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Research Statement

I specialize in the development and use of patent statistics to answer questions on the economics of innovation. Within the larger area of economics of innovation, I highlight innovations that emerge from smaller inventors and those from the Global South.

About 30 percent of patents filed at the U.S. Patent and Trademark Office are from small entities. Yet, their incentives to innovate and the costs they face are not fully understood and characterized. In my job market paper, I contribute to bridging this gap by studying the patents by small entities around a significant change in patenting rule in the United States, the America Invents Act (AIA) of 2011.

My other research focuses on the development of a patent database to study innovation originating from the Global South. India represents a significant proportion of patents that are filed in the developing world — accounting for about 10 percent of all patents filed at the United States Patent and Trademark Office (USPTO). However, the patents filed in India remain under-explored in the innovation literature due to poor data coverage. This project bridges the data gap by collecting and documenting a novel Indian patent dataset. I describe my two projects and my research agenda below.

Innovation by U.S. small entities

My job market paper studies the patenting activity of small entities relative to large entities before and after the passage of a Patent Reform Act that brought substantial changes to the U.S. patent system — the America Invents Act (AIA) of 2011. The paper acts as a first step in understanding the total effect of AIA and also highlights the legislation's complexity. I discuss the details of the Act and its nuances in my paper. By and large, the findings indicate that after the passage of AIA, the gap in patenting between small and large entities widened. However, we know that the effect of policies varies widely with entity size. Also, multiple sub-points of the Act remain to be studied.

To illustrate an example — first-time patentees are known to bring revolutionary inventions to signal their inventive capabilities to the market. The AIA created a sub-group of small entities, called "micro entities", who would receive a 75 percent discount on all filing fees. First-time patentees at the USPTO were on the decline since 2006, and their number dropped from 10.17 percent in 2006 to 7.74 in 2011. However, since 2012, they have steadily increased and are now at 19.2 percent, which is the highest after the passage of the Bayh-Dole Act of 1980. As a part of my agenda, I aim to study the following sub-point of the AIA — was the AIA responsible for encouraging first-time patentees to file for patents, and were those patents "market disrupting"? This is important for two reasons — one, the literature suggests the declining creativity of inventors over the years, and two, the presence of incumbent large firms deters small firms from entering or disclosing their inventions. Did AIA succeed partially in negating such effects and encouraging small and first-time patentees to reenter the field of patenting?

Patent database from the Indian Patent Office

Patent applications filed at the Indian Patent Office, also called Intellectual Property India (IPI), remain under-explored in the innovation literature due to lack of data and detail per patent in existing patent databases (PATSTAT, Derwent Innovation, etc.). My project constructs a novel patent dataset using the Intellectual Property of India public search tool. This dataset contains the following new information — first, it has better coverage of patent applications filed in India that were not previously found in the popular databases. Second, every patent contains additional details that were previously unknown. Patents are vastly heterogeneous, and the new information allows us to control such differences.

The most popular worldwide patent database among researchers is the European Patent Office's (EPO) PATSTAT. I use this as a benchmark to compare it with the patent dataset I develop. Here are two examples of the data gaps that are in PATSTAT that my project bridges — one, I recovered over 80 percent of patent abstracts, full applicant and inventor addresses, and patent legal events. This, in PATSTAT, is only available for 15 percent of the patents for the period of 2000-2008, and the legal event is completely unavailable. Two, the number of patent applications covered by PATSTAT is much lower than IPI. For example, in the year 2000 PATSTAT reported 417 patents filed in India while for IPI it is 3556.

Using the new patent-level information, I explore the geographical spread of inventions in India over time. In the new dataset, we can observe the complete addresses of patentees and inventors. Using the addresses, I recovered the pin codes of patent applicants (pin codes in India are similar to U.S. zip codes) which enabled me to pinpoint the patentees' location. Descriptive evidence shows that between the years 2000 and 2015, patents and inventors have emerged from areas of India where there were no patents filed previously. This seems to be a "green shoot" in the innovative environment in India. However, this "green shoot" does not seem to grow beyond a few patent applications. In most cases, patent applications from locations remain as stray cases of invention. Historically inventive areas of India — the large cities such as Chennai, Mumbai, Delhi, Hyderabad, and Bengaluru continue to dominate the innovative landscape of India with the highest number of patent applications filed. My future agenda is to study why participation in the patenting process has been concentrated and limited to a few areas within India historically.

Along with the aforementioned question, there is a range of questions pertinent to the Global South that I am interested in answering, and this is possible because of the availability of richer data. A few of them are — how often are inventions from developing countries filed elsewhere? How did the international patent law harmonization exercise – the Trade Related Intellectual Property Rights (TRIPS) agreement – influence collaboration among inventors within and across countries, and did it in turn correspond to an increase in follow-on and original inventions? I am particularly excited about these questions as complete patent data from India allows me and other researchers to study these, and importantly — adequately control for applicants' and patent office's strategies and minimize measurement error.