– Submission to the Innovation Policy Group –

Technology protectionism and the patent system: Strategic technologies in China

Gaétan de Rassenfosse
Assistant Professor of Innovation and IP Policy
Ecole polytechnique fédérale de Lausanne, Switzerland

> "Industry representatives express mixed opinions on whether there is *antiforeign bias* in the issuance or enforcement of patents in China. However, some non-Chinese firms reportedly find it more difficult to obtain patents in sectors that the Chinese government considers of *strategic importance*."
>
> United States International Trade Commission (ITC) 2010, page xviii (italics added)

The national treatment principle (NTP) is a centerpiece of many trade-related international law treaties. It states that foreigners and locals must be treated equally and its violation usually leads to retaliatory measures from the affected countries. The NTP is also central to international patent law treaties. It prevents countries from free riding on foreign technologies, thereby ensuring optimal provision of incentives for global innovation (Scotchmer 2004). Business and policy circles have voiced concerns about violation of the NTP at the State Intellectual Property Office in China (SIPO), but there is little empirical evidence backing this claim.

Discussions about unfair treatment of foreign applicants in China have thus far focused largely on issues related to the *enforcement* of IP rights (*e.g.*, Love et al. 2016). Although enforcement is a worthy topic of study in its own right, in this matter it may be thought of as a second-order issue. The logic being, if foreign applicants are unduly denied a grant in the first place, local competitors may legally use, produce, and sell those inventions in their home market. It is thus of primary importance to assess whether the patent system itself, rather than the judicial system, discriminates against foreigners. To date, scholarly evidence on the topic is patchy and inconclusive (Yang 2008, Liegsalz and Wagner 2013).

The project will test empirically whether there is an anti-foreign bias in the issuance of patents at the SIPO. The analysis will rely on a sample of about half a million patent applications filed at the SIPO in the period from 2001 to 2009. It will pay close attention to the fate of patent applications in 'strategic' areas, as extracted from the central planners' long-term development plan (SCPRC 2006). To properly map the strategic areas identified in the long-term plans to patent technology classes, I collaborate with patent examiners at the World IP Organization based in Geneva, Switzerland.

The project will introduce two major improvements over state-of-the-art techniques in the field of IP policy to control for unobserved heterogeneity. First, I track the grant outcome of more than 1.6 million exact 'twins' of patent applications in the sample. These twins are filed in jurisdictions other than China where applicants also sought to protect their inventions (including the United States, Russia, Taiwan, Japan, Korea, Canada and the EPO). I use them to form an expectation of the probability of grant at the SIPO (*i.e.*, a pseudo-fixed effect). However, because the grant outcome of these twins may also be subject to a home bias, I will develop a test inspired by Aakvik (2001) and Rosenbaum (2002) to assess the robustness of the findings to such bias. The test involves assuming that

the pseudo-fixed effect is biased and gradually removing bias by altering the grant outcome of the twin applications.

Second, I control for potential differences in the quality of the patent attorney firm by computing the average grant rate of the firm for all but the applications by the focal applicant. This empirical strategy ensures that the results are not explained by differences in the quality of the translation into Chinese or any other attorney-specific effect.

The dataset combines data from four main online and offline sources. The main source of data is the EPO Worldwide Patent Statistical Database (PATSTAT), which contains information on twins and the grant outcome at some of the selected offices. It also contains most patent-level information used in the empirical analysis. Information on the grant outcome at the SIPO comes from the INPADOC legal status table, which is an add-on to the PATSTAT database. I will crawl the Google Patent website to recover information on the number of independent and dependent claims at the SIPO and the number of words per claim as well as the SIPO website to recover data on attorney firms. I will also crawl other country-specific websites to recover grant information at the patent offices in Russia, Taiwan, and Canada. In an extension of the analysis, I plan to run through the model data on standard-essential patents (Searle database).

The project is currently at the proof-of-concept stage. I have built the backbone of the dataset and plan to enrich it with data available online. Preliminary analysis suggests no overall discrimination against foreigners but a strong and statistically significant discrimination against foreigners in the strategic fields. However, the analysis needs to be refined in a number of ways.

Use of funds

The funds will be used to cover two research assistants' salary over the summer months. One RA will develop web crawlers to collect online data and merge them to the existing database. Another RA will: i) clean applicant names at the SIPO; ii) manually go through reasons for refusals for a random sample of patent applications in the dataset; and iii) link data on standard-essential patents. RA costs should not exceed $13,000 (8 weeks * 40 hours * 20 CHF/hour per RA).

The funds will also cover participation at workshops and conferences in the United States (e.g., ASSA annual meeting), Europe (e.g., presentation at the World Trade Organization in Geneva) and Asia (e.g., Asia-Pacific Innovation Conference).

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