

# Lecture 14: Externalities



## **Clicker Question**

Low priced imports from China...

## Externalities

- A rational self-interested agent undertaking an economic activity considers the effect of the activity ***on his own welfare***,...
- ...and the agent reacts to the market price in order to maximize his welfare.
  - You buy when your ***WTP*** > ***p***, ...
  - ...but you don't buy when ***WTP*** < ***p***.
- Unfortunately, an agent may not consider the direct effects of his activities on other people.
- The direct effects of an agent's activities on other people are called ***externalities***.
- Because of externalities, an agent may act against the interests of society.

## Examples: Externalities

- I plant a flower garden for myself, but people on my street 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*** considered when the agent reacts to the market price.

## 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. To him, the so-called music is *obnoxious noise*.
- Students do not think about the effect of their so-called music on others—this activity has an **external cost**.
- To promote social welfare, 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**.
- To promote social welfare, restaurant customers ought to smoke less.

## ■ **Example:** Flu shot

- Anil thinks about getting a flu shot to protect himself from the flu,
- but he decides that flu shots are too painful.
- He doesn't worry about infecting his classmates, who could die from the flu.
- Anil's flu shot would help protect the students sitting near him in EC101—an **external benefit**.
- To increase social welfare, Anil ought to get the flu shot.

## ■ BU has a flu clinic today in the GSU basement!!!

- 11:00 to 4:30. It's free for students with BU insurance and most other insurance.

## 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 **reduce economic efficiency**,...
- because when deciding what activities to pursue,...
- people compare activity value with market prices,
- but they **lack the incentive** to consider the externalities those activities create.

## How should externalities be controlled?

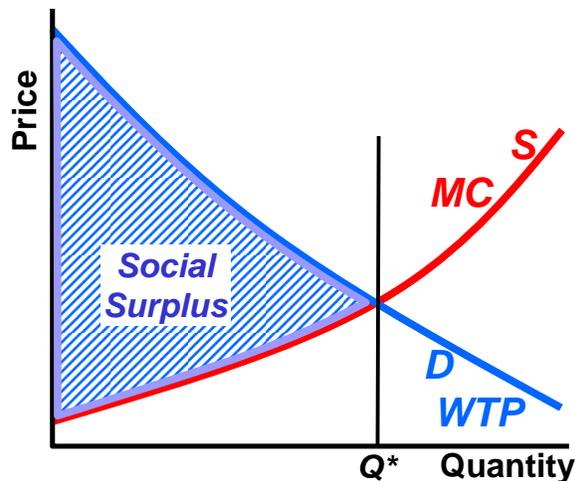
- Externalities are very common—most activities have them.
- They affect people not involved in decision making, so controlling them is important.
- Should the authorities ban activities with negative externalities (e.g. rock concerts, smoking)?
- Should the authorities force the performance of activities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

- **Example:** Educated citizens benefit all of society, so governments should pay students to study (or subsidize education).
- **Example:** To discourage students from putting on annoying rock concerts, universities could set fees of \$5,000 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**



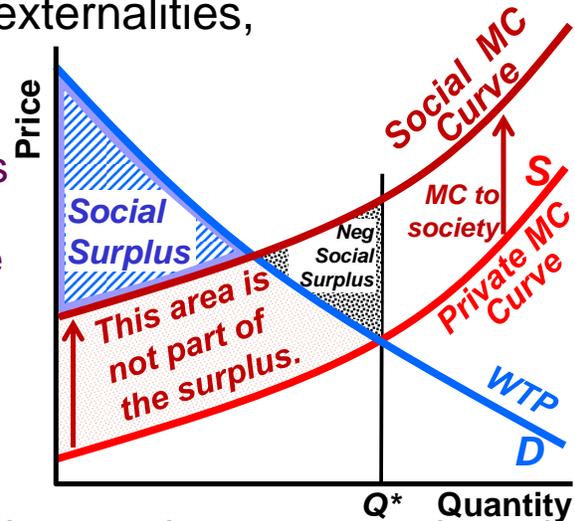
## Social Surplus with Externalities

- When **negative** externalities exist:
  - The **private costs** of a product (paid by private producers) **are less than** the **social costs** to all of society.
- When **positive** externalities exist:
  - The **private benefits** of a product (the WTP of buyers) **are less than** the **social benefits** to all of society.
- Social surplus is the difference between **social benefits** and **social costs**.
- But social benefits and social costs can no longer be measured with just demand and supply...
- ...because demand and supply reflect only private benefits and costs.

## Surplus in Markets with Negative Externalities

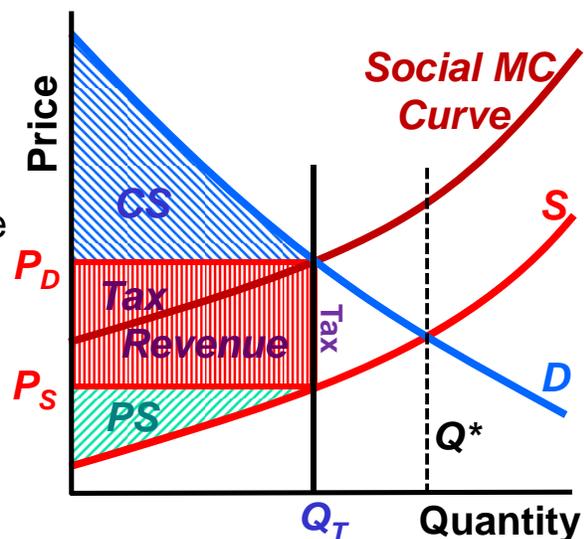
### ■ When there are negative externalities,

- The demand curve shows social (= private) benefits.
- But the supply curve shows only private costs.
- Social costs include private costs,
- but costs to the rest of society must be added,
- so social costs are greater than private costs.
- Social Surplus is less than the area between supply and demand.
- 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 will become available (no negative surplus)
- ...and so will tax revenues.
- By taxing goods with negative externalities,
  - other taxes that lower surplus can be reduced,...
  - and revenues lost from reducing the other taxes can be replaced.



In markets with negative externalities, taxes can increase efficiency.

## Clicker Question

In a market for a good with a large **positive** externality, a small tax...

In a market with positive externalities, a **subsidy** would increase efficiency.

## Pollution

- Pollution is an undesirable byproduct of production (or consumption).
- 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/buyers don't have the incentive to prevent or clean up ("abate") the pollution.

## How clean is clean?

- **Example:** Your mother is coming to your dorm room.
- You need to clean up.
- But how much should you clean?
  - Put away your bottles?
  - Throw out the trash?
  - Vacuum the floor?
  - Disinfect the bathroom?
  - Wash the walls?
  - Filter the air?

- 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*.
- For most mothers,...
- and even for the strictest fathers, ...
- it would *not* make sense, for example, to *sterilize* your room.

## *Clicker Question*

Economic analysis implies that governments should ...

# 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.
  - Economists call the easy, inexpensive things *“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?
- There is such a thing as **too clean**.

- We graph pollution and abatement on the right.

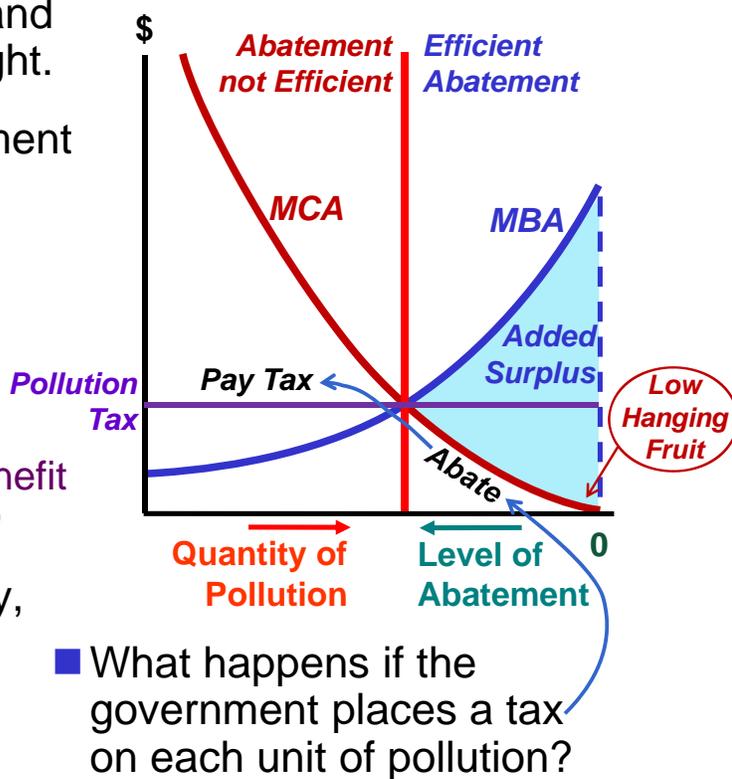
- With zero (0) abatement we have a lot of pollution.

- 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.



## The Coase Theorem

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

*Watch Coase video on Course Schedule*

- He suggested that externalities would often be internalized by negotiation between the private parties affected.
  - **Example:** Anil’s roommate offers to pay Anil if Anil gets the flu shot.
  - **Example (True):** An economist stepped into an elevator and noticed a young women smoking a cigarette. He offered her \$1 to put it out.

- Such negotiations internalize the externalities 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.

## ***Clicker Question***

The Coase Theorem says that when the activity of one agent directly affects the welfare of others,

End of File