CHAPTER 10

Externalities

PRINCIPLES OF
Economics
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Premium PowerPoint Slides
by Ron Cronovich

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?

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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.

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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

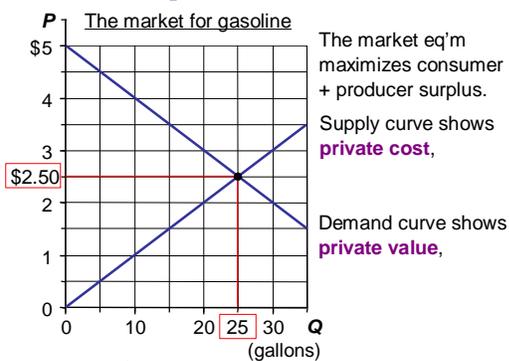§ Talking on cell phone while driving makes the roads less safe for others

Recap of Welfare Economics

P — The market for gasoline

The market eq'm maximizes consumer + producer surplus.

Supply curve shows **private cost**,

Demand curve shows **private value**,

Q (gallons)

Analysis of a Negative Externality

The market for gasoline

P

Social cost

Supply (private cost)

External cost

Q (gallons)

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Analysis of a Negative Externality

The market for gasoline

P

Social cost

S

D

Q (gallons)

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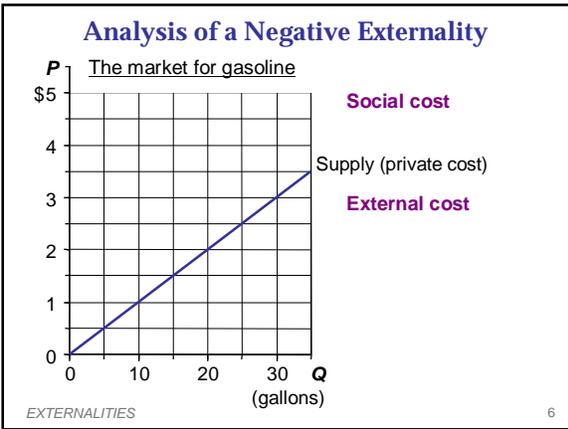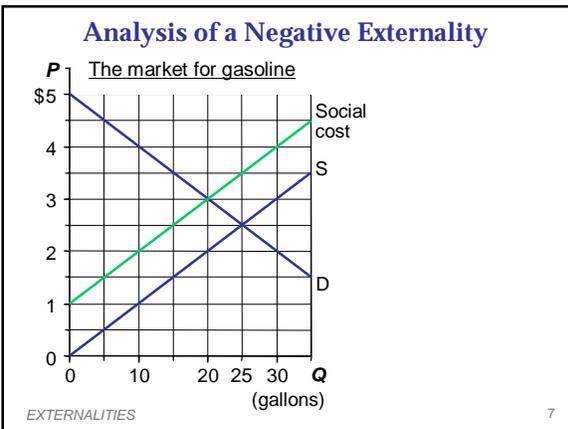
"Internalizing the Externality"

§ **Internalizing the externality**:

§ In our example,

§

(Imposing the tax on buyers would achieve the
same outcome; market Q would equal optimal Q.)

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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.

Thank you for not contaminating the fruit supply!

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

P The market for flu shots
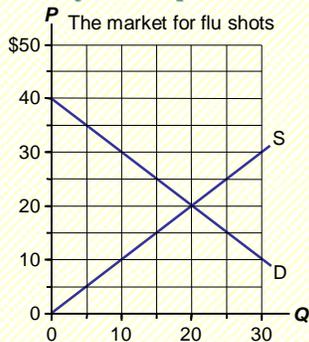
External benefit = $10/shot

§ Draw the social value curve.

§ Find the socially optimal **Q**.

§ What policy would internalize this externality?

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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:

A C T I V E   L E A R N I N G   *2*
A. Regulating lower SO_2 emissions

§ 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.

A C T I V E   L E A R N I N G   *2*
A. Answers

ACTIVE LEARNING 2
B. Tradable pollution permits

§ 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.

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B. Answers

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Tradable Pollution Permits

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

§ Result:

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Tradable Pollution Permits
in the Real World

§ 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:

Private Solutions to Externalities

§ **The Coase theorem**:

The Coase Theorem: An Example

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.

See Spot bark.

*Coase theorem: The private market will reach the
efficient outcome on its own…*

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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:

The Coase Theorem: An Example

§ 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:

The Coase Theorem: An Example

§ 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:

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Applying Coase

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?

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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.

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