

### Externalities and Property Rights

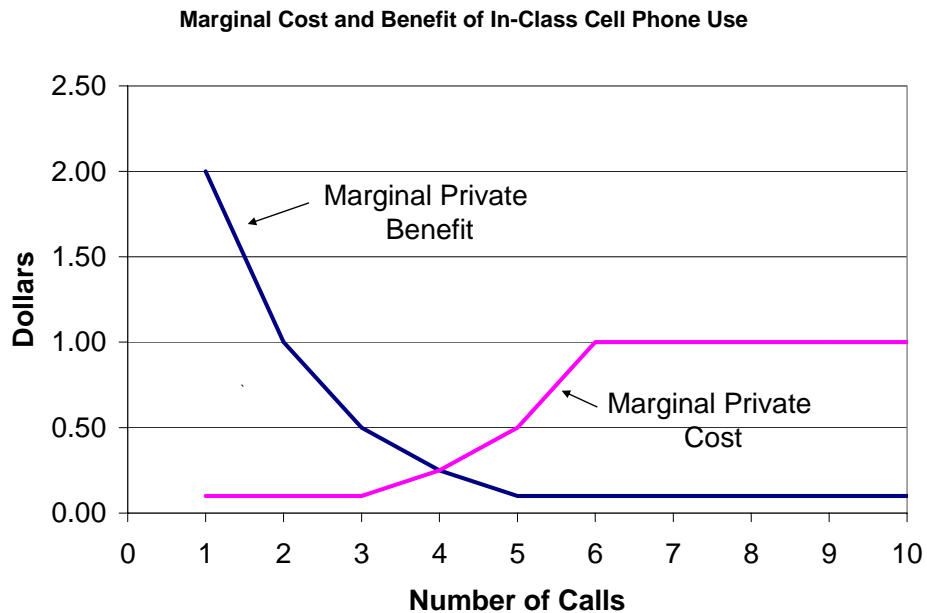
1. Definitions
  - a. Externalities are the costs (and sometimes benefits) that are not experienced directly by producers and consumers of a good. Externalities spill over onto third parties. Externalities may be negative (cigar smoke, pollution) or positive (the sight of a beautiful garden).
  - b. Property Rights are the conditions of ownership including the rights and restrictions regarding use, ownership and sale of property.
  - c. Tragedy of the Commons is the overuse of resources that are held in common by a group of people. Overuse occurs because no member of the group has an incentive to conserve or maintain the resource while all have an incentive to use the resource.
  - d. Transaction Costs are the resources that are used in making an exchange.
  
2. Economic Principles at Work
  - a. Negative externalities are costs experienced by third parties but not considered by first parties when they make decisions. I may believe the cost of smoking a cigar to be the price I pay for the cigar. The social cost of my smoking a cigar includes the discomfort and health risk you experience in the presence of cigar smoke.
  - b. Externalities get in the way of efficient use of resources. When negative externalities are associated with production or consumption of a good, then too much of the good will be produced and consumed. When positive externalities are associated with production or consumption of a good, then too little of the good will be produced and consumed.
  - c. Externalities persist in situations where property rights are either poorly defined or have not been secured. According to Ronald Coase, winner of the 1991 Nobel Prize in economics, externalities cause economic inefficiency not because of the externalities themselves but because of insecure property rights. Coase argued that if bargaining is not costly and if property rights are secure, then agents can bargain over externalities and achieve an efficient outcome.
  - d. If a production or consumption of a good has negative external effects, an efficient allocation will have that good produced and consumed at a level where the marginal benefits just equals marginal costs (including both private and third party costs).

**Exercise One:** The purpose of this exercise is to give you an opportunity to improve your understanding of concepts used in this class. Answer each question in the space provided.

- Why, when I smoke a cigar in class, is the economic cost greater than the price I pay for the cigar?
- What is your reservation price for permitting me to smoke my cigar in this room during class today? Please recall that your reservation price is the amount of money you must receive to make you just indifferent between having the money and tolerating my cigar smoke and not having the money and not having to tolerate the smoke.
- What is your estimate of the economic cost associated with me smoking a cigar during this class?

**Exercise Two:** The purpose of this exercise is to use the concepts of marginal benefit and marginal cost to understand why negative externalities imply an inefficient allocation of resources.

- The following diagram shows the marginal benefit and marginal private cost to an individual of taking a cell phone call in class provided cell phone use is not prohibited. Explain the shapes of the marginal benefit and marginal cost schedules and predict how many cell phone calls the individual will make.
- Explain why the marginal social cost of an in-class cell phone call is greater than the private social cost of the call and estimate the social cost of the cell phone call.
- Estimate the dead weight loss of cell phone use in class if there are no prohibitions?
- Design a tax that will reduce cell phone use to its socially optimal level.



**Exercise Three:** Suppose a paper mill is located on the banks of a trout stream. The mill must decide how much chemical waste to discharge into the stream. If it discharges a lot of waste, the mill is more valuable because it has a low cost of disposal but the fishery is less valuable because the trout are fewer in number and smaller in size. If the mill discharges little waste, the mill is less valuable but the fishery is more valuable. The table gives the values of the mill and fishery as a function of the mill's pollution decision.

	Economic Implications of Pollution Decision	
Pollution Decision of Mill	Value of Mill	Value of Fishery
High Effluent Discharge	\$3,000	\$2,000
Low Effluent Discharge	\$1,000	\$6,000

- What is the socially better decision - high or low discharge?
- Suppose the rights belong to the Mill. What will happen as the result of bargaining?
- Suppose the rights belong to the Fishery. What will happen as the result of bargaining?

**Exercise Four:** Under the Clean Air Act Amendments of 1990, the U.S. Environmental Protection Agency (EPA) established the Acid-rain Abatement Program that authorized the creation of a sulfur dioxide (SO<sub>2</sub>) allowance trading system. An air pollution allowance trading program introduces market forces into pollution control, harnessing the incentives of the free market to reduce pollution. The total amount of pollution to be allowed from certain similar sources (such as electric generation and other large "smokestack" plants) within the designated area for a specified period (typically one year) is determined based on local clean air standards and the goals of the emission reduction program. The total is divided into allowance units, which are auctioned off to the sources. "Allowances" are in units of pollutant emitted, such that a polluter will use up its allowances as it pollutes. The key to the system is that these allowances may be traded between sources, or may be banked. At the end of the period, each source must have enough allowances to balance its emissions for that period, otherwise a penalty on each excess unit of pollution is imposed. See

[http://www.epa.gov/region01/students/pdfs/rd\\_airtrad.pdf](http://www.epa.gov/region01/students/pdfs/rd_airtrad.pdf).

- What sort of company would want to sell pollution credits? Why?
- What sort of company would want to buy pollution credits? Why?
- Do you think it is a good idea to allow companies to trade pollution credits? Why or why not?

**Exercise Five:** Suppose three companies in the Ohio Valley each produce 1000 tons of sulfur dioxide (SO<sub>2</sub>) per year. Under the provisions of the Clean Air Act, the Federal Government has decided to reduce the total amount of SO<sub>2</sub> emissions next year by 1200 tons. The following table gives, for each firm, the **marginal cost per ton** of reducing SO<sub>2</sub> emissions. For example, it will cost company B \$100 per ton to reduce emissions by any amount between 0 and 200 tons, \$150 per ton to reduce emissions by more than 200 tons, \$200 per ton to reduce emissions by more than 600 tons, and so forth. The total cost to company B of reducing SO<sub>2</sub> emissions by 700 tons is \$115,000 (200 x \$100 + 200 x \$150 + 200 x \$200 + 100 x \$250).

SO <sub>2</sub> Reduction (tons)	Marginal Cost Per Ton of SO <sub>2</sub> Reduction		
	Company A	Company B	Company C
000-200	\$100	\$100	\$50
201-400	\$100	\$150	\$100
401-600	\$100	\$200	\$150
601-800	\$150	\$250	\$300
801-1000	\$150	\$300	\$500

- What might account for the different marginal cost schedules for the three companies?
- What is the most efficient way to lower pollution by 1200 tons? Explain.
- Suppose the government does not know the actual marginal cost schedules. Design a pollution reduction program that will achieve the efficient solution.