



## On the strength of intellectual property protection that nations provide

Sunil Kanwar <sup>a,\*</sup>, Robert Evenson <sup>b</sup>

<sup>a</sup> Department of Economics, Delhi School of Economics, India

<sup>b</sup> Department of Economics, Yale University, United States

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### ABSTRACT

Researchers studying the commitment of countries to intellectual property rights run into the claim that the technology-haves (the developed countries) opt for relatively stronger protection of intellectual property, whereas the technology-have-nots (the developing countries) opt for weaker protection. It is but a short step from this assertion to the claim that this results in huge trade losses for the former. Using cross-national panel data for 1981–2000 we find that the evidence is only weakly consistent with this conjecture at best; and that the technology-have-nots more likely provided weaker protection due to paucity of financial resources and human capital, and their inward-looking trade-orientation.

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### 1. On intellectual property and intellectual property protection

Although the agreement on Trade Related Intellectual Property issues (TRIPs) reached in April 1994 under the aegis of the GATT/WTO committed the member signatories to *harmonizing* their intellectual property laws within a specified time frame, it also served to highlight the *widely diverging* strengths of protection that different nations provide to intellectual property. In the case of patent laws, for instance, nations have differed with respect to coverage, duration, conditions for the revocation of patents once granted, when a patent application may be challenged, enforcement procedures, and so on. Similarly, numerous differences have obtained across nations with respect to the other instruments of intellectual property protection such as copyrights, trademarks etc. as well (Evenson, 1990).

While the cross-national differences in intellectual property protection may have decreased post-TRIPs, they have far from vanished. For instance, though most countries now provide for (product and process) patents for ‘tangibles’, some countries (e.g. Australia, Japan, New Zealand, and the United States) subscribe to a wider definition of patentable innovations, and allow the patenting of ‘business methods’ as well (Barracough, 2005). Second, while

some countries allow patents in agriculture (e.g. Australia, the European Union nations, and the United States), many developing countries have opted for a *sui generis* system of protection for agriculture that is restricted to plant breeders rights. The latter is weaker than the former on several counts – the duration of protection under *sui generis* systems tends to be less than 20 years, allows for ‘researchers’ exemption’ and ‘farmers’ exemption’,<sup>1</sup> and the grant criteria are not equally well-defined.<sup>2</sup> Third, the TRIPs agreement only prescribes some lower thresholds for protection, not upper thresholds. Thus, while developing countries provide copyright protection to software (in accordance with the agreement), some countries (e.g. the European Union nations, and the United States) provide patent protection which is even stronger (Oates, 2005). Again, while many developing countries provide base-level copyright protection for the lifetime of the author plus fifty years (as per the agreement), the European Union and the United States provide copyright protection for the lifetime of the author plus 70 years (United States Copyright Office, 2005; United

<sup>1</sup> ‘Researchers’ exemption’ allows researchers to use protected material for research without permission, whereas ‘farmers’ exemption’ allows farmers to save and reproduce protected germplasm; neither being permissible under a patent system.

<sup>2</sup> For instance, one of the criteria for plant breeders rights is ‘distinctness’, but this is not uniquely defined. While one country may grant plant breeders rights for a variety of apples, say, only if it is 20% or more redder than existing varieties, another country may opt to do so if the new variety is 10% or more redder. In this way, the criteria for plant breeders’ rights may be watered down to suit one’s situation.

\* Corresponding author. Department of Economics, Delhi School of Economics, University of Delhi, Delhi 110007, India. Tel.: +91 11 27667005; fax: +91 11 27667159. E-mail address: [sunil\\_kanwar@econbase.org](mailto:sunil_kanwar@econbase.org) (S. Kanwar).

Kingdom Government, 2005). Last but not the least (for many other cross-national differences may be discerned upon scrutiny), countries differ markedly in terms of the enforcement of intellectual property rights.

Researchers studying different countries' commitment to intellectual property protection often run into the claim, that countries with a relatively higher technological base (the developed countries) have an incentive to provide relatively stronger protection to intellectual property, whereas countries with a relatively lower technological base (the developing countries) have little incentive to do so. While this possibility has been acknowledged in the literature, few researchers have studied it formally. Of these few, McLeland and O'Toole's (1987) analysis is limited to the assertions that the "... LDC perspective is different primarily because there are few research-based pharmaceutical companies located in those countries", and that "[M]ost indigenous manufacturers are compounders who purchase the active ingredient ... and mix and package the drug ...". The authors do not offer any evidence on these sweeping statements – how true this might be for, say, Argentina, Brazil, Cuba, India etc; or whether their claims pertain to other industries as well.<sup>3</sup> Frame (1987) considers a group of countries with a 'low' commitment to protect intellectual property, and claims that United States trade losses on account of inadequate protection and trade in counterfeit goods run into several billions of dollars, but does not explicitly show that the latter phenomenon (of some countries supposedly benefiting by providing weak protection to others' intellectual property) is linked to the former set of countries. Ginarte and Park (1997) study the strength of protection countries provide by using lagged values of the possibly endogenous causal variable (namely, research and development spending) in lieu of the variable itself, but do not provide any test for the presence of endogeneity bias. Lerner (2002) deviates from the earlier studies by analysing the determinants of specific aspects of patent laws rather than composite indices of protection. The strength of protection granted by nation states, however, is determined by the sum total of the different aspects of their intellectual property laws, and not by the individual characteristics per se; for some aspects such as the length of protection may substitute for others such as the breadth of protection. Therefore, ideally, an analysis of the determinants of specific aspects of protection should be presented alongside that of protection as a whole. It appears, then, that the empirical evidence on the issue is thin and not supportive of any generalisation, and would benefit from further enquiry.

This paper examines empirically whether technological development leads to the strengthening of laws pertaining to its protection. This relationship is captured at the economy-wide level, employing cross-country data on the strength of intellectual property protection, level of technological development and other country-specific control variables. Using plausible instruments, we attempt to control for endogeneity bias and obtain consistent estimates of the relationship. Although Hausman endogeneity tests reject the presence of any significant endogeneity bias, we nevertheless present the IV results alongside the OLS results as the two are fairly similar. In the case of the IV specification, the test of over-identifying restrictions is found to be consistent with exogeneity of the instruments. Our estimation results show that the level of technological development has, at best, only a weak positive influence on the strength of intellectual property protection provided by nations; rather, it is access to financial resources and human capital, and trade orientation, that explain the level of protection nations provide. Section 2 considers the underlying arguments in greater detail and spells out the estimating regression. Section 3 discusses the empirical results, and Section 4 outlines the broad conclusions.

<sup>3</sup> It is of some interest that the authors thank the Pharmaceutical Manufacturers Association (presumably in their home country) for financial support for their paper.

## 2. Intellectual property protection and technological development: the estimating equation

An interesting question raised in the literature relates to whether the strength of intellectual property protection that a country provides depends on its level of technological development. Do countries with a low technology base (primarily developing countries) opt for weak intellectual property protection, and those with a relatively higher technology base (primarily developed countries) opt for a régime of strong(er) intellectual property protection? Lower levels of technology in developing countries, it is argued, imply the availability of a range of goods and services that is narrower and of poorer quality, so that these countries have an incentive to allow 'cheap' technology imports through imitation, by adopting a system of relatively weak intellectual property rights. For instance, many developing countries historically permitted only process patents on pharmaceuticals, which enabled firms in these countries to synthesize various drugs by alternative processes *even when product patents on these drugs were valid in other (developed) jurisdictions*. Once countries have attained an adequate level of technological development, so the argument proceeds, they switch to stronger protection of intellectual property, because now they have something to protect; and they cannot reasonably expect other countries to honour their claims to this property unless they themselves do so in the first place. For these reasons, we may expect a positive relationship running from the level of technological development of nations to the strength of intellectual property protection that they provide. How strong this relationship is in practice, however, is far from obvious. This paper attempts to bridge this gap between conjecture and the ground reality, by providing further empirical evidence on the above-mentioned relationship.

### 2.1. The regressand: the index of protection

While ideally one ought to consider a range of intellectual property instruments (patents, copyrights, trademarks) in constructing an index of the strength of intellectual property protection, in practice there is consensus that the most dramatic differences in intellectual property protection across nations have obtained in the sphere of patents.<sup>4</sup> We therefore use an index of patent rights (*IP*) as the regressand in this study.<sup>5</sup> This index, constructed by Ginarte and Park (1997) and Park and Wagh (2002), is based on five sub-indices relating to five important aspects of patent laws – index of coverage (*ICOV*) regarding what categories of inventions may be granted protection; index of duration (*IDUR*) pertaining to the number of years of protection; index of membership (*IMEM*) reflecting membership in international patent agreements such as the Paris convention, Berne Convention etc.; index of revocation (*IREV*) relating to the conditions that may culminate in the withdrawal of protection, such as 'non-working' of patents, national emergencies etc.; and the index of enforcement (*IENF*) pertaining to the enforcement mechanisms available, such as preliminary injunctions, burden of proof reversal

<sup>4</sup> The inter-country variation in trademarks and (to a lesser extent) copyrights has traditionally been small (Gadbaw and Richards, 1988). Of course, this is probably not true of their enforcement, but data on those aspects is seldom available. Further, deriving a composite index may be infeasible on account of data constraints.

<sup>5</sup> The World Economic Forum (various years), and Rapp and Rosek (1990) provide alternative indices of protection. The former is based on surveys of individuals regarding the strength of protection in their respective countries, and the latter is based on a comparison of the patent laws of individual countries with the guidelines proposed by the US Chamber of Commerce's Intellectual Property Task Force. The Ginarte–Park index is superior to both, as it is not impressionistic, considers various facets of patent protection in greater detail, and hence makes for greater variation in the protection index even for the developed countries.

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