

Externalities



EE211

Externalities

Externality: when actions taken by firms or consumers impose costs or confer benefits on third parties.

Individual agents care about private costs. But what matters for allocative efficiency is social cost.

Even if all markets were perfectly competitive, externalities would lead to allocative inefficiency.

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

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** – the direct value to buyers
 - **external benefit** – the value of the positive impact on bystanders
- The socially optimal Q maximizes welfare:
 - At any lower Q , the social value of additional units exceeds their cost.
 - At any higher Q , the cost of the last unit exceeds its social value.

Public Policies Toward Externalities



Two approaches:

- **Command-and-control policies** regulate behavior directly. Examples:
 - limits on quantity of pollution emitted
 - requirements that firms adopt a particular technology to reduce emissions
- **Market-based policies** provide incentives so that private decision-makers will choose to solve the problem on their own. Examples:
 - corrective taxes and subsidies
 - tradable pollution permits

Corrective Taxes & Subsidies



- **Corrective tax:** a tax designed to induce private decision-makers to take account of the social costs that arise from a negative externality
- Other taxes and subsidies distort incentives and move economy away from the social optimum.
- Corrective taxes & subsidies
 - align private incentives with society's interests
 - make private decision-makers take into account the external costs and benefits of their actions
 - move economy toward a more efficient allocation of resources

Corrective Taxes vs. Regulations



- Different firms have different costs of pollution abatement.
- Efficient outcome: Firms with the lowest abatement costs reduce pollution the most.
- 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, a regulation requiring all firms to reduce pollution by a specific amount not efficient.



Corrective taxes are better for the environment:

- The corrective tax gives firms incentive to continue reducing pollution as long as the cost of doing so is less than the tax.
- If a cleaner technology becomes available, the tax gives firms an incentive to adopt it.
- 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:

- Congestion
The more you drive, the more you contribute to congestion.
- Accidents
Larger vehicles cause more damage in an accident.
- Pollution
Burning fossil fuels produces greenhouse gases.

Tradable Pollution Permits



- **A tradable pollution permits system reduces pollution at lower cost than regulation.**
 - Firms with low cost of reducing pollution do so and sell their unused permits.
 - Firms with high cost of reducing pollution buy permits.
- **Result: Pollution reduction is concentrated among those firms with lowest costs.**

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 raises this price and thus reduces the quantity of pollution firms demand.
 - A tradable permits system restricts the supply of pollution rights, has the same effect as the tax.
- 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 and 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:

- Moral codes and social sanctions, e.g., the “Golden Rule”
- Charities, e.g., the Sierra Club
- Contracts between market participants and the affected bystanders

Private Solutions to Externalities



- **The Coase theorem:**

If private parties can costlessly bargain over the allocation of resources, they can solve the externalities problem on their own.

The Coase Theorem: An Example

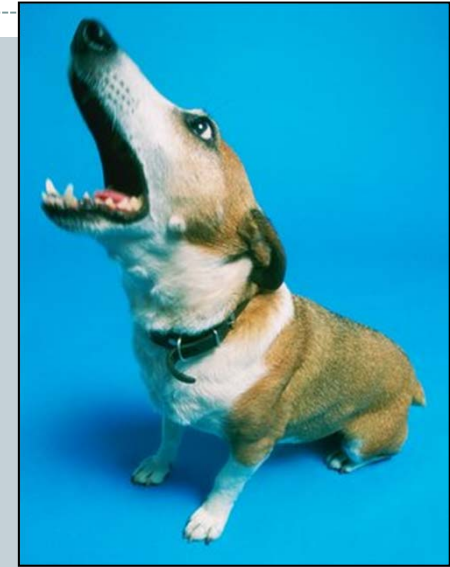
Paul owns a dog named Spot.

Negative externality:
Spot's barking disturbs Jane,
Paul's neighbor.

The socially efficient outcome
maximizes Paul's + Jane's well-being.

- If Paul values having Spot more than Jane values peace and quiet, the dog should stay.

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



See Spot bark.

The Coase Theorem: An Example



- **CASE 1:**
Paul has the right to keep Spot.
Benefit to Paul of having Spot = \$500
Cost to Jane of Spot's barking = \$800
- **Socially efficient outcome:**
Spot goes bye-bye.
- **Private outcome:**
Jane pays Paul \$600 to get rid of Spot,
both Jane and Paul are better off.
- **Private outcome = efficient outcome.**

The Coase Theorem: An Example



- **CASE 2:**
Paul has the right to keep Spot.
Benefit to Paul of having Spot = \$1000
Cost to Jane of Spot's barking = \$800
- **Socially efficient outcome:**
See Spot stay.
- **Private outcome:**
Jane not willing to pay more than \$800,
Paul not willing to accept less than \$1000,
so Spot stays.
- **Private outcome = efficient outcome.**

The Coase Theorem: An Example



- CASE 3:
Jane has the legal right to peace and quiet.
Benefit to Paul of having Spot = \$800
Cost to Jane of Spot's barking = \$500
- Socially efficient outcome: Paul keeps Spot.
- Private outcome: Paul pays Jane \$600 to put up with Spot's barking.
- Private outcome = efficient outcome.

The private market achieves the efficient outcome regardless of the initial distribution of rights.

Why Private Solutions Do Not Always Work



1. Transaction costs:

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. Stubbornness:

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

3. Coordination problems:

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

Sources:



- **Krugman, P. and Robin Wells (2008)**
- **Mankiw, N.G. (2012)**
- **Lipsey, Ragan, Storer (2008)**