

The Economics of Climate Change

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Part 3: Policy Instruments

continued

Bargaining (Coase)

Bargaining: the Coase Theorem

Ronald Coase (Nobel Prize 1991) sees externalities as arising through the absence of property rights: pollution occurs when property rights are ill-defined.

If property rights are well-defined, side of market without rights has to compensate other side:

- If atmosphere is a free public good, those who suffer from emissions have to (buy some of the rights from) emitters
- If agents have right to have clean environment, potential polluters have to compensate (buy some of the rights from) ‘consumers’ of clean environment

Bargaining: the Coase Theorem

- **Coase Theorem, Part 1**

In a competitive economy with complete information and zero transaction costs, the allocation of resources will be Pareto-efficient if all property rights are assigned.

- The Coase Theorem proposes that economic agents will solve externality problems without intervention, simply by assigning property rights
- Legal rules of entitlement = *property rights* determine ownership in the economy...
- ...and determine the direction of compensating payments if property right is violated.

Example: Introducing property rights

Example:

- Polluter with benefits from emission level e : $B-C(e)$
(cost curve convex, same for damage below)
- Marginal abatement costs $MC = -C'(e)$
- Pollutee with income M suffers damages $D(e)$ from emissions, utility:
 $M-D(e)$ (note: once more quasi linear money metric)
- Marginal damages $MD = D'(e)$

Social (Pareto) optimum given by

- Maximize $B-C(e)+U-D(e)$
- Yields $D'(e) = -C'(e)$
- **Marginal damages = marginal benefits = marginal abatement costs**

Introducing property rights

Right to clean environment:

- Starting point: zero emissions, $e=0$
- Polluter with large abatement costs $C(o)$, pollutee with large utility $U-D(o)$
- Polluter can try to convince pollutee to accept a certain level of emissions if appropriately compensated.
- Pollutee demands compensation (Transfers T) such that $U-D(e)+T \geq U-D(o)$
-> minimal transfer: $T=D(e)-D(o)$
- Polluter maximizes: $B-C(e)-(D(e)-D(o))$
- Solution: **Marginal damages = marginal benefits** ($D'(e) = -C'(e)$)
- **Utility of pollutee: $U-D(o)$**
- **Benefits of polluters: $B-C(e)-(D(e)-D(o))$**

Introducing property rights

Right to pollute:

- Starting point: emissions as chosen by polluter $e^* > 0$ ($-C'(e^*) = 0$)
- Polluter with no abatement cost $C(e^*)$, pollutee suffers large damages $D(e^*)$
- Pollutee can try to convince polluter to reduce emissions if appropriately compensated.
- Polluter demands compensation (Transfers T) such that $B - C(e) + T \geq B - C(e^*)$
->minimal transfer: $T = C(e) - C(e^*)$
- Pollutee maximizes $U - D(e) - (C(e) - C(e^*))$
- Solution: **Marginal damages = marginal benefits** ($D'(e) = -C'(e)$)
- **Utility of pollutee:** $U - D(e) - (C(e) - C(e^*))$
- **Benefits of polluters:** $B - C(e^*)$

Bargaining: the Coase Theorem

- If there are no income effects (quasi linear money metric utility, i.e. no effect of income on the marginal disutility of the emissions), then
- **Coase Theorem, Part 2**
The obtained Pareto-efficient allocation does not depend on the assignment of property rights.
- The efficient emission level does not depend on whether polluter compensates victim, or whether victim has to compensate polluter for not emitting
- Wealth distribution however does depend on whom has to pay the compensation

Bargaining: the Coase Theorem

- The practical limitations of the Coase theorem for global warming are:
 - The lack of clear property rights
 - Transaction costs in reaching compensation agreements:
 - often at least one side of market consists of many agents :
GHG emissions: billions of polluters,
global warming: millions of victims (and winners)
 - Court may be too costly or not exist (international GHG bargaining!)
- In sum, the Coase theorem suggests a market solution to the externality problem, but there are reasons why the market may not function
- In practice, Coase solutions are rarely observed