

## Research Statement

My Ph.D. thesis discusses impact of litigation mechanism in patent systems. The overarching objective of my research is to provide the policy environment that best addresses the needs of the knowledge economy. I analyze the topic by three aspects. The first essay develops a methodology to compare the quality of patent litigation system in major economics: US, UK, Germany, Korea, China and Japan. Quality is defined as whether it provides a fair and just legal environment for nullifying weak patents and judging infringement actions. Systematic quality is evaluated based on a two-layer framework: "legal standard" and "operational design". The paper finds that filing of litigation trials is negatively related with degree of the law enforcement. Jurisdictions with rigorous and predicable judgment have low risk of opportunistic and anti-competitive filings.

The second essay discusses the relationship between ownership fragmentation and determinants of opposition filing in European Patent Offices (EPO). Opposition procedure allows competitors to challenge validity of European patents soon after grant, and effective in all EPO designated states. The second essay discusses how does patent ownership condition affects bargaining between licensing and opposition, Ex ante bargaining is failing under two extreme conditions: when the technology ownership is highly concentrated, licensing will bring a new competitor and make the incumbent firm loss original market power. To avoid future infringement suits, competitor is highly likely to oppose the interested patent; when the technology ownership is widely fragmented, transaction cost for searching and contracting keep increasing so that potential entrance is more likely to oppose the exist patent directly.

The third essay has constructed new measures to link theory on technological radicalness on opposition filings. Patent in radical invention, decomposed by novelty, unique and impact on future technology has high likelihood of being opposed.

## Research Proposal

In the following years, I would like start more empirical study based on patent databases.

### 1) Mechanism design in patent system

The first topic is to explore the impact of mechanism design of post grant reviews in patent systems. Specifically, there exist significant systematic differences between opposition procedures in European Patent Office (EPO) and post grant reviews in USPTO: The first factor is cost. Opposition in EPO takes much less cost than Post Grant reviews in USPTO. Second, opposition in EPO asks for the notice must be filed within nine months after the grant decision published, while there is no time limitation in US; Finally, opposition procedure

in EPO does not permit settlement. Even the opposed parties and opponents have the incentive to settle their cases and withdraws its opposition, the EPO examiners still continue the case, therefore opposition in EPO has highly rate of revoking.

The systematic differences lead to different style facts in EPO and USPTO, varied from the general filing rate compared to total patents granted, outcomes and backlogs, strategic implication under the characters of firms.

The first step of research is to provide a comprehensive description of the cases challenged in post grant reviews in USPTO and related lawsuits in US Federal. I try to answer how much percentage of the patent challenged in USPTO is also challenged in an infringement suit? Has the patent or the equivalent been challenged in opposition in EPO or other validation proceeding worldwide? Why the "opponent" didn't challenge the validity of patent before the infringement suit? And how is the outcome of the challenged patent: be settled? Still exist on the market? Be challenged again?

To answer this, I would like to match the patent information of cases challenged in USPTO and Federal courts. The second direction is to examine more fully how firm characteristics, including the size and liquidity position of disputants, affect the strategy to cooperate, settle, oppose or suit. The third direction is to match litigation cases with other enforcement activities, such as licensing and patent pool.

## 2) The use of publication and patent statistics in studies of gender differences

The second interested topic is to test the gender effect on idea generation in S&T sectors.

The current literature on gender differences focus on the performance of woman scientists. They refer to the difficulties of women in reaching career levels comparable to those of their male colleagues, merits and education levels being equal. The available empirical evidence stated that female scientists produce a lower number of publications, and are less cited. One explanation is the house load and less time spending.

I have interest to explore the gender differences in idea generation, the first step of making innovation, instead of the general evaluation on productivity. I refer to the career expectations of women in S&T sections comparable to their male colleagues. Women have high incentive to work in basic science and radical technology. This kind of knowledge has the potential to become a breakthrough but have more variance in market adaptation.

To test this idea, I would like to do the data mining in the patent database such as "PATSTAT" in European Patent Office and also the publication dataset such as

“Thomson Reuters science citation index”. Large-scale dataset can provide the possibility to construct measures on causes of novelty in scientific works both of female and male scientists.

In the long terms, I also have interests to start projects on evaluating innovation policy in China. This objective is met by providing sound empirical evidence on research questions related, e.g., to the patent system, to the measurement of intangible capital, and to the benchmarking of higher education systems to name but a few topics of interest.