

Externalities, Common Property, and Public Goods

Intermediate Microeconomics

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Main topics

- ◆ What are Externalities?
 - Private and Social Costs and Benefits
- ◆ Example: Pollution
 - Benefit-cost analysis and optimal levels of pollution control
 - Types of pollution control policy.
- ◆ Common Property
 - Fisheries and the tragedy of the commons.
- ◆ Public Goods

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What are "Externalities?"

- ◆ An "externality" exists when an action (e.g. of consumption or production) results in a cost or gain to another (firm or individual).
- ◆ Classification and examples of externalities (See M&Y p. 568)

	production	consumption
positive	on-the-job training, basic research, network building	education, art & fashion, recycling, network use
negative	pollution, resource depletion, congestion	noise, conspicuous consumption

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Private and Social Costs and Benefits

- ◆ Externalities are often described by distinguishing between "private" benefits (costs) and "social" costs (benefits).
 - Social costs (benefits) incorporate all opportunity costs, pecuniary or nonpecuniary.
 - Private costs (benefits) are all social costs born privately by the individual/firm responsible for them.
- ◆ Externalities exist when:
 - Social costs (benefits) > Private costs (benefits)

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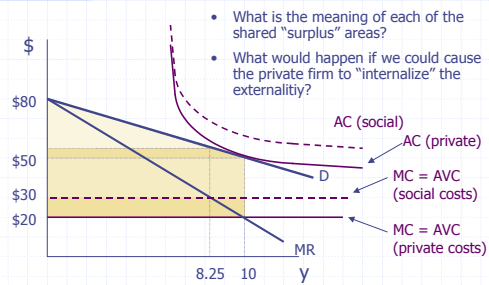
Pollution

- ◆ If a firm emits a pollutant, say, into the air or water (public goods), the contamination imposes a cost on society that is not "internalized" by the firm as part of its private costs.
- ◆ These costs typically are non-pecuniary. How can we measure the size or impact of such costs?
 - Demand side:
 - Willingness to pay – problems arise when the damaged good (air or water quality) is a public good.
 - Health costs: How much more does society spend in health costs because of the pollution?
 - Supply side:
 - How much would abatement cost?

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Redistributive Welfare Consequences of a Negative Production Externality

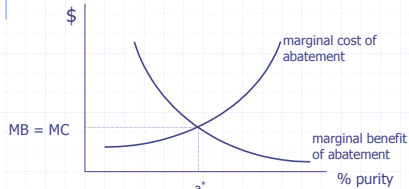


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What is the optimal level of pollution control (emissions abatement)?

- ◆ Pollution can be controlled or abated, but only at a cost. It requires investment in additional equipment, such as scrubbers or precipitators.
- ◆ The benefits of emission abatement diminish as air (or water) quality comes closer and closer to being pure.

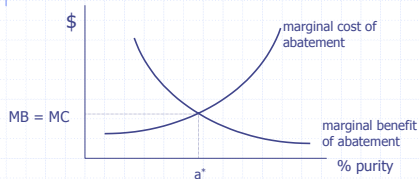


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Benefit-Cost Analysis

- ◆ If the government legislates emissions standards, what standards should be set? The relevant question is not only
 - Should we require it?
 - But how much do we require?
- ◆ A standard tool among policy makers to answer the question, "How much?" is **Benefit-Cost Analysis**.



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How might the government achieve an abatement level of a^* ?

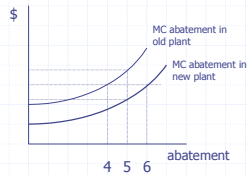
- ◆ Set direct legal emissions standards.
 - This fixes the emissions quantity for each polluter.
- ◆ Set effluent fees.
 - This fixes the emissions price.
- ◆ Distribute marketable emissions permits.
 - This fixes total the emissions quantity but not the emissions for each polluter.

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What is the intent of marketable emissions permits?

- ◆ Minimization of abatement costs. It is not optimal to require uniform standards of all polluters. Why?
 - Suppose an old (dirtier) and new (cleaner) plant emit pollutants.
 - MC of abating emissions by 1 unit is higher in the older plant.



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Can the Market Reduce Emissions? The Coase Theorem (Example: water pollution)

- ◆ Those damaged by the pollutants have an incentive to contract with emitter to reduce emissions.
 - If the polluter is allocated transferable property rights to pollute, the damaged party could purchase those rights (and not use them).
- ◆ Under what circumstance would this happen?
 - An upstream polluter dumps contaminants into water used exclusively by a single downstream user (say NYC water supply).
 - NYC has the incentive to buy the rights to control emissions if the price of reducing emissions by one unit is lower than the marginal cost of treating the contaminated water.
 - The emitter would accept an offer from NYC as long as the price offered is higher than the marginal cost of reducing the level of contamination by one unit.
 - $MC(\text{abatement}) \leq P \leq MC(\text{treatment})$
- ◆ Would dumping pollutants into the Hudson be so easily resolved? Why or Why not?

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Common Property

- ◆ Examples: coastal or ocean fisheries, underground irrigation water, common pastures, unregulated air waves ... clean air or water.
- ◆ "Common property" is an asset or resource in which multiple people have some implicit or explicit right to it because exclusive property rights are either poorly defined or not defined at all.
 - owners have exclusive rights over the output from using the common resource. If so, they reap the full gains from a marginal increase in its use without incurring the full marginal costs.
 - This, if unmitigated, results in "the tragedy of the commons." Common property tends to be overused. If the resource is depletable, it tends to be depleted.
- ◆ Consequence: The market produces the "Tragedy of the Commons."

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The "Tragedy of the Commons"

- ◆ A Classic Example: fishery
 - U.S. coastal waters are public. Commercial fishermen cannot own their fishery or exclude competitors from using it.
 - The logic of the tragedy of the commons:
 - If there are N commercial fishing companies. (Hypothetically, let's suppose that initially they are behaving ideally. That is, suppose they are all catching the maximum amount possible without depleting the fish population, y^* .)
 - Does any fishing co. have an incentive to fish more intensively than y^* ?
 - If the i^{th} company increases the catch by 1 ton, it will obtain the full MR but it will incur only $1/N$ of the MC to the common resource.
 - In a free market using a common fishery, commercial fishing companies have an incentive to over fish the waters, resulting in depletion and long-run decline in the fish population.
 - It is effectively an N -person Prisoners' Dilemma.
 - A cooperative (monopoly) outcome would not result in depletion.

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Public Goods

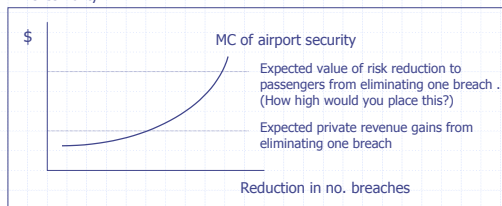
- ◆ Examples: national defense, law and order, public transportation, public education, public health, public parks, public waterways, air quality ...
- ◆ A public good has two characteristics (externalities):
 - It contains an element of common property—property rights are "non-exclusive" (either by nature or by law).
 - It is (partially or wholly) a "non-rival" good. One person's use of it does not use it up or make it unavailable for the next person.
- ◆ Are (unregulated) markets good at providing public goods?
 - No. They tend to underprovide them.

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Are Markets Good at Providing Public Goods?

- ◆ Example: airport security
- ◆ If left to themselves, would airlines provide the socially optimal amount of airport security?
- ◆ What collective (government) measures can we take to correct the externality?



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