

Lecture 14: Externalities

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Externalities

- A rational agent participating in a market transaction considers the effects of his economic activities on the people he does business with.
- But an agent may not consider the effects of his activities on people not connected to him through the market.
- Effects on others that are not considered by decision makers are called **externalities**.
- **Examples:** Externalities
 - I plant a flower garden for myself, but you enjoy looking at it.
 - I rent my apartment to noisy students who annoy the neighbors.
 - I drive my car and create more traffic.
- These effects are **not** transmitted through a market.

External Costs and Benefits

- **Example:** So-called music
 - Students arrange a “concert” for themselves on the BU beach.
 - Bob, in a nearby office, is trying to work, and the music bothers him.
 - Students do not think about the effect of their activity on others—music activity has an **external cost**.
 - Students should have fewer concerts.

■ **Example:** Second-hand smoke

- Restaurant customers enjoy smoking 😊.
- But restaurant employees suffer an increase in lung cancer and heart disease from second-hand smoke.
- Restaurant customers decide that the pleasure of smoking is worth the adverse health effects that they *themselves* will suffer,...
- but they do not consider the adverse effects on the restaurant staff—an **external cost**.
- Restaurant customers ought to smoke less.

■ **Example:** Gowns for high-school proms

- When **Anandi** buys a very expensive gown for her high-school prom,...
- other girls feel they must buy more expensive gowns as well.
- The added costs to [the parents of] the other girls constitute an **external cost** of Anandi's behavior.
- Economists call this a "**positional externality**."

- Positional externalities lead to a kind of "arms race."

■ **Example:** Self-disciplined roommate

- **Ting** is self-disciplined and studies during the day.
- Her roommate **Jiayin** would rather watch soap operas on TV.
- But **Ting** inspires **Jiayin** to study.
- **Ting** is pleased about the effect of studying on her own grades,...
- but she doesn't consider the positive effect of her behavior on her roommate—an **external benefit**.
- **Ting** ought to study even more!

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Positive and Negative Externalities

- An activity with an external benefit is said to have a **positive externality**.
- An activity with an external cost is said to have a **negative externality**.
- Externalities create **economic inefficiency**,...
- because when deciding what activities to pursue,...
- people **lack the incentive** to consider the externalities those activities create.

How should externalities be controlled?

- Externalities are very common—most activities have them.
- They affect people not involved in decision making, so controlling them is important.
- Should the authorities ban activities with negative externalities (e.g. rock concerts, smoking)?
- Should the authorities force the performance of activities with positive externalities (e.g. studying)?
- Such extreme solutions could make inefficiency even worse!
- Economists advocate using incentives (taxes and subsidies) to induce people to do the right thing.

Internalizing Externalities

- When buyers or sellers **receive subsidies** that correspond to the value of positive externalities,...
- or are required to **pay taxes** that correspond to the cost of negative externalities,...
- they have the incentive to adjust their activities in a way that increases surplus for all the members of society.
- This is because they are obtaining some of the benefits they create for others or paying some of the cost.

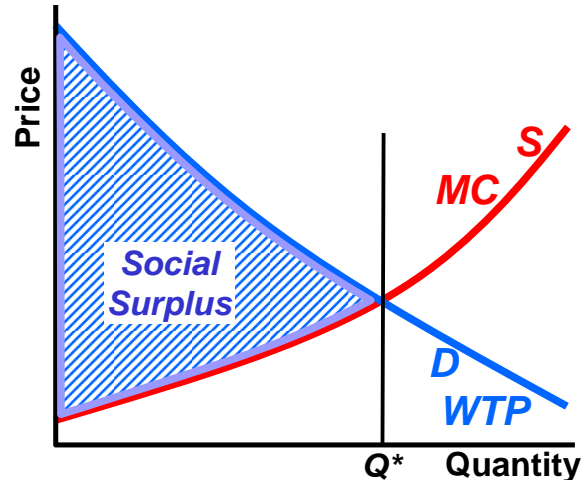
- **Example:** Educated citizens benefit all of society, so governments should pay students to study (or subsidize education).
- **Example:** To discourage students from putting on rock concerts, universities could set fees of \$5000 per concert.
- **Example:** Taxes on cigarettes could be set to include the costs of illness created by second-hand smoke.
- Such mechanisms increase social surplus by inducing people to **internalize** the externalities.



**act as if they themselves suffer (benefit)
from the externalities that they create**

Social Surplus in Markets without Externalities

- **Social surplus** in a market is the difference between **social benefit** and **social cost**.
- For goods without externalities, only the buyers benefit from the goods, and only the producers have costs.
- Private benefits and costs *are the same as* social benefits and costs.
- On a graph:
 - The demand curve shows private benefits.
 - The supply curve shows private costs.
 - The area between them measures **social surplus**.
 - **Social surplus = private surplus = CS + PS**



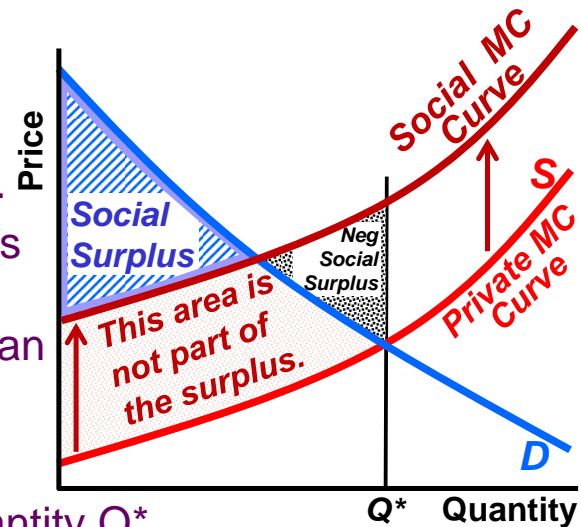
Social Surplus with Externalities

- When externalities exist:
 - The **private costs** of a product (paid by private producers) **do not equal** the **social costs** to all of society.
 - The private benefits of a product (the WTP of consumers) **do not equal** the **social benefits** to all of society.
- Social surplus is still the difference between social benefits and social costs.
- But social benefits and social costs are no longer determined by demand and supply, which reflect only private benefits and costs.

Surplus in Markets with Negative Externalities

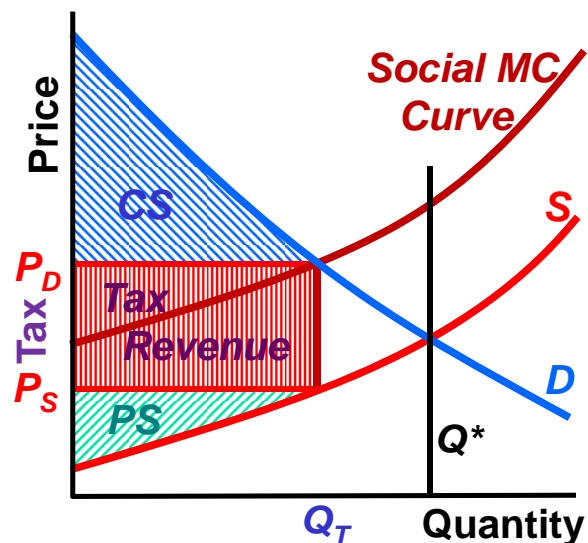
■ When there are negative externalities,

- The demand curve shows private and social benefits.
- But the supply curve shows only private costs.
- Social costs are greater than private costs.
- Social Surplus is reduced.
- Worse, the equilibrium quantity Q^* , creates negative social surplus.
- And the negative surplus cancels some positive surplus.



Using a Tax to Internalize a Negative Externality

- Suppose the government imposes a tax equal to the value of the externality.
- Then the quantity will be reduced to the efficient level.
- The full positive surplus and tax revenues will become available.
- By taxing goods with negative externalities,
 - other taxes that lower surplus can be reduced,...
 - lost revenues can be replaced, and surplus can be increased.



In markets with negative externalities, taxes can increase efficiency.

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Pollution

- Pollution is an undesirable byproduct of production.
- Pollution represents a major class of negative externalities.
 - Acid rain
 - Global warming
 - Ozone depletion
 - Contaminated water
 - Environmental mercury, lead, other heavy metals

Pollution as a Negative Externality

- Pollution is created when certain products (e.g. electricity, transportation) are produced.
- People who produce and purchase products...
 - electric utilities and consumers
 - chemical producers and consumers
 - automobile drivers
- do not pay for the damage caused by the pollution,...
- so producers/consumers don't have the incentive to prevent or clean up ("abate") the pollution.

How clean is clean?

- Your mother is coming to your dorm room.
- You need to clean up.
- But how much?

- There is no such thing as completely clean.
- Cleaning up a dorm room (or abating pollution) is not an all-or-nothing decision.
- There is a *tradeoff*.

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Abating Pollution

- Pollution caused by production activities can be controlled.
- For example, electricity generating companies can install “scrubbers”...
- Scrubbers prevent acid rain by removing some of the sulfur from exhaust gases.
- But as they try to remove more and more sulfur, the process becomes more and more costly.
- And electricity becomes increasingly expensive.

How much should pollution be abated?

- Every unit of pollution emitted causes more and more environmental damage.
- Abating (preventing or cleaning) a small amount of the pollution is relatively easy and inexpensive.
 - We do the easy things first, like washing the coal to remove some of the sulfur.
 - The easy, inexpensive things are called *“the low-hanging fruit.”*
- However, abating pollution becomes increasingly costly as standards of cleanliness increase.

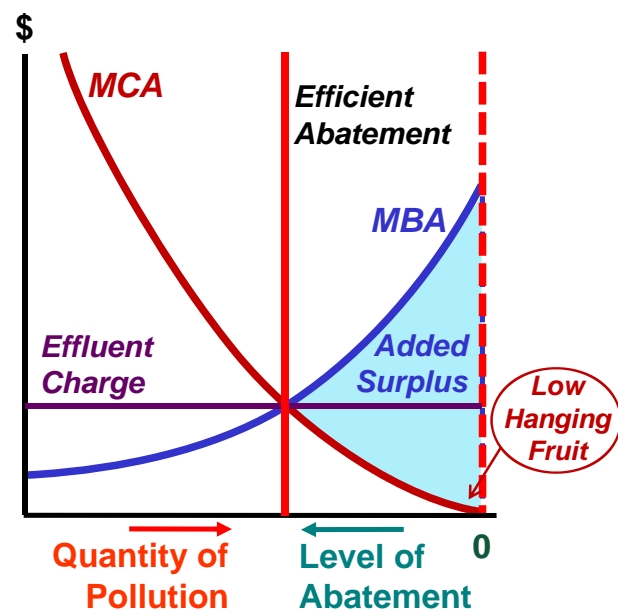
The Benefits and Costs of Abatement

- For a given unit of pollution, the **marginal benefit of abatement (MBA)** is the amount of damage that the pollution would have caused if it hadn't been abated (cleaned or prevented).
- The opportunity cost of abating an additional unit of pollution is the **marginal cost of abatement (MCA)**.
- Abatement creates social surplus as long as **MCA < MBA**. Why?
- How much should pollution be abated?

Efficient Abatement

- Economic efficiency (maximizing social surplus) requires that abatement continues as long as **MCA < MBA ...**
- and that abatement stops before **MCA > MBA**.
 - This means that the dividing line between abatement and no abatement should be at **MCA = MBA**
- Additional abatement would NOT be efficient! Why not?

- We graph pollution and abatement on the right.
- With zero (0) abatement we have a lot of pollution.
- We plot:
 - the marginal cost of abatement (**MCA**),
 - and the marginal benefit of abatement (**MBA**)
- If we abate efficiently,...
- pollution decreases,...
- and social surplus increases.



- What happens if the government forces the polluter to pay an “effluent charge” on each unit of pollution?

The Coase Theorem

- Ronald Coase [*rhymes with “nose”*] was a law professor at the University of Chicago.

Coase video on course website: Classes > Readings
- He suggested that externalities would often be internalized by negotiation between the private parties affected.
 - **Example:** Jiayin notices that Ting inspires her to study, so she pays Ting to study more.
 - **Example (True):** An economist stepped into an elevator and noticed a young women smoking a cigarette.
- Such negotiations internalize the externalities effects by connecting the agents with a market.

■ The Coase Theorem ***does not work very well*** when the costs of reaching agreements are high; that is, when

- the externality is produced by many people (or firms),
- the externality affects many people, or
- legal costs are high.

■ **Example:** Global warming.

■ **Example:** [Barcelona]
Noisy motorcycles (motos) passing your apartment.

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