The Economics of Climate Change
C 175 - Christian Traeger
Part 3: Policy Instruments
continued

Bargaining (Coase)
**Bargaining: the Coase Theorem**

Ronald Coase (Nobel Price 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