# In search of Optimality: Innovation, Economic Development, and Intellectual Property Rights

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## Introduction

Innovation is largely considered to be the principle catalyst of long-term economic growth. Therefore, what is the ideal method to spur innovation? In addition to other factors, intellectual property rights (IPR) – and their relative degree of severity – play an important role in technology development and diffusion. This paper explores the controversial and polarizing nature of IPR: one side falls in support of all-encompassing and stringent regulation while the other side remains critical of such a stance. However, recent research suggests that the internationally optimal solution lies not at the extremes, but somewhere in between.

Intellectual property refers to the protection of innovations of the mind. Through a legal framework, owners of such property receive specific rights, which may be used for recognition or financial gain. The mechanisms by which intellectual property is protected include copyrights, patents, trademarks, industrial designs, and geographic indications. Governments and certain ruling bodies determine the equilibrium point among the various stakeholders: "By striking the right balance between the interests of innovators and the wider public interest, the IP system aims to foster an environment in which creativity and innovation can flourish." (WIPO) This equilibrium, and the process by which it is achieved, is the source of constant debate.

The aforementioned mechanisms of intellectual property protection generally exist within the developed world. However, developing countries traditionally lack a modern, enforced, or efficient intellectual property system. The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) is an international accord establishing uniform guidelines for intellectual property protection. In principle, TRIPS applies to all WTO members, although important exceptions exist, and focuses on minimum standards, non-discrimination policies, and enforcement and dispute settlement mechanisms. The WTO affirms the net gain of TRIPS: "Society benefits in the long term when intellectual property protection encourages creation and invention, especially when the period of protection expires and the creations and inventions enter the public domain. Governments are allowed to reduce any short term costs through various exceptions, for example to tackle public health problems." (WTO) Nevertheless, despite this apparent commitment to a mutually advantageous international system, the debate rages on.

## The Case in Favor of Strong IPR Protection

The United States, along with many developed countries, is a spirited proponent of IPR and TRIPS, affirming the agreement's ability to foster long-term economic growth and national development. Industrialized nations receive international protection from intellectual property infringement and developing countries receive increases in trade, foreign direct investment (FDI), and technology generation and diffusion. Therefore, all members benefit from TRIPS.

IPR protection has the ability to encourage innovation and the formation of a well-functioning market system in developing

countries, both of which lead to economic growth. (Chen and Puttitanun 490) System strength and proper enforcement are critical components of this positive relationship between IPR and economic development. (Eicher and Newiak 19) In addition, empirical evidence exists to support the claim that the TRIPS-induced patent duration increase, which mandates a minimum of twenty years, has spurred innovation. (Abrams 1639-42)

Using a sample of developing countries in the post-TRIPS era, one study measures the impact of national IPR level on FDI and imports. The findings of this empirical analysis reveal a positive relationship: "On average, the results indicate a one point increase in the IPR score (about 10 percent) will increase a country's FDI by $1.5 billion (50 percent of the mean amount) and imports by $8.9 billion (40 percent of the mean amount)." (Lesser 19) As a result, developing countries should consider this positive relationship when devising IPR policy.

The empirical results from another study, which examines a diverse country panel from 1990-2005, confirm two hypotheses: (1) IPR encourage technology transfer and (2) IPR stimulate domestic innovation. (Park and Lippoldt 4) For example: "On the whole, the estimates suggest that a 1% strengthening of patent rights is associated with a more than 2% increase in the stock of inward FDI." (Park and Lippoldt 20) IPR protection promotes inward FDI and imports which, in turn, spurs technology transfer: "goods, services, and capital are a source of knowledge as well as a source of inputs with which to conduct innovation." (Park and Lippoldt 5) The positive relationship between developing country IPR and technology transfer is especially seen in high-tech products, such as chemicals, aerospace, and computer services. (Park and Lippoldt 28)

**The Case Against Strong IPR Protection**

A growing contingent of scholars, policymakers, and practitioners argue the disadvantages of TRIPS for developing countries. Proponents of this view criticize the assertion that strong IPR systems foster across-the-board innovation and economic growth. Furthermore, even if theoretical incentives for innovation and technology transfer exist as a result of intellectual property protection, this does not necessarily engender sustainable development: "IPR may provide an incentive for innovation but there is limited local capacity in LDCs to make use of it…even if stronger IP protection supports an increase in technology transfer, limited local absorptive capability may limit the potential to use it." (Léger, Developing Countries, 2) Similarly, various studies indicate the existence of a crowding out effect: the IPR induced influx of FDI and foreign technology reduces domestic innovation incentive and capacity, which impedes long-term economic growth in developing countries. (Jin, Garcia and Salomon)

Various studies support the case against universally stringent IPR. Results from an empirical analysis, which focuses on a panel dataset comprised of 22 developed and 76 developing countries and a time span of 30 years (1965-1995), find intellectual property protection and past R&D investments to have a positive and significant impact on innovation in developed countries but not in developing countries, thus indicating a divergence in the determinants of innovation. (Léger, Around the World, 24) Furthermore, research published in the Journal of World Business, which analyzed 18 Latin American and Caribbean developing countries from 1990-2003, challenges the positive relationship between IPR and FDI: "We find that with each point increase [in IPR reform] there is a 0.08% decrease in FDI per Model 1…and 0.09% decrease per the results of Models 2 and 3." (Khoury and Peng 17) Whereas intellectual property protection is generally understood to foster innovation and economic growth in developed countries, the same cannot be definitively stated for developing countries.

At low levels of economic development, rigorous IPR systems are likely to discourage innovation and economic growth.

**Achieving Optimality**

Despite the ongoing debate, IPR is not an all or nothing game. Recent literature emphasizes the importance of an individualized approach; the optimal level of intellectual property protection is contingent upon country specific factors. Research published in *the Journal of Development Economics* supports the existence of a U-shaped curve regarding optimal IPR and level of economic development: "[The study shows] that innovation in a developing country increases with the protection of IPRs, and it is possible that a country's optimal IPRs depend on its level of development (technological ability) in a non-monotonic way, first decreasing and then increasing." (Chen Puttitanun 489) This U-shape indicates that, at a low level of development, a reduction in IPR will encourage economic growth until a certain point; at said point, an increase in IPR will encourage economic growth. These results are illustrated in Appendix A.

The impact of IPR on innovation is contingent upon the initial level of IPR, proxied by an IPR scale, and economic development, proxied by per capita GDP. Utilizing a dataset of 62 developed and developing countries and a timeframe from 1980-2009, the findings of one study, detailed in Appendix B, indicate that the IPR influence on innovation is nonlinear (contingent upon IPR level) and that the level of economic development influence on the innovation/IPR relationship is also nonlinear. (Hudson and Minea 66) For example, at time X, Guatemala and Norway have a comparable level of IPR (approximately 3.15). However, at time X, Guatemala has a per capita GDP of $5,527 and an innovation/IPR elasticity of negative 0.0094; Norway has a per capita GDP of $24,381 and an innovation/IPR elasticity of positive 0.0125. As a result, an increase in IPR for Guatemala would reduce innovation, whereas an increase in IPR for Norway would increase innovation. (Hudson and Minea 73) Therefore, the relative levels of both IPR and development are critical determinants of innovation and economic growth.

When devising intellectual property policy, proper attention must be given to the initial levels of IPR and economic development. Many developing countries, and especially least developed countries, are unable to benefit from stringent intellectual property protection. As a result, a base level of IPR and economic development is essential when establishing IPR systems. The minimum IPR standard should rest at the low IPR value that, irrespective of level of economic development, encourages innovation – critical value number one. After this point, any rise in IPR has a negative effect on innovation. As IPR continues to increase, a new value marks the end of this innovation-stifling phase and the beginning of an innovation-encouraging phase – critical value number two. Instead of premature and detrimental advancement, countries must remain at critical value number one for an undefined amount of time. This temporary optimality allows a country to benefit from innovation, which in turn stimulates economic growth and prepares the country for a future jump in IPR level. The final value is the maximum level of IPR – critical value number three. As with the move from critical value one to critical value two, another waiting period ensues at this second temporary optimality, where the country has the opportunity to further increase its level of economic development. At a certain point of development, the country may move to the final level. This movement in contingent upon the level of economic development and does not correlate with a predetermined period of time. (Hudson and Minea 73)

**Conclusion**

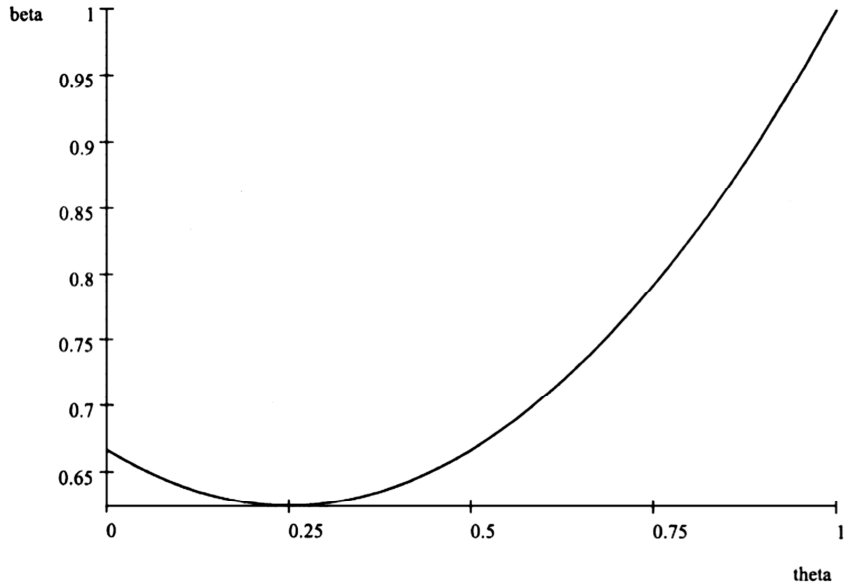
Countries must have the freedom to base their individual strength of intellectual property protection on national factors. If the leaders of

the international community truly desire to foster technology diffusion and universal economic growth, they would rework the current system, which is guilty of advancing both an inequitable one-size-fits-all approach and ineffective time constraints. Intellectual property rights remain a significant tool for policymakers and, when employed correctly, have the power to engender innovation and economic development.

## Appendix A

The level of development, measured by per capita GDP, is represented by theta (θ); the level of IPR, measured by the GP index, is represented by beta (β), such that $\beta = 0 \rightarrow$ no protection and $\beta = 1 \rightarrow$ perfect protection. (Chen and Puttitanun 477) The study analyzes data from 64 developing countries between 1975-2000. The statistical results of the model confirm the U-shaped hypothesis: "This suggests that countries tend to lower their IPRs initially as GDP [per capita] begins to rise and then raise them after a certain point." (Chen and Puttitanun 483-486)

**Figure 1: Relationship Between β(θ) and θ (Chen and Puttitanun 483)**

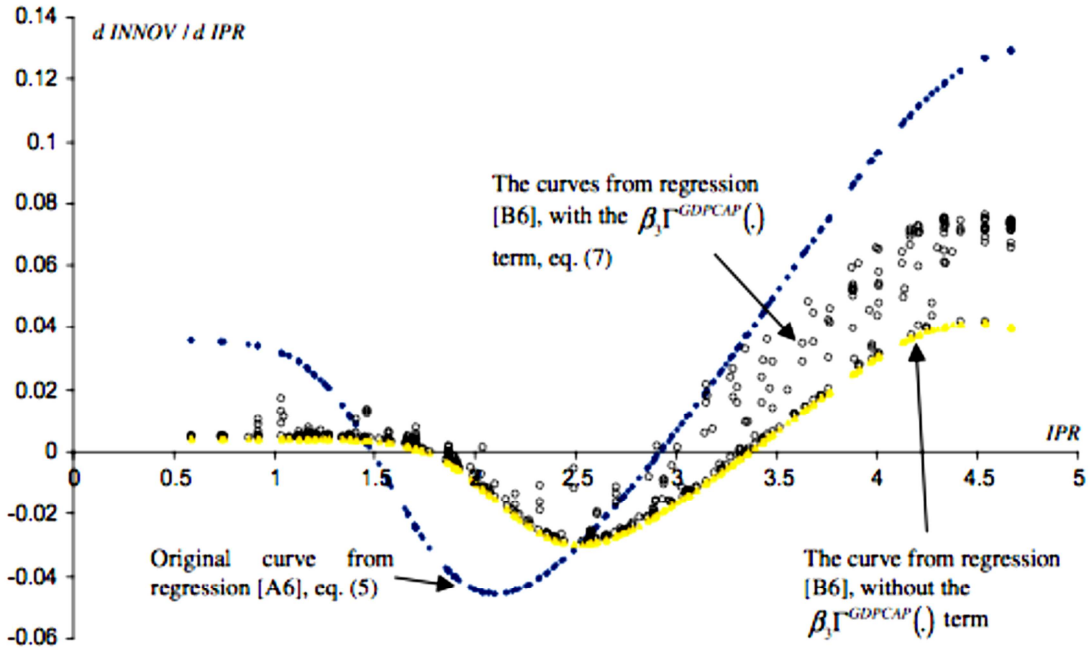



## Appendix B

The study analyzes the impact of IPR on innovation, subjected first to IPR level (blue curve in Figure 2) and second to both IPR level and economic development level (yellow curve and surrounding points in Figure 2). The incorporation of the economic development level, measured by the per capita GDP, yields two important effects on the innovation/IPR elasticity (as compared to IPR level alone, measured by the blue line in Figure 2): (1) the curve shifts down and to the right: "Thus, accounting for the per capita GDP levels mitigates the effects of an IPR strengthening on innovation, suggesting the presence of important synergies (between the level of economic development and the level of IPR) that require unified analysis" and (2) the existence of a direct effect: "The impact is such that the innovation/IPR derivative increases (decreases) when the per capita GDP level is above (below) a threshold of around $4500." (Hudson and Minea 71) Low-IPR countries tend to be close to the yellow

curve. More wealthy countries tend to be above the yellow curve; high-IPR more wealthy countries tend to be significantly above the yellow curve.

**Figure 2: Impact of IPR and economic development on innovation/IPR elasticity (Hudson and Minea 72)**

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