



# Do Stronger Intellectual Property Rights Increase Innovation?

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**Summary.** — Do stronger intellectual property rights (IPR) increase innovation? Recent decades have seen a global transformation in IPR standards, underpinned by the theory that stronger IPRs spur increased incentives to innovate. This study tests the impact of ever more rigorous IPR systems on innovation through an index of economic complexity of 94 countries from 1965 to 2005. Our results confirm that stronger intellectual property systems engender higher levels of economic complexity. Nevertheless, only countries with an initial above-average level of development and complexity enjoy this effect.

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## 1. INTRODUCTION

This study works to address some of the current gaps and continuing debates in intellectual property rights (IPR) literatures. Our period of interest (1965–2005) is one of increasing intellectual property rigor for both industrialized and developing countries. In contrast to previous studies which have used patent applications, awards, or research and development (R&D) spending as their primary indicator of innovative activity, we build on a database of 94 countries over the period from 1965 to 2005 to examine the effects of IPR changes on a country's economic complexity (Hausmann *et al.*, 2013). Our approach offers a number of novelties in on-going debates about innovation. First, by focusing on the country's economic complexity measured through its export sophistication, we avoid some of the problems with standard innovation indicators to better capture if more innovative products and processes are being developed and, importantly, applied across an economy as a whole. Second we offer insights on the benefits and costs of increasingly rigorous standards in developing economies. Third, we build on a new wave of research which is working toward unraveling the drivers of economic sophistication and understanding the institutional environments which foster more value-added production in developing countries (Zhu & Fu, 2013).

An abundant and expanding body of research has recently uncovered the importance of export complexity as both a predictor and a driver of future economic development (Anand, Mishra, & Spatafora, 2012; Hausmann, Hwang, & Rodrik, 2007; Lall, Weiss, & Zhang, 2005). This stream of work has shown that a mere quantitative increase in exports does not reflect either current or potential for economic development. It is not how much you export, these scholars argue, but *what* you export that matters (Anand *et al.*, 2012; Hausmann *et al.*, 2007). At the same time that literatures in economic development and policy have established the critical role that increasing export sophistication plays as driver of economic development, the global rules governing the ownership of technology and its diffusion—the regulatory framework underlying product innovation—have been radically transformed.

Intellectual property rights (IPR) standards, norms, and institutions were at the forefront of debates on productivity in the 1980s and 1990s during the WTO's Uruguay Round

of negotiations. The resulting change of 157 countries' national patent rules to one minimum standard—through the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)—marked a watershed moment in the global political and economic regulation of innovation. In the wake of global IPR changes, scholars have sought to understand the effects of increasing patent protection on economic development. Studies have worked on the effects of the new standards on patent applications, investment in research and development, technology transfer, productivity growth, and inequality.<sup>1</sup> Yet, evidence about optimal levels of patent protection remains inconclusive and some scholars have recently called for research which “better estimates the effects of IPR policy on innovation rates and also structural models that would enable the evaluation of the effects of different policies in equilibrium growth and welfare” (Acemoglu & Akcigit, 2012, p. 40).

Our study addresses this ongoing debate by working to unravel the relationship between export sophistication and increasingly rigorous IPR standards. Our findings yield two broad sets of results. Across a world sample, we show that the higher the intellectual property laws, the more positive impact they have on a country's level of innovation, as measured through export sophistication. However, the positive effect seems to be restricted to countries that start out with an above average level of development and complexity. For developing countries, our results show that IPR has at best a non-significant effect on economic complexity and most often has a negative effect. These findings are in line with the

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theory that access to technology and technology transfer are important drivers of innovation and productive output, especially for developing countries playing a global game of technological “catch-up”. This research lends urgency to the importance of tailoring national systems to development demands and reassessing literatures on intellectual property.

The paper proceeds in the following structure: Section 2 briefly reviews the literature on IPR institutions and innovation. Section 3 presents the dataset and econometric model used in our analysis. Section 4 discusses our results while Section 5 offers conclusions and looks toward future research pathways.

## 2. INTELLECTUAL PROPERTY INSTITUTIONS AND ECONOMIC COMPLEXITY

One of the primary mechanisms in intellectual property systems is the patent.<sup>2</sup> A patent confers a set of monopoly ownership privileges to an inventor for a finite period of time, thus protecting the inventor from appropriability by other firms at a significantly lower cost. The period of protection rewards inventors for their investment in innovation-producing activities. In turn, society sacrifices immediate access to the new technology in exchange for the benefits conveyed through the incentive to innovate. This trade-off has been described as the “patent bargain” (Jensen, Johnson, Lorenz, & Lundvall, 2007) and it is at the center of research of intellectual property systems.

An early stream of theoretical work examining this trade-off attempted to develop a model for “optimal” patent levels (Horowitz & Lai, 1996; O’Donoghue & Zweimuller, 2004). One flank of scholars describes the relationship between IPRs and their benefits as comprising an inverted-U curve in which IPR norms reach a peak point of rigidity from which the trade-off between the positive aspects of IPR for owners (higher returns from monopoly rights, more resulting capacity for R&D) are eclipsed by the negative aspects (reduced diffusion, reduced competition, higher transaction costs from licensing). The inverted U-curve relationship however has been questioned by researchers who doubt that beneficial outcomes taper off (Kanwar & Evenson, 2003) and suggest that innovation not only increases relative to IPR strength, but that does so in an ever amplified manner (Kanwar, 2007; Schneider, 2005). This school of thought predicted that application of the North’s intellectual property standards would be hugely beneficial for the global South and provide an impetus for bridging the global technological divide (Lai & Qiu, 2003). A theoretical model developed by Dinopoulos and Segerstrom (2010) is more buoyant still, positing that higher levels of IPR protection in the developing world spur multiple gains, including perpetual increases in the transfer of technology to the global South, increases in R&D by Southern affiliates of northern-based multinationals and finally both a decrease in the global wage gap and increase in innovation in industrialized countries. These results are confirmed by evidence that intra-firm transfer of technology increases, especially for firms heavily dependent on patent-based technologies (Branstetter, Fisman, & Foley, 2006). These multinational firms, according to some researchers, cause positive spillover effects including spread of knowledge and skills to local workforce (Görg & Strobl, 2005; Poole, 2012) and growth of local suppliers (Smarzynska Javorcik, 2002, 2004). Finally, the standardization of a reliable set of IPR norms opens ‘markets for technology,’ linking innovations and facilitating tacit and formal exchanges of technological knowledge (Arora, Fosfuri, & Gambardella, 2001; Athreye & Cantwell, 2007).

At the root is the question posed by some scholars: would the predicted expansion of industrial activity by multinationals in developing countries neutralize the losses incurred by terminating imitative production in these countries? Branstetter, Fisman, Foley, and Saggi (2011) review the behavior of multinational enterprises ex-ante and ex-post reforms and suggest that the outcomes are favorable. Among all these predicted benefits of expanded and global IPR norms, the central argument for reforms however was that standard IPR institutions would drive innovation and bridge the global technological divide.<sup>3</sup>

The TRIPS agreement codified these cheerful IPR views into global trade law: from 1996 onward all members of the WTO agreed to implement IPR systems respecting a patent life of 20 years.<sup>4</sup> In the wake of the implementation of TRIPS norms, many scholars in political economy have worked to empirically assess their impact.<sup>5</sup> Some researchers have argued that the agreement has increased innovation (Abrams, 2009) and facilitated diffusion, as inventors are more apt to share their ideas when their ownership rights are protected (Moser, 2011). However, a contrasting, less sanguine view of ever-stronger IPRs has gained strength as more studies examine the different effects of the treaty on countries across varying levels of economic development. McCalman (2001) has shown how increased IPRs result in wealth transfers from developing countries to their industrialized counterparts. A recent study by Hudson and Minea (2013) employs a unified econometric approach analyzing the impact of IPR through both initial IPR and per capita GDP. They find that global IPR homogeneity is sub-optimal, as “the same level of IPR has a different impact on richer countries than poorer ones” (Hudson & Minea, 2013). These works build on a stream of evidence indicating that different intellectual property institutions may be more conducive for both firm learning and the processes of technological catch-up (Acha, Marsili, & Nelson, 2004; Bell & Pavitt, 1993). This idea posits that IPR standards should be “development appropriate,” and draws on the notion that innovation is an incremental, cumulative process requiring access and adaptability of technological knowledge (Acemoglu, Gancia, & Zilibotti, 2012). Two studies examining histories of industrialization (Cimoli, Dosi, Mazzoleni, & Bhaven, 2011; Odagiri, Goto, Sunami, & Nelson, 2010) show through multiple cases across industrialized and developing countries, that IPRs were not significant drivers of technological advancement and that in fact, many advanced industrial economies achieved their development under loose IPR frameworks.<sup>6</sup>

The actual effectiveness of patents and their differences across industries has long been a subject of interest for innovation scholars. Thirty years ago renowned innovation economist Edwin Mansfield asked how germane patents truly were for industries in the generation and commercialization of new products. Reviewing surveys of 100 US firms across 13 industries, he found that they were only essential for a small portion of innovations, and only in select few industries (Mansfield, 1986).<sup>7</sup> This finding has lead researchers to question, do firms actually use patents as the preferred mechanism for guarding secretive information? An interesting discussion on the overall importance of the global IPR regime and their potential not only to promote innovation but also to enable diffusion can be found in Archibugi and Filippetti (2013). Their provocative conclusion is that the overall effect of the regime has been overestimated, and that effects have been “much ado about nothing.” Cohen, Nelson, and Walsh’s (2000) work confirms this result, finding that most firms use other instruments such as trade secrecy, lead time advantages,

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