

Environmental change, patents, and development

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Based on joint work with Christian Helmers, U
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Papers (all joint with Helmers)

- The role of patent protection in (clean/green) technology transfer, *Santa Clara High Technology Law Journal* 26 (2010): 487-532.
- Innovation in clean/green technology: Can patent commons help? NBER Working Paper No. 16920 (March 2011); UNU-MERIT Working Paper No. 2011-025, forthcoming JEEM.
- The impact of joining the regional European Patent Convention system, July 2012
- The impact of foreign pharmaceutical patents on innovation in Chile, with Maria Jose Abud and Aisan Etcheverry (INAPI and Chilean Ministry of Economy)

Hall-Helmers 2010 background

- Double externality
 - Green technology policy needs diffusion as well as innovation
- Green technology is highly varied, draws from many scientific and engineering disciplines
 - Much is complex (e.g., electric & hybrid cars)
 - Some is low tech; highly substitutable (e.g., clean stoves)
 - Some requires standard-setting (e.g., smart grid)
- Patents may raise transactions cost and slow diffusion

Two questions for research

- Does stronger patent protection encourage technology transfer?
 - **How does it affect the behavior of foreign firms?** - Stronger IP protection in the host country should encourage (or at least not discourage) transfer of technology.
- Does stronger patent protection encourage technology development?
 - **How does it affect the behavior of domestic firms?** - Stronger IP could encourage their innovative activities, but can also discourage imitation and inhibit learning and catchup.

Question 1: Tech transfer

- For middle income countries that already have innovative capacity or capable of imitation
 - Both tech licensing and FDI respond to stronger IP regimes
 - Quality of technology transferred rises, and there is a shift toward licensing (markets for technology)
- Very low income countries see little response
- IPRs are not very highly ranked by firms as an influence on tech transfer, except for R&D facilities and very advanced technologies.

Question 2: Patents & tech development

- Stronger patents encourage patenting in general, especially by firms and countries on the frontier
- Difficult to find clear evidence of positive impacts of stronger patents on innovation, except in chemical-related sectors
 - Many other factors matter, so the experiments are often not clear
 - we don't see enough variation in patent systems, and it takes time for firms to adjust
 - It is rare to have an independent measure of innovation (other than patents), so R&D effort used as proxy
- Historically, IP systems have developed in parallel with the innovative part of the economy

An unanswered question

- Is the marginal scientist or engineer in a developing country better employed
 - examining patents?
- OR
- doing R&D?
- commercializing new technology?
- advising firms on adoption of new technologies?

Knowledge sharing via patents

- Two “experiments” in clean/green technologies:
 - **Eco Patent Commons** – created by IBM & others at the WBCSD
 - **Hall and Helmers (2012)** study
 - **GreenXchange** – created by Nike & others
 - **Ghafele and O’Brien (2012)** study

GreenXchange

- Created **January 2010** by **Nike** with **~400** patents
 - Other participants are a very mixed group: Yahoo!, Best Buy, Creative Commons, IDEO, Mountain Equipment Co., nGenera, Outdoor Industry Association, salesforce.com, 2degrees
- Only **19** additional patents added (Best Buy and UC Berkeley)
- 3 types of license:
 - standard – a royalty-free license (like EcoPC)
 - standard plus – a license with restrictions/payment
 - research non-exempt – allows improvement and patenting for noncommercial use (designed for universities)
- BUT, in practice (on the website today) only 2 standard, 5 standard plus, 456 research licenses offered on website

Some lessons from GreenXchange

Source: [Ghafele and O'Brien \(ICTSD Policy Brief #13\)](#)

- traditional IP model very strong and hard to overcome
- many firms want access to people behind the patent rather than just the patent – importance of tacit knowledge
- limited resources – website is essentially useless for anyone who is interested in knowing what is available

The eco-patents commons

- Created **January 2008** by **IBM** at World Business Council For Sustainable Development (WBCSD)
- First **green** patent commons
- Firms can pledge patents related to green technology (defined by IPC subclasses, but flexible)
 - **11** firms have done so, about **120** patents
- Available to third parties for climate-change related activities with auto royalty-free license
 - ownership remains with firm
 - not a donation, and not tax deductible
 - defensive termination right

IBM view

[P]ledging patents for free use by others [...] can be a win for innovators in other parts of the world, who might look at these ideas and further them and use them as the basis of additional solutions. And it can be a win for those who pledge because **it could open up opportunities to collaborate with people that you might not otherwise have collaborated with.**

(Wayne Balta, Vice President of Environmental Affairs, IBM)

That is, the patent helps you learn where and how to access relevant **tacit knowledge for** subsequent invention/innovation.

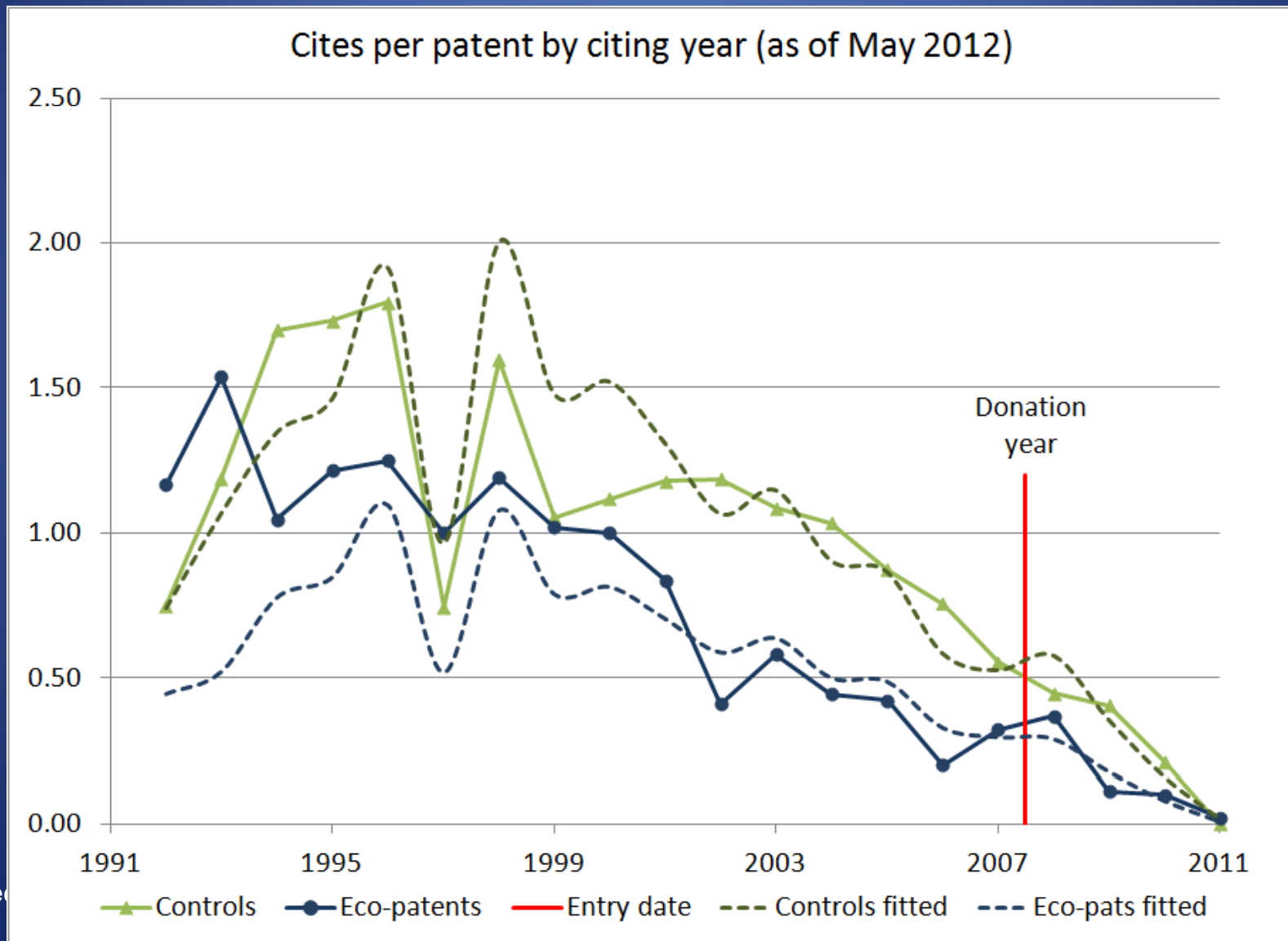
Summary of findings

- Pledged patents tend to be **narrower and less valuable** than the typical patent in the class
- Pledged patents indistinguishable from the other patents in a firm's portfolio, except
 - they are **more green**
 - **much less likely to match the IPC pattern of the firm**, suggesting that they are not central to firm strategy
- Pledged patents **just as likely to be kept in force**

Knowledge transfer?

- Cannot tell whether inventions protected by pledged patents are used
- Look at diffusion by analysing whether patents are cited before and after donation
 - compared to control patents in same class with same priority
- Conclusion: these patents are cited *less* before donation (and also *less* after).
- Who cites them?
 - more likely to be individuals or non-profits/ universities (than cite the controls)
 - mostly developed country institutions & authorities

EcoPC cites decline earlier than those for the controls



Overall conclusion

- So far, these “commons” or “exchanges” have not yielded much.
- Relatively few patents are actually donated.
- Patents are often not that useful by themselves.
 - those that really have a valuable exclusionary effect will not be donated
 - others might have useful information but the information is often incomplete
- Hard to see the use if users do not at least have to register.