In this chapter, look for the answers to these questions:

- What is an externality?
- Why do externalities make market outcomes inefficient?
- What public policies aim to solve the problem of externalities?
- How can people sometimes solve the problem of externalities on their own? Why do such private solutions not always work?

Introduction

- One of the principles from Chapter 1: Markets are usually a good way to organize economy activity. In absence of market failures, the competitive market outcome is efficient, maximizes total surplus.
- One type of market failure: externality
- Externalities can be negative or positive, depending on whether impact on bystander is adverse or beneficial.
Introduction

- Self-interested buyers and sellers

- Another principle from Chapter 1: 
  *Governments can sometimes improve market outcomes.*

Examples of Negative Externalities

- Air pollution from a factory
- The neighbor’s barking dog
- Late-night stereo blasting from the dorm room next to yours
- Noise pollution from construction projects
- Health risk to others from second-hand smoke
- Talking on cell phone while driving makes the roads less safe for others

Recap of Welfare Economics

- The market eq’m maximizes consumer + producer surplus.
- Supply curve shows *private cost,*
- Demand curve shows *private value,*
Analysis of a Negative Externality

The market for gasoline

Supply (private cost)
External cost
Social cost

“Internalizing the Externality”

- Internalizing the externality:
  - In our example,
  - (Imposing the tax on buyers would achieve the same outcome; market $Q$ would equal optimal $Q_0$.)

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Examples of Positive Externalities

- Being vaccinated against contagious diseases protects not only you, but people who visit the salad bar or produce section after you.
- R&D creates knowledge others can use.
- People going to college raise the population's education level, which reduces crime and improves government.

Positive Externalities

- In the presence of a positive externality, the social value of a good includes
  - private value
  - external benefit

- The socially optimal $Q$ maximizes welfare:
  - At any lower $Q$,
  - At any higher $Q$,

Active Learning 1

Analysis of a positive externality

- Draw the social value curve.
- Find the socially optimal $Q$.
- What policy would internalize this externality?
Effects of Externalities: Summary
If negative externality

If positive externality

To remedy the problem, "internalize the externality"

Public Policies Toward Externalities
Two approaches:
- Command-and-control policies
- Market-based policies

Corrective Taxes & Subsidies
- Corrective tax:
  - Also called Pigouvian taxes after Arthur Pigou (1877-1959).
  - The ideal corrective tax =
  - For activities with positive externalities,
Corrective Taxes & Subsidies

- Other taxes and subsidies distort incentives and move economy away from the social optimum.
- Corrective taxes & subsidies

Corrective Taxes vs. Regulations

- Different firms have different costs of pollution abatement.
- Efficient outcome:
  - A pollution tax is efficient:
    - Firms with low abatement costs will reduce pollution to reduce their tax burden.
    - Firms with high abatement costs have greater willingness to pay tax.
  - In contrast,

Corrective Taxes vs. Regulations

Corrective taxes are better for the environment:

- If a cleaner technology becomes available,

- In contrast, firms have no incentive for further reduction beyond the level specified in a regulation.
Example of a Corrective Tax: The Gas Tax

The gas tax targets three negative externalities:

- Acme and US Electric run coal-burning power plants. Each emits 40 tons of sulfur dioxide per month, total emissions = 80 tons/month.
- Goal: Reduce SO$_2$ emissions 25%, to 60 tons/month
- Cost of reducing emissions: $100/ton for Acme, $200/ton for USE

Policy option 1: Regulation
Every firm must cut its emissions 25% (10 tons).
Your task: Compute the cost to each firm and total cost of achieving goal using this policy.

ACTIVE LEARNING 2
A. Regulating lower SO$_2$ emissions

ACTIVE LEARNING 2
A. Answers
Initially, Acme and USE each emit 40 tons SO$_2$/month.

Goal: reduce SO$_2$ emissions to 60 tons/month total.

Policy option 2: Tradable pollution permits

Issue 60 permits, each allows one ton SO$_2$ emissions. Give 30 permits to each firm. Establish market for trading permits.

Each firm may use all its permits to emit 30 tons, may emit < 30 tons and sell leftover permits, or may purchase extra permits to emit > 30 tons.

Your task: Compute cost of achieving goal if Acme uses 20 permits and sells 10 to USE for $150 each.

A tradable pollution permits system reduces pollution at lower cost than regulation.

Result:
Tradable Pollution Permits in the Real World

- \( \text{SO}_2 \) permits traded in the U.S. since 1995.
- Nitrogen oxide permits traded in the northeastern U.S. since 1999.
- Carbon emissions permits traded in Europe since January 1, 2005.
- As of June 2008, Barack Obama and John McCain each propose "cap and trade" systems to reduce greenhouse gas emissions.

Corrective Taxes vs. Tradable Pollution Permits

- Like most demand curves, firms' demand for the ability to pollute is a downward-sloping function of the "price" of polluting.
  - A corrective tax
  - A tradable permits system

  When policymakers do not know the position of this demand curve, the permits system achieves pollution reduction targets more precisely.

Objections to the Economic Analysis of Pollution

- Some politicians, many environmentalists argue that no one should be able to "buy" the right to pollute, cannot put a price on the environment.
- However, people face tradeoffs. The value of clean air & water must be compared to their cost.
- The market-based approach reduces the cost of environmental protection, so it should increase the public's demand for a clean environment.
Private Solutions to Externalities

Types of private solutions:

- The Coase theorem:

  Dick owns a dog named Spot.
  Negative externality:
  Spot’s barking disturbs Jane, Dick’s neighbor.

  The socially efficient outcome maximizes Dick’s + Jane’s well-being.
  - If Dick values having Spot more than Jane values peace & quiet, the dog should stay.

  Coase theorem: The private market will reach the efficient outcome on its own…
The Coase Theorem: An Example

CASE 1:
Dick has the right to keep Spot.
Benefit to Dick of having Spot = $500
Cost to Jane of Spot’s barking = $800

Socially efficient outcome:

Private outcome:

CASE 2:
Dick has the right to keep Spot.
Benefit to Dick of having Spot = $1000
Cost to Jane of Spot’s barking = $800

Socially efficient outcome:

Private outcome:

CASE 3:
Jane has the legal right to peace & quiet.
Benefit to Dick of having Spot = $800
Cost to Jane of Spot’s barking = $500

Socially efficient outcome:

Private outcome:
Collectively, the 1000 residents of Green Valley value swimming in Blue Lake at $100,000. A nearby factory pollutes the lake water, and would have to pay $50,000 for non-polluting equipment.

A. Describe a Coase-like private solution.

B. Can you think of any reasons why this solution might not work in the real world?

Why Private Solutions Do Not Always Work

1. The costs parties incur in the process of agreeing to and following through on a bargain. These costs may make it impossible to reach a mutually beneficial agreement.

2. Even if a beneficial agreement is possible, each party may hold out for a better deal.

3. If # of parties is very large, coordinating them may be costly, difficult, or impossible.