Lecture Notes 5
Economics of the Environment and Natural Resources/Economics of Sustainability
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Regulation of Pollution

Command & Control
- good because:
  - flexible in complex processes (law of unintended consequences)
  - more certainty for producers
- bad because:
  - need so much information
  - low incentives for innovation
  - inefficient since generally violate equimarginal principle

Other refinements & policies:

subsidies might occasionally have some "bonus" or increasing returns provision, as with land use: a landowner who converts land to park gets more subsidy if it borders on an existing park; this is useful if the marginal benefits (to species habitat) are increasing in contiguous land area

from Law & Econ, we know that 100% monitoring is inefficient, better to catch some portion of offenders but fine them extra *(see below)*

could use "performance bonds" but these need careful monitoring (since generally forfeiture of bond involves lengthy legal proceedings); sometimes used on surface mining; also impose liquidity costs (extra financing needed) and open 'moral hazard' for regulators – 'pay-to-play'

Fees & Tradable Permits

A fee or tax per unit of emission is the Pigouvian solution – set the price and let firms decide. Tradable permits can give an equivalent outcome – permits are sold for a price; this price is essentially a tax.

Tradable Permits

Suppose EPA issues L permits for pollution and each firm gets L_i

Firm emissions are ℓ_1, ℓ_2 and $L = \ell_1 + \ell_2$

Pollution, p, is $a_i e_i$, so $\ell_1 = a_1 e_1, \ell_2 = a_2 e_2$

price of pollution is α

So firm's total cost is

$$TC_i = C_i(e_i) + \alpha(\ell_i - L_i)$$

$$TC_i = C_i(e_i) + \alpha(a_i e_i - L_i)$$

to minimize these costs set MTC=o so

$MC_e + a_i\alpha = 0$ therefore

$$-\alpha = \frac{MC_1}{a_1} = \frac{MC_2}{a_2}$$

thus equimarginal principle is met

if there are multiple receptor standards, all of which must be met, then firms will choose e_i to meet the lowest limit

3 Results:

Equilibrium exists for any initial allocation of permits

Emissions from each source are efficient (no matter initial allocation)

If price equals marginal damage then equimarginal principle holds

Tradable Permits are usually allocated by either

- giving them away to current polluters (usually proportional to current pollution amounts, sometimes called 'grandfathering')
- auctioning them off to the highest bidder