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Public Goods and Common Resources

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In This Chapter

- ▶ What are **public goods**?
- ▶ What are **common resources**?
- ▶ Give examples of each.
- ▶ Why do markets generally **fail** to provide the efficient amounts of these goods?
- ▶ How might the government **improve** market outcomes in the case of public goods or common resources?

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Introduction

- ▶ We consume many goods without paying:
 - ▶ Parks, national defense, clean air & water
 - ▶ When goods have no prices, the market forces that normally allocate resources are absent
 - ▶ The private market may fail to provide the socially efficient quantity of such goods, so:
- ▶ “Governments can sometimes improve market outcomes.”

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Characteristics of Goods

- ▶ Excludability
 - ▶ People can be prevented from using a good
 - ▶ **Excludable**: fish in a private pond; Wi-Fi access
 - ▶ **Not excludable**: fish in the ocean; radio signals
- ▶ Rivalry in consumption
 - ▶ One person's use of a unit of a good reduces another person's ability to use it
 - ▶ **Rival**: MOS rice burgers; iPad Air
 - ▶ **Not rival**: Demon Slayer Gurenge (紅蓮華) MP4; iOS Apps

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The Different Kinds of Goods

- ▶ Private goods
 - ▶ Excludable & Rival in consumption (pizza)
- ▶ Public goods
 - ▶ Not excludable & Not rival in consumption (national defense)
- ▶ Common resources
 - ▶ Not excludable & Rival in consumption (deer in the forest)
- ▶ Club goods
 - ▶ Excludable & Not rival in consumption (cable TV)

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Example 1: Different Kinds of Goods

1. Fish in private pond:
 - A. Rival or not?
 - B. Excludable or not?
2. Fish in the ocean:
3. Specific research on a cholesterol-lowering drug for which a patent can be obtained:
4. Basic research on lifestyle and cholesterol levels:

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Fish in private pond:
Rival or not? Excludable or not?

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Fish in the ocean: Rival or not? Excludable
or not?

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Specific research on a cholesterol-lowering drug for which a patent can be obtained: Rival or not? Excludable or not?

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Basic research on lifestyle and cholesterol levels: Rival or not? Excludable or not?

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Example 1: Different Kinds of Goods

- | | |
|---|---|
| 1. Fish in private pond: | 1. rival, excludable: private good |
| 2. Fish in the ocean: | 2. rival, not excludable: common resource |
| 3. Specific research on a cholesterol-lowering drug for which a patent can be obtained: | 3. not rival, excludable: club good |
| 4. Basic research on lifestyle and cholesterol levels: | 4. not rival, not excludable: public good |

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Active Learning 1: Categorizing Roads

► A road is which of the four kinds of goods?

► *Hint:* The answer depends on whether the road is congested or not, and whether it's a toll road or not. Consider the different cases.

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A road is which of the four kinds of goods?

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Active Learning 1: Answers

- ▶ Rival in consumption? Only if congested.
- ▶ Excludable? Only if a toll road.

Four possibilities:

- ▶ Uncongested non-toll road: public good
- ▶ Uncongested toll road: club good
- ▶ Congested non-toll road: common resource
- ▶ Congested toll road: private good

Ask The Experts

Congestion Pricing

- ▶ “In general, using more congestion charges in crowded transportation networks — such as higher tolls during peak travel times in cities, and peak fees for airplane takeoff and landing slots — and using the proceeds to lower other taxes would make citizens on average better off.”

▶ Do you Agree or Disagree?

▶ Do you think Economists Agree or Disagree?

Source: IGM Economic Experts Panel, January 11, 2012.

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Do you "Agree" or "Disagree"?

“In general, using more congestion charges in crowded transportation networks — such as higher tolls during peak travel times in cities, and peak fees for airplane takeoff and landing slots — and using the proceeds to lower other taxes would make citizens on average better off.”

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Do you think Economists Agree or Disagree?
 “In general, using more congestion charges in crowded transportation networks — such as higher tolls during peak travel times in cities, and peak fees for airplane takeoff and landing slots — and using the proceeds to lower other taxes would make citizens on average better off.”

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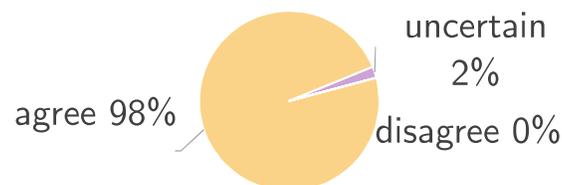
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Ask The Experts

Congestion Pricing

- ▶ “In general, using more congestion charges in crowded transportation networks — such as higher tolls during peak travel times in cities, and peak fees for airplane takeoff and landing slots — and using the proceeds to lower other taxes would make citizens on average better off.”

What do economists say?



Source: IGM Economic Experts Panel, January 11, 2012.

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Not Excludable Goods

- ▶ Public Goods and Common Resources
 - ▶ People cannot be prevented from using these goods, they are available to everyone free of charge
 - ▶ For both, externalities arise because something of value has no price attached to it
 - ▶ Private decisions about consumption and production can lead to an inefficient outcome

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Public Goods and Free Riders

- ▶ Free Rider
 - ▶ Person who receives the benefit of a good but avoids paying for it
- ▶ The Free-Rider Problem
 - ▶ Public goods are not excludable, so people have an incentive to be free riders
 - ▶ Prevents the private market from supplying the goods
 - ▶ Market failure (or lack-of-market failure!)

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Active Learning 2: Let's Build a Fountain!

You and your neighbors (about 100 people) would love to have a water fountain in the neighborhood park. Each of you values having the fountain at NT\$2,000. The neighborhood association finds a construction firm that will build the fountain for NT\$140,000. A hat is passed around for the contributions, but once the money is counted, there are only NT\$60,000 collected.

- A. Should the fountain be build?
- B. What happened? Will the fountain be built?
- C. Can the government help build the fountain? How?

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You and your neighbors (about 100 people) would love to have a water fountain in the neighborhood park. Each of you values having the fountain at NT\$2,000. The neighborhood association finds a construction firm that will build the fountain for NT\$140,000. Should the fountain be build?

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The neighborhood association finds a construction firm that will build the fountain for NT\$140,000. A hat is passed around for the contributions, but once the money is counted, there are only NT\$60,000 collected. Will the fountain be built?

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What happened? Can the government help build the fountain? How?

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Active Learning 2: Answers

- A. Should the fountain be build?
 - ▶ YES, because the benefit (NT\$200,000) exceeds the cost (NT\$140,000)
- B. What happened? Will the fountain be built?
 - ▶ The free-rider problem: some didn't contribute because they can still enjoy the fountain if built.
 - ▶ Because only NT\$60,000 were collected, the fountain cannot be build

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Active Learning 2: Answers

- C. Can the government help? How?
 - ▶ The government can tax every neighbor \$1,400 and then use the money to build the fountain.

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Public Goods

- ▶ Government can remedy the free-rider problem
 - ▶ If total benefits of a public good exceeds its costs
- ▶ How?
 - ▶ Provide the public good
 - ▶ Pay for it with tax revenue
 - ▶ Make everyone better off
- ▶ Problem: Measuring the benefit is usually difficult

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Some Important Public Goods

- ▶ National Defense: **Very expensive public good!**
 - ▶ USA: US\$778 billion (3.7% GDP) in 2020
 - ▶ Taiwan: US\$12.2 billion (1.9% GDP) in 2020
 - ▶ Everybody agrees national defense is a public good the government should provide
- ▶ Basic Research: General knowledge
 - ▶ Subsidized by government
 - ▶ Difficulties: hard to measure the benefits and decisions are made by members of Congress, not scientists

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Some Important Public Goods: For Fighting Poverty

- ▶ Welfare System:
 - ▶ (Temporary Assistance for Needy Families program, TANF)
 - ▶ Provides a small income for some poor families
- ▶ Food Stamps
 - ▶ (Supplemental Nutrition Assistance Program, SNAP)
 - ▶ Subsidize the purchase of food for those with low incomes
- ▶ Government Housing Programs
 - ▶ Make shelter more affordable

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The Difficult Job of Cost–Benefit Analysis

- ▶ The Government
 - ▶ Provides public goods because the private market on its own will not produce an efficient quantity
- ▶ Must determine **what kinds** of public goods to provide
- ▶ Must determine what **quantity** of the public good to provide

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Cost–Benefit Analysis

- ▶ Cost–Benefit Analysis
 - ▶ Study that compares the costs and benefits to society of providing a public good
 - ▶ Estimate the total costs and benefits of the project to society as a whole
- ▶ There are no price signals to observe
 - ▶ Estimating costs and benefits of public projects are rough approximations at best

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Audience Q&A Session

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Common Resources

- ▶ Common resources are **not excludable**
 - ▶ Cannot prevent free riders from using
 - ▶ Little incentive for firms to provide
 - ▶ Role for government: seeing that they are provided
- ▶ Common resources are **rival** in consumption
 - ▶ Each person's use reduces others' ability to use
 - ▶ Role for government: ensuring they are not overused

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The Tragedy of the Commons

- ▶ The Tragedy of the Commons
 - ▶ Parable that shows why common resources are used more than desirable
- ▶ Medieval town where sheep graze on common land
 - ▶ As the population grows, the number of sheep grows
 - ▶ The amount of land is fixed, the grass begins to disappear from overgrazing
 - ▶ With no grass left, raising sheep is impossible

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The Tragedy of the Commons

- ▶ Social and Private Incentives Differ
 - ▶ The private incentives (using the land for free) outweigh the social incentives (using it carefully)
- ▶ The tragedy arises because of a **negative externality**
 - ▶ Allowing one's flock to graze on the common land reduces its quality for other families
 - ▶ People neglect this external cost, resulting in overuse of the land

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The Tragedy of the Commons

- ▶ Possible solutions:
 1. Regulate the number of sheep per family
 2. Internalized the externality by taxing sheep
 3. Auction off a limited number of sheep-grazing permits
 4. Make land private property: divide the land among town families

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Some Important Common Resources

- ▶ Clean Air and Water
 - ▶ Negative externality: pollution
 - ▶ Regulations or corrective taxes
- ▶ Congested Roads
 - ▶ Negative externality: congestion
 - ▶ **Corrective Tax**: charge drivers a toll; or increase tolls during rush hour
 - ▶ **Tax on Gasoline**: but is also discourages driving on uncongested roads

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Some Important Common Resources

- ▶ Fish, Whales, and Other Wildlife
 - ▶ Oceans: least regulated common resource
 - ▶ Needs international cooperation
 - ▶ Difficult to enforce an agreement
 - ▶ Fishing and Hunting **Licenses**
 - ▶ **Limits** on fishing and hunting seasons
 - ▶ Limits on size of fish
 - ▶ Limits on quantity of animals killed

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Solutions to Lack-of-Market Failure

- ▶ In 2009, "Lin" Ostrom won the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for:
 - ▶ Studying how real people manage common resources both in the field (case study) and lab (experiments)
- ▶ In 2012, Al Roth won the same prize for:
 - ▶ Designing markets for medical interns, school choice and even organ transplants (kidney exchange)

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Active Learning 3: Social Media

Facebook, Twitter, YouTube, IG and D-card, etc. are examples of social media that most of us use.

- A. How is social media a common resource?
- B. In your use of social media, have you had to deal with undesirable behavior of others? Is this an externality?
- C. Do you think the providers of social media forums should regulate the behavior of users? If not, why not? If so, how?

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Is social media rival in consumption? Is it excludable?

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In your use of social media, have you had to deal with undesirable behavior of others? Is this an externality?

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Do you think the providers of social media forums should regulate the behavior of users? If not, why not? If so, how?

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The Importance of Property Rights

- ▶ Market fails to allocate resources efficiently
 - ▶ Because **property rights** are not well established
 - ▶ Some item of value does not have an owner with the legal authority to control it
- ▶ Government can potentially solve it
 - ▶ Help define property rights and thereby **unleash market forces**
 - ▶ So this really is a failure due to the **lack of market!!**
 - ▶ Regulate private behavior
 - ▶ Use tax revenue to supply goods that markets fail to supply

Think-Pair-Share

While Watching a Nature Documentary, You Find that:

- ▶ Kenya, Tanzania, and Uganda have made it illegal to kill elephants and sell their ivory. But countries like Botswana, Malawi, Namibia, and Zimbabwe allow people to kill elephants, but only those on their own property.
- ▶ Let's talk about elephants and chickens:
 - A. How is an elephant like a chicken? Different?
 - B. Which are going extinct: elephants or chickens?
 - C. How is it possible to turn an elephant into a chicken?
 - D. Where is the elephant population increasing?

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How is an elephant like a chicken?

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Is chicken rival in consumption? What about elephants?

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Is chicken excludable? What about elephants?

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Which are going extinct: elephants of chickens?

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How is it possible to turn an elephant into a chicken?

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Where is the elephant population increasing?

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Chapter In a Nutshell

- ▶ 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 others' 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, especially those not excludable.

Chapter In a Nutshell

- ▶ **Public goods** are neither rival in consumption nor excludable.
 - ▶ Examples of public goods include fireworks displays, national defense, and the discovery 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.

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Chapter In a Nutshell

- ▶ **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.
 - ▶ Governments can remedy this problem: regulations and corrective taxes, to **limit the use** of common resources.

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Chapter 11: Public Goods & Common Resources

- ▶ Excludable vs. Rivalness
- ▶ Public Goods
 - ▶ Non-excludable and non-rival goods
- ▶ Common Resources
 - ▶ Non-excludable and rival goods
- ▶ Classical Market Failure = **Lack-of-Market** Failure!
 - ▶ Caused by Lack of Property Rights!

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Chapter 11: Public Goods & Common Resources

- ▶ Homework:
 - ▶ Mankiw, Ch.11, Problem 4, 5, 7, 9, 10
- ▶ Challenge Questions (Past Midterms)
 - ▶ 2007 - Essay Q7
 - ▶ 2009 - (Multi-Choice Q14)
 - ▶ 2012 - (True/False Q10)

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Audience Q&A Session

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The End