

Environmental Economics for Environmental Sciences (ENR-21306)

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IEP II (Perman et al., 9.2-9.3)



Constraints on IEAs

- An IEA is voluntary, so it must:
 - Yield positive net benefits for all participants
 - Not use force
- IEPs are different from market transactions
 - Many to many (heavy TCs)
 - Common pool characteristics (free riding)
 - Pay now for uncertain benefits much later

Self-enforcing agreements

- For each country, a self-enforcing agreement has:
 - No incentive to renegotiate, but incentive to go on
 - Pay-offs should deter cheating
 - Penalties to non- i should not deter country i
 - Penalties to i should not encourage country i to renegotiate
- Self-enforcing equilibrium has these properties:
 - Of N countries, K cooperate and $N-K$ do not
 - Each in K abates to maximises pay-off to **all K**
 - Each non- K pursues its individually rational policy
 - None in K can gain by withdrawal
 - None in non- K gains by joining the agreement

Self-enforcing agreements

- Literature predicts these results for this framework:
 - Non- K and K would be better off if $K=N$ (PD!)
 - $K=N$ is not Nash
 - Non- K do better than K
 - High cooperation if $K=N$ gains close to $K<N$ gains
 - Treaties achieve little when N is large
- So no good for CC
- Ozone (small N) vs climate change (large N)!

Mechanisms (possibly) supporting IEAs

- **Commitment:** Agent commits to action, regardless of others' actions, e.g., carbon tax or ETS in EU
 - BUT: Hard to make credible or durable self-sacrifice
- **Side-payments:** EU pays others to join Kyoto
 - BUT: Money first, verification later. Additionality!
- **Issue-linkage:** Countries cooperate over many things
 - Can work: Russia activated Kyoto by joining
 - ...in exchange for EU support to join WTO
 - ...then Russia undermined Kyoto (excess credits)

Conclusions

- IEAs should be self-enforcing
- Coalitions do **not** usually cover all countries
- Cooperation will be high if difference between benefits under full cooperation and non-cooperation is small
- When N is large, treaties can achieve very little
- Issue-linkage may help to improve participation

Strategy:

1. Buy off (or kill off) domestic lobby
2. Make tit for tat deal (links) with other countries
3. Add to Core with side payments

EU did 1 and 3 but skipped (or couldn't do) 2 with China and US
