Stage-dependent intellectual property rights☆

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A B S T R A C T

Inspired by the Chinese experience, we develop a Schumpeterian growth model of distance to frontier in which economic growth in the developing country is driven by domestic innovation as well as imitation and transfer of foreign technologies through foreign direct investment. We show that optimal intellectual property rights (IPR) protection is stage-dependent. At an early stage of development, the country implements weak IPR protection to facilitate imitation. At a later stage of development, the country implements strong IPR protection to encourage domestic innovation. Therefore, the growth-maximizing and welfare-maximizing levels of patent strength increase as the country evolves towards the world technology frontier, and this dynamic pattern is consistent with the actual evolution of patent strength in China.

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“China and others are entering the tricky middle-income stage of development in which the big advances from absorbing rich-world technology start to run out.” The Economist (2011)

1. Introduction

In the late 1970’s and early 1980’s, the implementation of a modern intellectual property rights (IPR) system in China was subject to intense debates.1 Proponents including Deng Xiaoping, the paramount leader of China at that time, saw the creation of a modern IPR system in China as a necessary means to attract foreign direct investment (FDI) and to provide incentives for domestic innovation. In 1982, the first intellectual property law under the leadership of Deng was drafted in China. Then, through a series of policy reforms, the strength of patent rights in China increased over time. For example, the Ginarte–Park index of patent rights in China gradually increased from 1.33 in 1985 to 4.08 in 2005.2 In 1992, the statutory term of patent in China was lengthened from 15 years to 20 years.3 Then, in compliance with the TRIPS agreement,4 China reformed its patent system again in 2000.5 Recently, the Third Amendment to the Chinese Patent Law was approved in December 2008 and came into effect in October 2009 with the objective of building China into an innovative country with well-protected IPR by 2020.6 Following these patent reforms, research and development (R&D) as a percentage of gross domestic product (GDP) in China increased from 0.7% in 1992 to 1.7% in 2009. As for the inflow of FDI to China, it increased from US$11 billion in 1992 to US$185 billion in 2010.7

3 As for the term of patent for utility model and design patents, it was lengthened from 5 years to 10 years. Also, this patent reform expanded patentable subject matter in China.
4 The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is an agreement of the World Trade Organization (WTO). In summary, TRIPS establishes a minimum level of IPR protection that must be provided by all member countries.
5 The policy changes include (a) providing patent holders with the right to obtain a preliminary injunction against the infringing party before filing a lawsuit, (b) stipulating standards to compute statutory damages, (c) affirming that state and non-state enterprises enjoy equal patent rights, and (d) simplifying the patent application process, examination and transfer procedures and unifying the appeal system. See for example Hu and Jefferson (2009) who show that this patent reform is a major factor for explaining the increase in patenting activities in China.
6 See for example Yang and Yen (2010) for a review of the policy changes in this third amendment. In summary, the changes aim at (a) promoting patent applications, (b) encouraging exploitation of jointly owned patents, (c) heightening patentability requirement, (d) increasing statutory damages and administrative fines, (e) clarifying the granting of compulsory licenses, and (f) establishing protection for genetic resources.
7 Data from the World Development Indicators.
In addition to strengthening patent rights, China also improved the protection for trade secrets by developing a comprehensive set of laws and regulations over the last two decades. In a recent report issued by NERA Economic Consulting, Sepetys and Cox (2009, p. 3) nicely summarize the evolution of IPR in China as follows.

"In the early stages of development, with limited resources and limited capacity for research and development, there may be little or no IPR protection. Domestic industry will be characterized by imitation rather than innovation. Imitation allows for low-cost production, low prices for goods and services, and the stimulation of consumption and employment. A weak IPR regime may support technological growth and development through imitation in early stages of development. At subsequent stages of development, however, a weak IPR regime discourages domestic innovation. Innovation and technological development are drivers of economic growth. Economies that succeed in shifting into knowledge-based production are characterized by domestic innovation, typically supported with well-designed and adequately enforced IPR laws."

In this study, we develop a stylized growth-theoretic model to formalize this commonly discussed insight on the evolution of IPR in developing countries using China as a timely example. For example, one objective of China's twelfth five-year plan (2011–2015) is to shift its reliance on foreign technology to domestic innovation. A recent study by Li (2010) provides an interesting case-study analysis of the developing countries using China as a timely example. For example, one formalize this commonly discussed insight on the evolution of IPR in equilibrium model, Judd (1985) finds that the optimal patent length

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