Chapter

10

Externalities

Externalities

- Externality
  - The uncompensated impact of one person's actions on the well-being of a bystander
  - Market failure
  - Negative externality
    - Impact on the bystander is adverse
  - Positive externality
    - Impact on the bystander is beneficial

Externalities

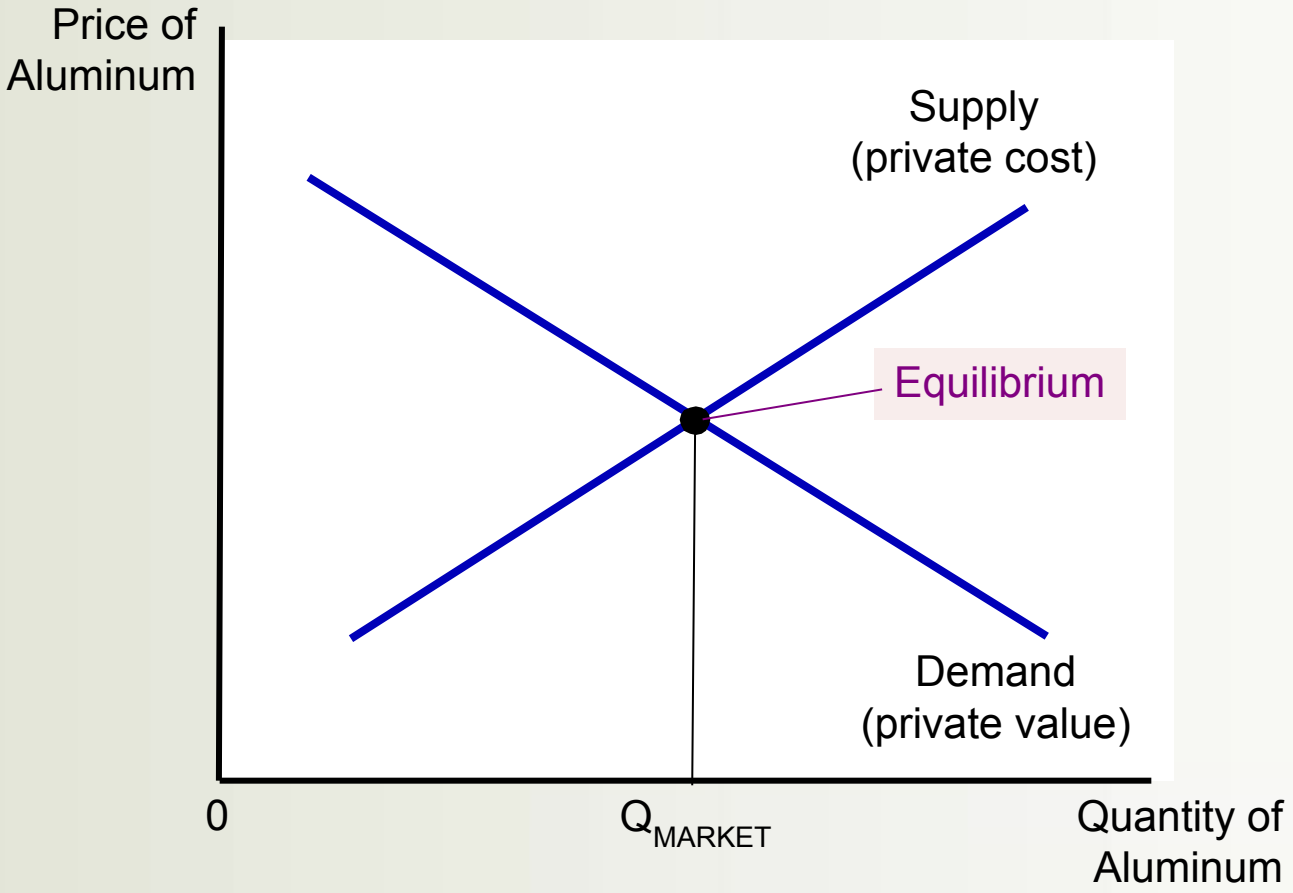
- Examples of negative externalities:
  - Exhaust from automobiles
  - Barking dogs
- Examples of positive externalities:
  - Restored historic buildings
  - Research into new technologies
- Decision maker - fails to account for externalities
    - Government: protect the interests of bystanders

Externalities and Market Inefficiency

- Externalities
  - Cause markets to allocate resources inefficiently
- Welfare economics: a recap
  - Demand curve – value to consumers
    - Prices they are willing to pay
  - Supply curve – cost to suppliers
  - Equilibrium quantity and price
    - Efficient
      - Maximizes sum of producer & consumer surplus

Figure 1

The market for aluminum



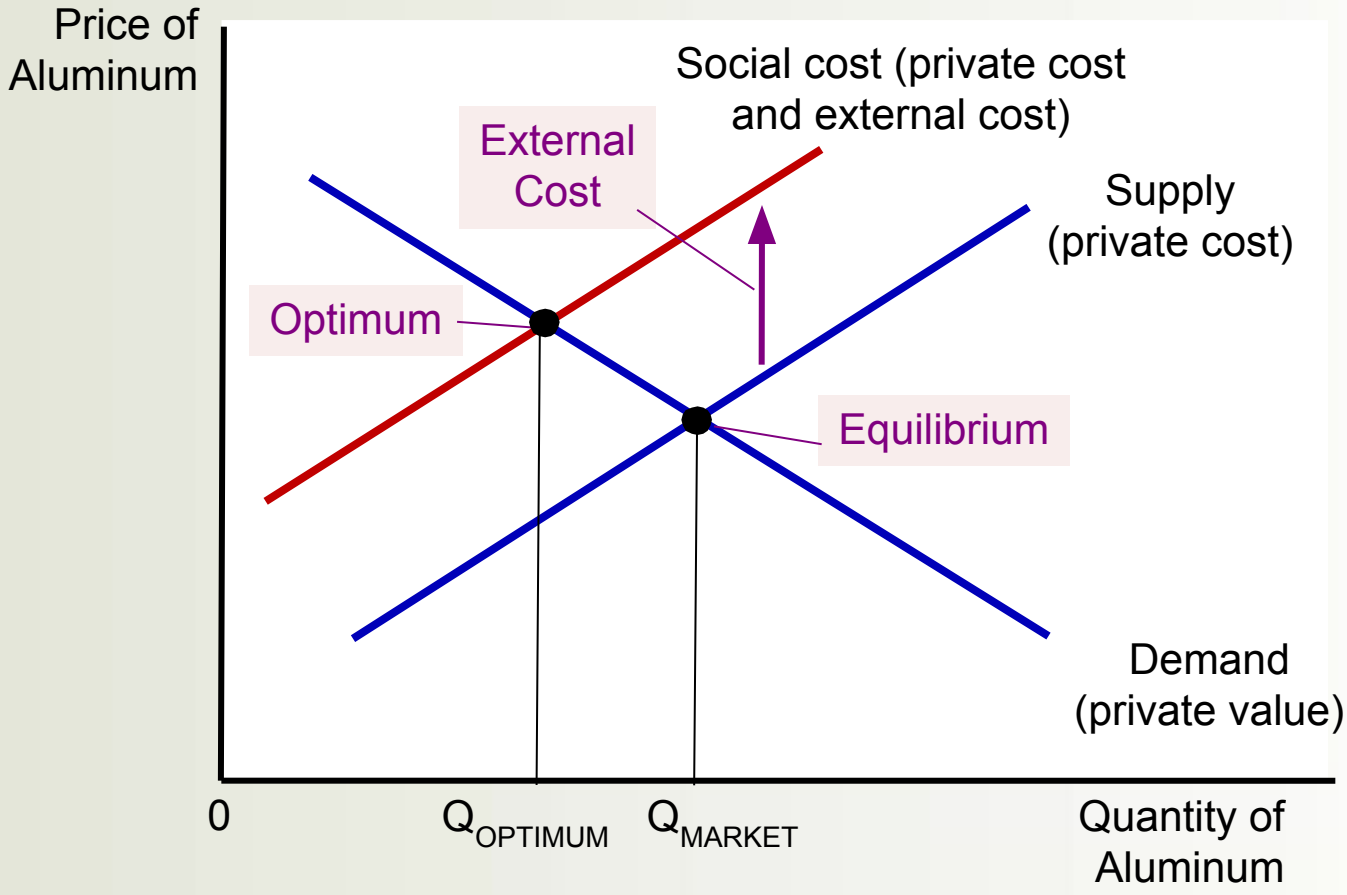
The demand curve reflects the value to buyers, and the supply curve reflects the costs of sellers. The equilibrium quantity, Q_{MARKET}, maximizes the total value to buyers minus the total costs of sellers. In the absence of externalities, therefore, the market equilibrium is efficient.

Externalities and Market Inefficiency

- Negative externalities
  - Pollution
  - Cost to society (of producing aluminum)
    - Larger than the cost to the aluminum producers
  - Social cost - supply
    - Private costs of the producers
    - Plus the costs to those bystanders affected adversely by the negative externality
  - Social cost curve – above the supply curve

Figure 2

Pollution and the social optimum



In the presence of a negative externality, such as pollution, the social cost of the good exceeds the private cost. The optimal quantity, $Q_{OPTIMUM}$, is therefore smaller than the equilibrium quantity, Q_{MARKET}.

Externalities and Market Inefficiency

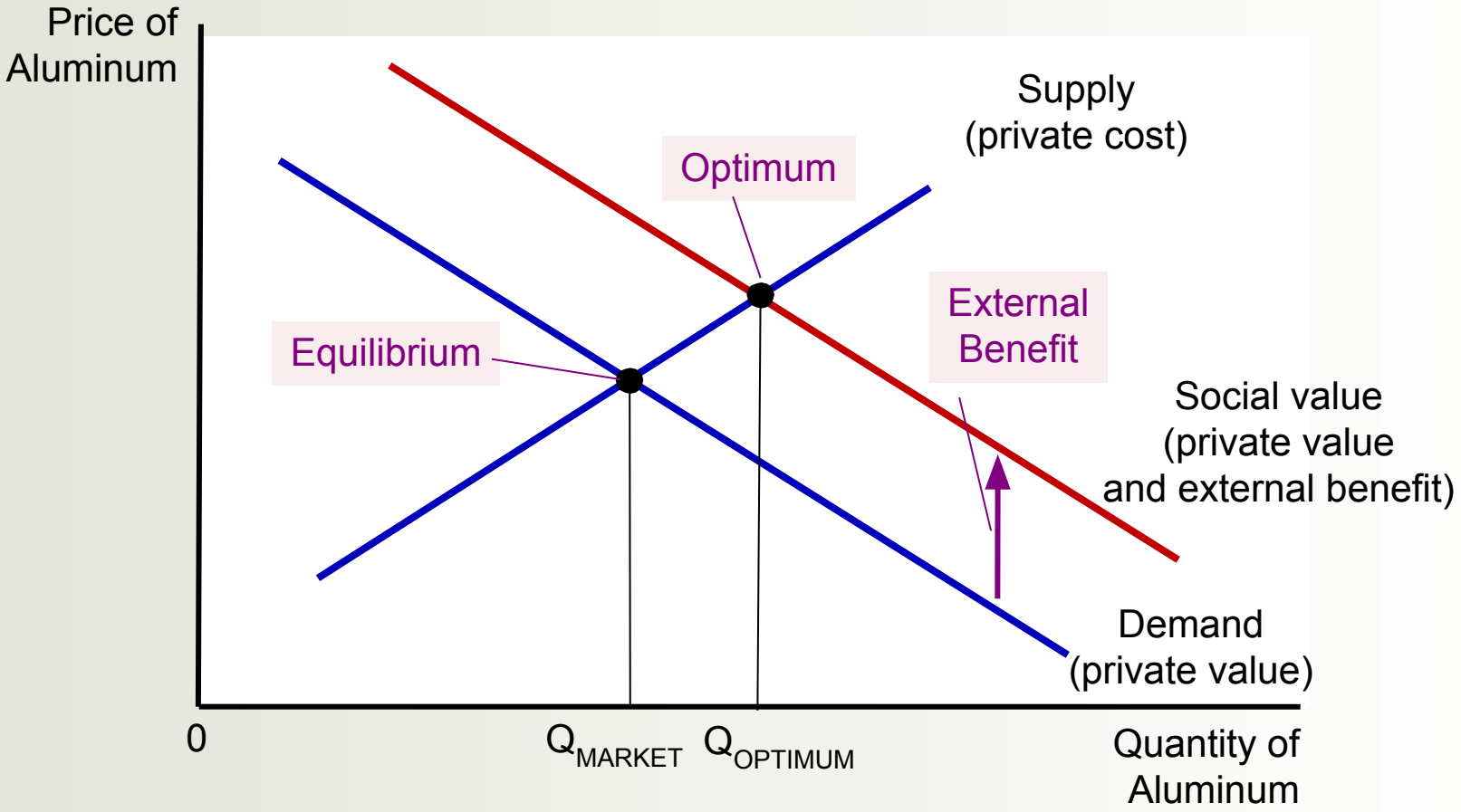
- Negative externalities
  - Optimum quantity produced
    - Maximize total welfare
    - Smaller than market equilibrium quantity
- Government – correct market failure
  - Internalizing the externality
    - Altering incentives so that people take account of the external effects of their actions
    - E.g.: tax producers
      - Shift supply upward – by the size of the tax
      - Tax – value of negative externality

Externalities and Market Inefficiency

- Positive externalities
  - Education
    - Benefit of education – private
    - Externalities: better government, lower crime rate, higher productivity and wages
  - Social value – demand
    - Higher than private value
  - Social value curve
    - Above demand curve

Figure 3

Education and the social optimum



In the presence of a positive externality, the social value of the good exceeds the private value. The optimal quantity, $Q_{OPTIMUM}$, is therefore larger than the equilibrium quantity, Q_{MARKET}.

Externalities and Market Inefficiency

- Positive externalities
  - Socially optimal quantity
    - Greater than market equilibrium quantity
  - Government – correct market failure
    - Internalize the externality
    - Subsidy

Externalities and Market Inefficiency

- Negative externalities
  - Markets - produce a larger quantity than is socially desirable
- Positive externalities
  - Markets - produce a smaller quantity than is socially desirable
- Government: internalize the externality
  - Taxing goods that have negative externalities
  - Subsidizing goods that have positive externalities

Technology spillovers, industrial policy, and patent protection

- Technology spillover = Positive externality
  - Impact of one firm's research and production efforts on other firms' access to technological advance
  - Government: internalize the externality
    - Subsidy = value of the technology spillover
- Industrial policy
  - Government intervention in the economy that aims to promote technology-enhancing industries
- Patent law
  - Protect the rights of inventors by giving them exclusive use of their inventions for a period of time

Public Policies Toward Externalities

- Command-and-control policies: regulation
  - Regulate behavior directly
    - Making certain behaviors either required or forbidden
    - Cannot eradicate pollution
  - Environmental Protection Agency (EPA)
    - Develop and enforce regulations
      - Protecting the environment
    - Dictates maximum level of pollution
    - Requires that firms adopt a particular technology to reduce emissions

Public Policies Toward Externalities

- Market-based policies
  - Provide incentives
    - Private decision makers - choose to solve the problem on their own

1. Corrective taxes and subsidies
   - Corrective tax
     - Induce private decision makers to take account of the social costs that arise from a negative externality
     - Places a price on the right to pollute
     - Reduce pollution at a lower cost to society

Why is gasoline taxed so heavily?

- The gas tax = corrective tax
  - Three negative externalities
    - Congestion
    - Accidents
    - Pollution
  - Doesn't cause deadweight losses
  - Makes the economy work better
    - Less traffic congestion, safer roads, and cleaner environment

Why is gasoline taxed so heavily?

- How high should the tax on gasoline be?
  - Most European countries
    - Gasoline taxes - much higher than those in the U.S.
  - 2007 study, Journal of Economic Literature
    - Optimal corrective tax on gasoline was $2.10 per gallon
    - Actual tax in the United States: 40 cents
- Tax revenue from a gasoline tax
  - Lower taxes that distort incentives and cause deadweight losses
  - Some government regulations
    - Production of fuel-efficient cars – unnecessary

Public Policies Toward Externalities

- Market-based policies

2. Tradable pollution permits
   - Voluntary transfer of the right to pollute from one firm to another
   - New scarce resource: pollution permits
   - Market to trade permits
   - Firm's willingness to pay
     - Depend on its cost of reducing pollution

Public Policies Toward Externalities

2. Tradable pollution permits

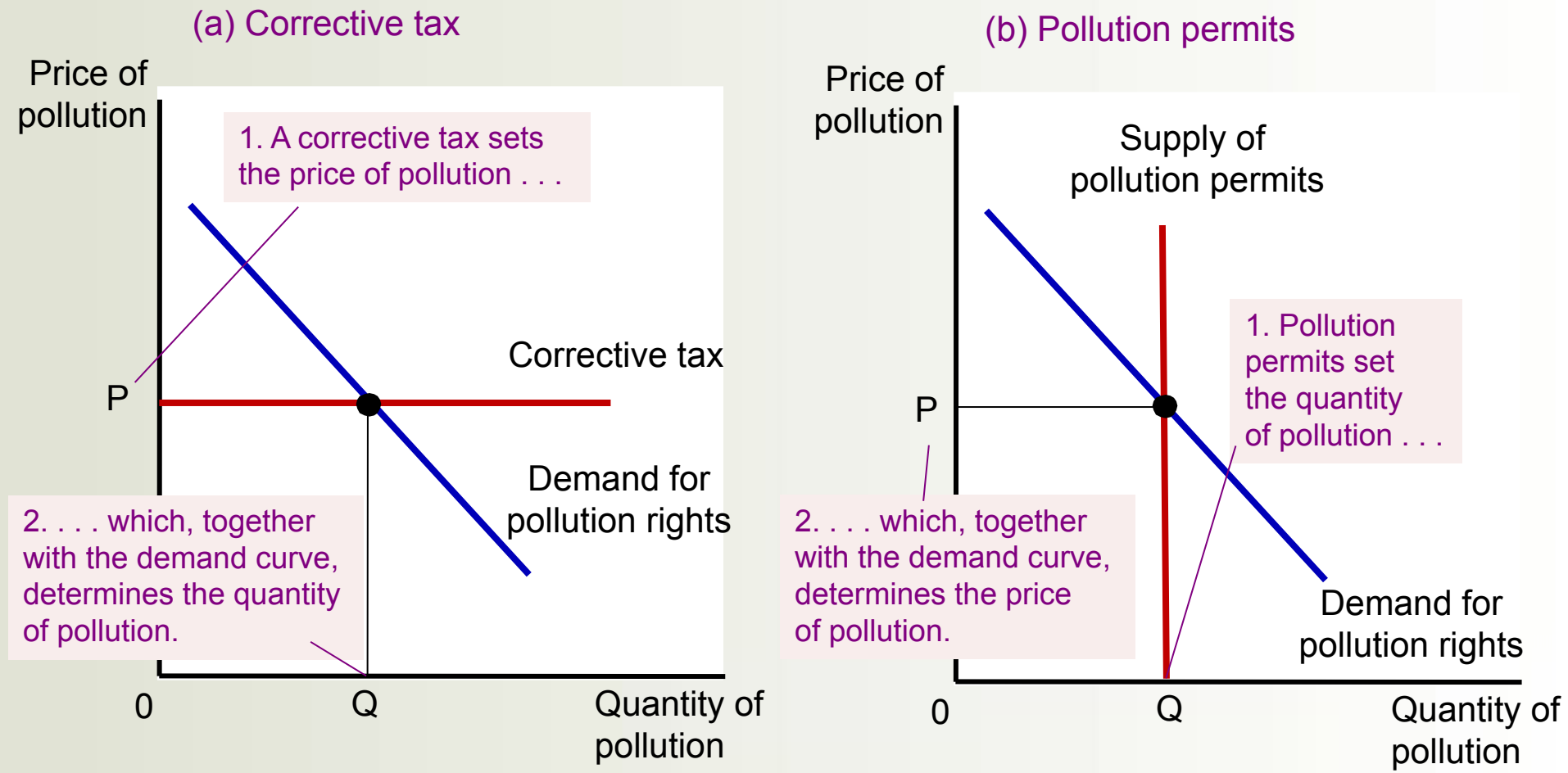
- Advantage of free market for pollution permits
  - Initial allocation of pollution permits
    - Doesn't matter
  - Firms - reduce pollution at a low cost
    - Sell whatever permits they get
  - Firms - reduce pollution only at a high cost
    - Buy whatever permits they need
  - Efficient final allocation

Public Policies Toward Externalities

- Reducing pollution using pollution permits or corrective taxes
  - Firms pay for their pollution
    - Corrective taxes - to the government
    - Pollution permits, - buy permits
  - Internalize the externality of pollution

Figure 4

The equivalence of corrective taxes & pollution permits



In panel (a), the EPA sets a price on pollution by levying a corrective tax, and the demand curve determines the quantity of pollution. In panel (b), the EPA limits the quantity of pollution by limiting the number of pollution permits, and the demand curve determines the price of pollution. The price and quantity of pollution are the same in the two cases.

Public Policies Toward Externalities

- Objections to the economic analysis of pollution
- "We cannot give anyone the option of polluting for a fee." - former Senator Edmund Muskie
- People face trade-offs
  - Eliminating all pollution is impossible
  - Clean water and clean air – opportunity cost
    - Lower standard of living

Public Policies Toward Externalities

- Clean environment - is a normal good
  - Positive income elasticity
    - Rich countries can afford a cleaner environment
      - More rigorous environmental protection
  - Clean air and clean water - law of demand
    - The lower the price of environmental protection
      - The more the public will want
- Economic approach
  - Pollution permits and corrective taxes
    - Reduces the cost of environmental protection
    - Increase demand for a clean environment

Private Solutions to Externalities

- The types of private solutions
  - Moral codes and social sanctions
  - Charities
  - Self-interest of the relevant parties
    - Integrating different types of businesses
  - Interested parties – enter a contract

Private Solutions to Externalities

- The Coase theorem
  - If private parties can bargain without cost over the allocation of resources
    - They can solve the problem of externalities on their own
  - Private economic actors
    - Can solve the problem of externalities among themselves
  - Whatever the initial distribution of rights
    - Interested parties - reach a bargain:
      - Everyone is better off & Outcome is efficient

Private Solutions to Externalities

- Why private solutions do not always work
  - High transaction costs
    - Costs that parties incur in the process of agreeing to and following through on a bargain
  - Bargaining simply breaks down
  - Large number of interested parties