Strengthening Efficiency and Competitiveness in the European Knowledge Economies (SEEK)

Conference 2012: The Green Growth Challenge

ZEW

Seek Project:

Diffusion of Climate-Friendly Technologies

The Role of Intellectual Property Rights, Human Capital, and Environmental Policy

Motivation

- Important role of technological change in reducing the costs associated to climate change mitigation.
- Technology transfer from developed to developing countries can facilitate access to appropriate emission reduction technologies.
- Little knowledge about the dynamics, the drivers of technological change and technology transfer and the resulting economic and environmental performance.
- Many analyses focus on demand determinants of innovation and thus neglect other drivers, e.g. knowledge stocks, the importance of intellectual property rights, the role of human capital, and environmental policies.
- The research on climate-friendly technologies so far concentrates on innovation and diffusion in developed countries but hardly on the diffusion from developed to developing countries.

Research Questions

- Does governmental intervention support the innovation and the diffusion of environmentally friendly products? If so, what policy types are the most promising?
- What are the advantages and disadvantages of the protection of intellectual property rights (IPR) with respect to innovation and diffusion of climate-friendly technologies and products? How does the IPR regime influence environmental performance?
- What is the role of human capital in fostering development and adoption of clean technologies? How does human capital influence environmental performance?
- What are the dynamics of technology transfer to developing countries in comparison to diffusion within OECD countries?
- To what extent has the diffusion of climate-friendly technologies impacted the receiving countries in terms of economic competitiveness and environmental performance?

Research Team

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Project Description

Data Collection

- Bloomberg New Energy Finance
- IEA Policies and Measures
- PATSTAT
- IPR regime data
- R&D expenditure data (STAN-ANBERD)
- EU-KLEMS database

Innovation and Diffusion and Their Drivers

- Development of policy indicator
- Impact of IPR regimes on innovation and diffusion
- Role of human capital and education on absorptive capacity

Methods

- Econometric methods:
  - Panel data models using country level time series
  - Estimation of translog production functions
  - Patent data analysis

Concentrate on renewable energy technologies, but do not neglect conventional technologies with increased energy efficiency.

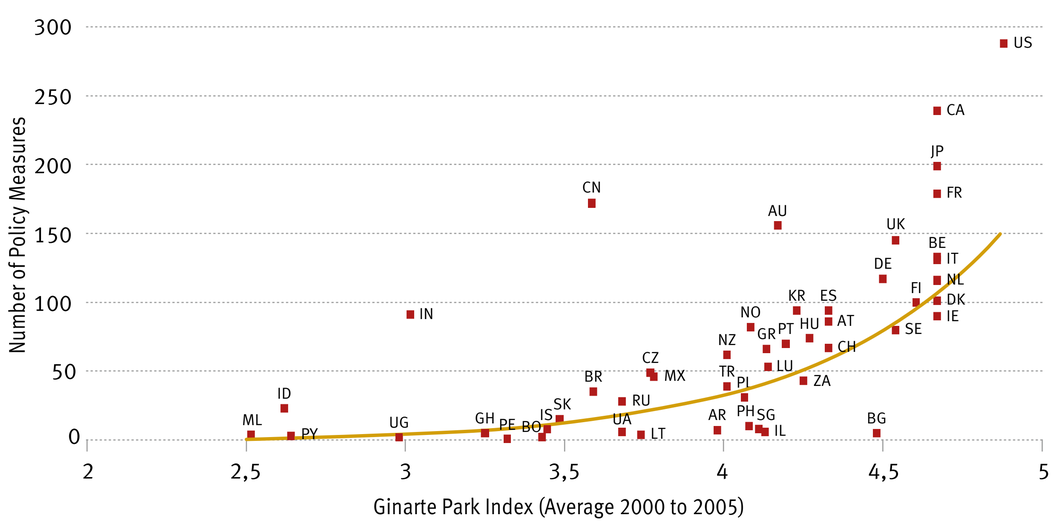
Environmental Performance

- Influence of policy stringency and IPR regimes on deployment of climate-friendly technologies
- Impact on various indicators of environmental performance such as greenhouse gas emissions and energy

Research Contribution

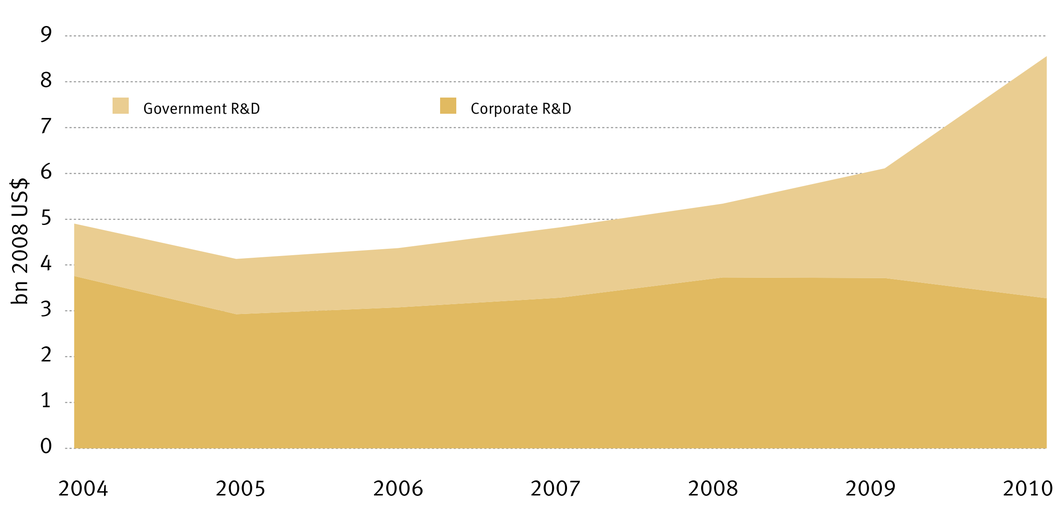
- Establishment of broad database on private R&D and investments with particular focus on energy technologies.
- Extension of the empirical analysis to issues of energy and environmental technology transfer in developed and developing countries.
- Improvement of the understanding of how the institutional framework, human capital and policies affect diffusion patterns and opportunities.

Relationship Between IPR Protection and Policy Measures



Notes: The Ginarte Park Index measures the strength of the patent system in a given country by evaluating different dimensions of patent protection.
Source: IEA Policies and Measures Databases (2011), Ginarte & Park (1997), Park (2008)

Global R&D Investment in Renewable Energy



Source: Bloomberg, Bloomberg New Energy Finance, IEA, IMF, government agencies