

IPR and International Transfer of Green Technologies: Economic Perspectives

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Essential public goods issues

- Domestic policy bias toward inaction due to political economy considerations.
- Uncoordinated international policies fail to account for static and dynamic externalities from GHG emissions.
- Failure to impose a high and stable price for GHG emissions reduces investment incentives.
- Innovation and technology diffusion are subject to appropriability and asymmetric information problems.

The costs of inaction in GHG emissions

- Mitigation costs rise under BAU (Stern report):
 - From current 430 ppm CO₂e to stable 550 ppm in 30 years might cost 1% of global GDP per year in policy and technology investments.
 - BAU might raise concentration to 530 ppm in 30 years; stabilizing at 550 after that could cost 4-6% of global GDP.
 - Even 550 ppm bears 24% chance of 4° C average temperature rise by end of this century.
 - These goals are unattainable without participation of major DCs.
- So we need large investments in development, distribution and adaptation of new technologies.

Will IPR help or hurt?

- As always, the issue is context-specific.
- GHG-reducing technologies are highly heterogeneous:
 - Renewables (wind, solar, hydrogen cells, biofuels);
 - New building materials;
 - New disposal mechanisms (carbon capture);
 - Cellular and microbial technologies;
 - New crop varieties;
 - New land use patterns;
 - Implementing processes (software, etc.)
- R&D investments depend foremost on effective global carbon pricing to raise demand.
- Technology types vary in IPR sensitivity of innovation, licensing, ITT, and costs of local adaptation.

General comments on ITT

- Technology transfer is largely a private market activity through trade, FDI, licensing and professional services.
- ITT is costly and requires investment.
- Primary factors:
 - Market demand, growth, and proximity;
 - Trade and investment policies;
 - Labor skills and productivity;
 - Investment climate (governance, infrastructure, finance);
 - Conditions of competition.

Roles of IPR: evidence

- The best recent evidence suggests:
 - High-tech and capital-goods exports from OECD to DCs are responsive to patent regime changes (Ivus, working paper).
 - US MNEs sign more technology-licensing contracts with both affiliates and unrelated firms after patent reforms (Branstetter et al, QJE 2006).
 - Patent rights support development of “technology markets” in IP-sensitive goods and technologies (Arora, et al, MIT Press 2001).
 - Patent registrations signal an intent to exploit technology, which spreads technology diffusion (Eaton and Kortum, Econometrica 2002).
 - Local productivity gains depend on R&D capacity.
 - Not much evidence of such effects in poorest countries .

What about specific technologies?

- Barton (ICTSD 2007) informal review found no evidence of patent excess costs or holdup problems in 4 sectoral green technologies.
- Cautionary notes:
 - Chaudhuri, et al (AER 2006) predict substantial price increases in India in medicines with few substitutes.
 - Goeschl and Swanson (Env Dev Econ 2003) document same in hybrid plants (no technical substitutes).
 - Where patents and other proprietary rights may be combined with technological standards a potential competition issue arises.
- Tentative conclusions:
 - Little reason at this time to indict IPR for limited ITT in green technologies.
 - Vigilance in competition policy could be important.
 - More in-depth studies are needed.

Policies are still needed

- Even if it's not an impediment, the global IPR system is *not sufficient* to encourage optimal investments and ITT in green technologies.
- Existing provisions (CDM) seem ineffective.
- The challenges:
 - Rapidly develop environmentally sound technologies;
 - Encourage their transfer and deployment in DCs
- Many broader policies are critical:
 - Improved investment climates in DCs;
 - Effective GHG emissions pricing to incentivize R&D;
 - Integration of all major countries into pricing regime;
 - Reduction of trade and investment barriers;
 - Public investments in technology funds with subsidies for technology transfer and local adaptation; all major countries to contribute.

Specific IPR questions

- The post-Kyoto 2012 framework likely will need more assertive IPR approaches.
 - Use of TRIPS flexibilities to narrow scope of patents and facilitate inventing around.
 - Experimental use and research exemptions to facilitate local adaptive research.
 - Limited assertion of government use and compulsory licenses to accelerate technology deployment.
 - Revised competition regimes to address potential market-structure problems.
 - Recourse to targeted patent buyouts in key countries.
 - Access regimes for results of publicly funded research.

Specific IPR questions

- Big question 1: Which countries would qualify for lower-cost access?
- Big question 2: Can a protection/diffusion regime be calibrated to specific industry needs?

Political economy: can global cooperation work?

- Good news:
 - Cross-border GHG externalities imply mutual interests in technological change and use.
 - Many environmental technologies involve two-way trade and FDI so there may be a balance of export and import interests.
 - Rapidly emerging commercial interests in innovation and use in major DCs.
- Bad news:
 - Expect subsidies and green tariffs to benefit politically powerful interests in each country.
 - Publicly funded research by country likely to be distributed preferentially to domestic firms.
 - It may require significant compensation to major DCs to induce their cooperation in investing in reduced GHG emissions.

Thank you