



The Economic Implications of Strengthening Intellectual Property Rights in Developing Countries

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Abstract

We survey the recent literature on the economic implications of strengthening intellectual property rights in developing countries. First, we identify the theoretical concepts and empirical methods that are frequently applied to this topic. Then we discuss ten specific economic studies that have addressed this topic in the last ten years. Finally, we identify the most common findings in the literature.

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INTRODUCTION

Intellectual property rights (IPRs) refer to a set of laws and rules that protect the economic value of inventions and artistic creations from imitation by competitors. The most common forms of IPRs are patents, copyrights, trademarks, and trade secrets.² IPRs help to motivate and reward creative and innovative efforts, but they can also limit the spread of technological advances and create market power, which can lead to higher prices for consumers. Economic analyses of IPRs focus on this trade-off between incentives for innovation and growth (dynamic efficiency) and competitive pricing (static efficiency). Policymaking in this area involves balancing these conflicting interests.

This tradeoff is even more complicated in the context of international trade and investment. There are often significant differences in IPR regimes across countries, and there is generally a large gap between the strength of IPRs in advanced countries (often referred to in the literature as “the North” because of the historical location of most advanced countries in the Northern Hemisphere) and developing countries (often referred to in the literature as “the South” because of the historical location of many developing countries in the Southern Hemisphere). These differences in IPRs can have a significant impact on international economic activity: they can affect a firm’s willingness to transfer technology and to make direct investments across borders, and they can influence international trade flows. There have been attempts to close the North-South gap by strengthening IPRs in the South, like the WTO’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) negotiated during the Uruguay Round. But these attempts can have economic costs and benefits that are very unevenly distributed between the North and the South.

In the two decades since the signing of TRIPS, the benefits and costs of strengthening IPRs in the South has become an important research topic among academics in the field of international economics. Researchers have developed complex theoretical and econometric models of international trade, foreign direct investment (FDI), and technological innovation, and these models have contributed to the continuing policy debate. For economic theorists, it is challenging to model trade-related IPRs because they involve interrelated economic decisions about international trade, investment, and technology transfer. Their models have been used to predict whether a country will choose to strengthen and reform its IPRs and when countries might benefit economically from strengthening their own IPR regimes. The models have also been used to study the effects of IPRs on wages and economic welfare, FDI, and the form and extent of international technological transfer.

For empirical researchers, the large policy changes that have occurred in developing countries offer opportunities to study and better understand the economic implications of IPRs. The TRIPS reforms have generated many informative “policy experiments” in the data. Recent econometric studies have tried to quantify the effects of changes in IPR protection on patenting,

² The issue of trade secrets is not directly addressed in the economic studies that we review, but this issue is discussed in detail in Hall et al. (2014).

research and development (R&D) spending, international royalty and licensing payments, and international trade. This is a challenging area for empirical researchers, for two reasons in particular. First, data on international technology, investment, and services flows are very limited, especially when compared to the data on merchandise trade. Second, IPR policies are often complex and their implementation is usually not transparent.

In this article, we briefly survey the recent literature on the economic implications of strengthening IPRs in developing countries. We review and summarize 10 studies that have been published in leading academic journals or conference volumes in the last decade.³ The 10 studies are a fairly representative sample of the issues, methods, and findings in the literature. Although several of the studies that we review recommend specific policy alternatives, we are not endorsing one view over another, nor are we offering policy recommendations of our own.

THEORETICAL MODELS: WHY DIFFERENT COUNTRIES VIEW IPRS DIFFERENTLY

In a 2003 article titled “The North’s Intellectual Property Rights Standard for the South,” Lai and Qiu develop a theoretical model of trade between the North and the South. They estimate the effect on economic welfare of an international agreement to harmonize countries’ IPR standards. Assuming that the North has a greater demand for innovative products and a greater capacity for innovation, their model indicates that the North will choose stronger IPRs than the South before an international agreement is negotiated. The introduction of the international agreement strengthens the South’s IPRs relative to the North’s pre-agreement level, and this increases global welfare; however, the North benefits at the expense of the South. In the North, producers gain from higher profits while consumer prices remain largely unchanged, resulting in net positive welfare effects. In the South, on the other hand, consumer prices rise, resulting in net negative welfare effects. Lai and Qiu conclude that the South would be unwilling to strengthen their IPRs unless they receive some form of compensation. Because the South has a comparative advantage in goods that are not patent-intensive, they suggest that the North offer increased market access as compensation.

Lai and Qiu also model a multi-sector negotiation in which the two countries simultaneously bargain over the strength of IPRs in the South and tariff levels in the North. The bargained outcome is that the South strengthens its IPRs and the North lowers its tariff rates. Higher bargaining power in the South leads to an improved outcome overall, with deeper trade liberalization in the North. Though it is not possible in their model for both parties to benefit from a

³ Maskus (2012) provides a broader, book-length discussion of the global economics of intellectual property rights. His book includes an introduction to the theoretical concepts and empirical challenges, a detailed survey of recent literature, and a set of policy recommendations. While our brief review covers several of the same articles reviewed in Maskus, it is narrower in scope. We focus specifically on the trade and investment effects of strengthening IPRs in developing countries.

single-issue agreement, the multi-issue agreement results in economic gains for both the North and the South.

Grossman and Lai's 2004 study, "International Protection and Intellectual Property," extends this analysis, focusing again on the incentives that governments have to protect intellectual property when they are open to trade with other countries at very different levels of economic development. Their North-South model is similar to that in Lai and Qiu (2003), but with one key difference: they include in their model the factors determining the resource costs of innovation. Grossman and Lai conclude that the optimal level of IPRs in the absence of trade would not depend on the size of a country's market. However, when the countries trade with each other the relative size of the countries' markets and their relative productivity in innovation do affect the countries' incentives to strengthen their IPRs. Since the North is assumed to have a greater R&D capacity and a larger market, the North has a stronger incentive to protect IPRs.

Grossman and Lai show that there is a level of patent protection that maximizes global economic welfare, and it can be achieved with different combinations of country-level patent protection. However, different policy distributions for IPRs have different implications for welfare in the North and South. Policies that maximize incentives for global research are beneficial for the North but detrimental to the South, and international harmonization of patent policy does not necessarily lead to a globally efficient outcome.

Chen and Puttitanun examine how a developing country's capacity for innovation contributes to the IPR regime that it adopts, in their 2005 article titled "Intellectual Property Rights and Innovation in Developing Countries." Their theoretical model treats the foreign IPR regime and foreign innovation as exogenous and predicts how a country's government will choose its level of IPR protection to maximize domestic social surplus. The model has two sectors, an import sector and a local sector. The import sector has a foreign firm, whose patented technology allows it to produce higher quality products, and a domestic firm that can imitate that technology to a degree determined by the protection of IPRs. The local sector also has two firms, one which can develop technology and one which only imitates this technology. Increased protection of IPRs makes imitation more difficult in both sectors. In the import sector, higher IPRs imply that lower-quality goods will be produced by the domestic firm and that there will be less price competition for the foreign firm, resulting higher prices and a reduction of consumer surplus. However, in the local sector, higher IPRs imply more incentives for innovation. For this reason, there is a tradeoff between the benefits that a country can gain from imitation and those it can gain through domestic innovation. Based on their model, Chen and Puttitanun hypothesize that very poor countries will provide strong protection for IPRs in order to ensure access to foreign technologies; middle-income countries will provide relatively weak protection to facilitate domestic imitation of these foreign technologies; and advanced countries will provide strong protection to benefit their own innovators.

Branstetter and Saggi have made several important contributions to this theoretical literature, including their 2011 article titled "Intellectual Property Rights, Foreign Direct Investment, and Industrial Development." They develop a North-South model of the determinants of innovation,

imitation, and FDI. They use the model to examine how the strengthening of IPRs in developing countries impacts their growth, the countries' ability to attract FDI, and the location of multinational production. In the model, there are three types of firms: Northern firms, Northern multinationals and Southern imitators. A strengthening of IPRs in the South raises the cost of imitation while increasing the incentive for FDI by reducing the risk of imitation. However, it also boosts the demand for labor and real wages in the South, as the South becomes a more attractive location for investment. At the same time, it increases the rate of innovation in the North, since shifting multinational production to the South frees up labor for innovation in the North. A rise in the R&D productivity of Northern firms decreases imitation in the South, increases innovation in the North, increases FDI in the South, and increases the shares of production and sales that are controlled by multinational firms.

Regarding the location of production, Branstetter and Saggi conclude that strengthening IPRs in the South increases FDI and consequently the share of Southern production that is undertaken by multinationals. But because imitation is reduced, the profit that must be earned to entice a Northern firm to become a multinational via FDI is lower, and this decreases the value of the foreign affiliate sales of a typical multinational firm relative to the sales of a Northern exporter.

EMPIRICAL STUDIES: THE EFFECTS OF IPR REFORMS ARE COMPLEX

Park and Lippoldt advanced the empirical front in the literature in their 2005 article titled, "International Licensing and Strengthening of Intellectual Property Rights in Developing Countries during the 1990s." Their study examines whether stronger IPRs in developing countries encourage technology transfer through international licensing. They use firm-level data on international licensing and quantitative indexes of patent rights, copyright rights, trademark rights, and enforcement effectiveness in conducting their analysis. Their descriptive statistics show that 32 percent of the international royalties and license fee receipts of the U.S. firms they study come from licensing industrial processes, 30 percent from pre-recorded performances, 20 percent from general use software, and 9 percent from trademarks. Approximately 80 percent of licensing receipts for U.S. parent firms originated in countries where per capita GDP exceeded \$18,000 (in 1995 U.S. dollars), and 73 percent of receipts came from affiliated parties.

Park and Lippoldt estimate a model with the licensing receipts of individual firms as the dependent variable and indexes of IPRs as the main independent variables. They estimate the model for a sample of U.S. parent firms for three years (1992, 1995, and 1999). The influence of IPRs varies depending on the type of IPR: patent rights and enforcement effectiveness were significant in most of the specifications, while trademark and copyright protection had only weak influences. The influence of IPRs varied by sector and by the type of property licensed. They found that when U.S. firms were deciding how to transfer technology within a country, stronger IPRs made them more likely to choose international licensing. The coefficients on many of the IPR

variables are statistically significant, though they do not explain a large part of the variation in any of the econometric specifications.

Park and Lippoldt also find that developing nations that implemented more extensive patent reforms tended to have more licensing agreements with developed nations. The overall conclusion of their study is that the strengthening of IPRs had a net positive effect on international licensing of technologies between unaffiliated parties in the 1990s.

Branstetter, Fisman, and Foley offer another rigorous analysis of firm-level data in their 2006 article titled “Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U.S. Firm-Level Data.” They examine the impact of IPR reforms in 16 countries on technology transfer within U.S. multinational firms. Their econometric model uses firm-level and affiliate-level data on royalty payments and country-level data on patents. They find that as reforms occurred, royalty payments to parents and affiliate R&D expenditures increased. They further found that this effect was concentrated among affiliates of parent companies that used U.S. patents extensively before the IPR reforms. Within this group, royalties increased by more than 30 percent. They also find that IPR reforms led to a 23 percent increase in affiliate R&D expenditures in patent-intensive industries. They also examined whether patenting by multinationals increased after IPR reforms. They found that nonresident patent filings grew more rapidly after reform, suggesting that the multinationals transferred new technologies beyond those which had been used, but not patented, prior to reform.

Chaudhuri, Goldberg, and Jia focus more narrowly on the patent-intensive pharmaceutical industry in their 2006 article titled “Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India.” They examine the effect of patent enforcement on sales of antibiotics in India. Their study addresses the common public health concern that strengthening IPRs in poor countries may reduce consumer access to life-saving medicines. India provides an interesting case study because it has a disease mix that is similar to that of many other developing countries and because it has a large generic pharmaceutical industry. Chaudhuri, Goldberg, and Jia first estimate the price and expenditure elasticities of demand for antibiotics in India, using an econometric model based on product-level data for 1999 and 2000. Then they use the estimated model to calculate the difference in economic welfare if there were patent protection on these products and some domestic substitutes were withdrawn from the Indian market, as a result. They estimate that there would be significant losses in consumer welfare due to higher prices and loss of product variety.⁴

Ivus studies another type of economic effects – the effects of stronger IPRs on the innovating world’s exports to developing markets – in her 2010 article titled “Do Stronger Patent Rights Raise High-Tech Exports to the Developing World?” To distinguish between the effects of self-initiated IPR reforms and TRIPS-mandated IPR reforms, Ivus uses data from before and after the signing of the TRIPS agreement and the fact that former colonies of Britain and France

⁴ Specifically, they estimate that the prices of foreign patentable antibiotics would be at least 100 percent higher (absent domestic price regulation).

developed strong IPRs before many other countries. She compares the growth rates of exports along two dimensions: former colonies of Britain and France compared to all other countries (“colonies” versus “non-colonies”), and patent-sensitive industries compared to patent-insensitive industries.

Ivus begins by describing the pattern of changes in IPRs in former colonies and non-colonies between 1960 and 2000. The former colonies had stronger IPRs at the time that the TRIPS agreement was signed, apparently as a result of their colonial relations, but the IPRs of the non-colonies changed to a greater extent after the signing of the agreement. Ivus classifies industries as patent-sensitive or patent-insensitive, depending on whether the industries derive their competitive advantage from patented inventions. In her econometric analysis, the dependent variable is export growth rates in the different time periods. These growth rates difference-out country fixed effects associated with the colonial relationships. Using this difference-in-difference measure, Ivus finds that strengthening of IPRs increased exports from the North to the South. She estimates that the dollar value of new exports created by changes in IPRs was about \$35 billion per year (in 2000 U.S. dollars), an 8.6 percent increase in the annual value of patent-sensitive trade of the countries in the model.

Arora, Branstetter, and Chatterjee study the effects of patent reform on domestic innovation in the India in their 2011 study titled, “Strong Medicine: the Impact of Patent Reform on the Indian Pharmaceutical Industry.” They present an econometric analysis of the effects of Indian patent reforms on the activities of 315 Indian pharmaceutical firms. They find that the reforms had significant positive effects on the stock market values and R&D spending of the firms, especially the most technologically advanced ones. Their study is important because it acknowledges the often overlooked possibility that strengthening IPRs in developing countries can encourage domestic innovation. It provides evidence that this actually occurred in the case of research-intensive Indian pharmaceutical firms.

Most recently, Park estimates the effect of Southern IPRs on Northern R&D expenditures in his 2012 article titled “North-South Models of Intellectual Property Rights: An Empirical Critique.” He uses firm-level panel data on R&D carried out by U.S. multinationals and their affiliates in developed countries from the U.S. Direct Investment Abroad Survey published by the U.S. Department of Commerce, Bureau of Economic Analysis, as well as indexes of patent protection in individual countries weighted by market share. Park’s model uses R&D investment as a dependent variable, and two measures – the level of domestic patent protection and the level of foreign patent protection – as independent variables. Park disaggregates the measure of foreign patent protection into developed countries and developing countries.

Park’s descriptive statistics indicate that most of the U.S. firms in his sample sell to other developed countries. He finds that the levels of patent protection in developing countries are low compared to those of developed countries, and that the levels of domestic patent protection in most developed countries are greater than weighted aggregate patent protection in other countries.

In his econometric analysis, he finds that IPRs in developing countries do not have a significant positive effect on R&D in developed countries. Patent protection in other developed countries, however, is strongly positively correlated with the R&D of U.S. parent firms and their foreign affiliates. Park estimates that the elasticity of the firms' R&D with respect to the strength of patent rights in the foreign countries is 0.92. He finds that the patent rights in all foreign markets combined have a greater quantitative impact than domestic patent rights, reflecting the large size of the global market relative to the domestic market. Several control variables, including the value of sales and the number of R&D employees, are also strongly significant. Tax rates have a negative impact on R&D, but they are only statistically significant for foreign affiliates, suggesting that taxes have only a local influence. Public R&D funding is also statistically significant at the 5 percent level in all specifications.

Overall, Park finds that the protection of IPRs in the South does not have a strong positive influence on R&D in the North, probably because the relatively small economies in the South represent a minor share of the potential market for innovation. Nonetheless, he predicts that this may change in the future, as the markets in the developing countries grow.

CONCLUSIONS

This article has demonstrated that the economics of trade-related IPRs is an active research area with many interesting questions. While the literature continues to advance with the development of richer data sources, most of the questions have not been conclusively answered, and there is a need for further study. However, several preliminary themes find support in the 10 studies we have reviewed.

First, the strengthening of IPRs in the South appears to have little effect on the level of R&D expenditures and the rate of innovation in the North. But it apparently has a positive significant effect on the rate of international technology transfer from the North to the South.

Second, strengthening IPRs in the South has an ambiguous effect on international trade from the North to the South, but has a significant positive effect on FDI in the South. Stronger IPRs can reduce technology imitation and therefore create a market in the South for innovative products exported from the North. On the other hand, strong IPRs can encourage local production through FDI that displaces North-to-South trade in these products.

Third, stronger IPRs in the South usually benefit the North at the expense of the South. However, there are well-defined cases in which stronger IPRs can benefit the South. Stronger IPRs can induce FDI and technology transfer and increase labor demand in the South, and in some cases they can increase innovation in the developing countries.

BIBLIOGRAPHY

- Arora, A., L. Branstetter, and C. Chatterjee. "Strong Medicine: the Impact of Patent Reform on the Indian Pharmaceutical Industry." In *The Location of Biopharmaceutical Activity*, edited by I. Cockburn and M. Slaughter. Chicago: University of Chicago Press, 2011.
- Branstetter, L., R. Fisman, and C.F. Foley. "Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U.S. Firm-Level Panel Data." *Quarterly Journal of Economics* 121, no. 1 (2006): 321-349.
- Branstetter, L. and K. Saggi. "Intellectual Property Rights, Foreign Direct Investment and Industrial Development." *Economic Journal* 121, no. 555 (2012): 1161-1191.
- Chen, Y. and T. Puttitanun. "Intellectual Property Rights and Innovation in Developing Countries." *Journal of Development Economics* 78 (2005): 474-493.
- Chaudhuri, S., P.K. Goldberg, and P. Jia. "Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinalones in India." *American Economic Review* 96, no. 5 (2006): 1477-1514.
- Grossman, G. and E. Lai. "International Protection and Intellectual Property." *American Economic Review* 94, no. 5 (2004): 1635-1653.
- Hall, B., C. Helmers, M. Rogers, and V. Sena. "The Choice between Formal and Informal Intellectual Property: A Review." *Journal of Economic Literature* 52, no. 2 (2014): 375-423.
- Ivus, O. "Do Stronger Patent Rights Raise High-Tech Exports to the Developing World?" *Journal of International Economics* 81, no. 1 (2010): 38-47.
- Lai, E. and L. Qiu. "The North's Intellectual Property Rights Standard for the South?" *Journal of International Economics* 59, no. 1 (2003): 183-209.
- Maskus, K. *Private Rights and Public Problems: The Global Economics of Intellectual Property in the 21st Century*. Washington, DC: Peterson Institute for International Economics, 2012.
- Park, W. "Intellectual Patent Protection: 1960-2005." *Research Policy* 37, no. 4 (2008): 761-766.
- Park, W. "North-South Models of Intellectual Property Rights: An Empirical Critique." *Review of World Economics/Weltwirtschaftliches Archiv* 148, no. 1 (2012): 151-180.
- Park, W. and D. Lippoldt. "International Licensing and Strengthening of Intellectual Property Rights in Developing Countries During the 1990s." *OECD Economic Studies* 40 (2005): 7-48.