

How compliant are developing countries with their TRIPS obligations?

Intan M. Hamdan-Livramento^{*†}

29th September 2008
(this version)

1 Introduction

Arrow (1959) underscores the importance of having an incentive mechanism that would encourage innovative activities, one of which is the government sanctioned monopoly rights of intellectual property rights (IPR) protection. He argues that market failure of knowledge production justifies the institutionalization of such mechanism, so as to encourage this beneficial activity that would have positive spillover effects. This same line of argument was pushed forth by the *demandeurs* of the Trade-Related Aspects of Intellectual Property Rights agreement¹ during the Uruguay Round of negotiations, whereby it was contended that the lack of IPR protection in some countries hindered the free flow of goods and services worldwide. However, research on examining the relevance of having IPR protection produce inconclusive results. Evidences have been compiled on how IPR protection, in particular the patent system, impacts R&D (Varsakelis, 2001; Mansfield, 1994), trade (Smith, 1999; Maskus and Penubarti, 1995; Ferrantino, 1993), foreign direct investments (Smarzynska Javorcik, 2004; Lee and Mansfield, 1996; Mansfield, 1994) and welfare (Falvey, Foster, and Greenaway, 2006; Thompson and Rushing, 1999; Deardoff, 1992; Rapp and Rozek, 1990). However, review of the impact of IPR protection in developing countries is still mixed. Even in countries with long traditions of IPR protection, researchers have not been able to clearly establish the causality of IPR systems on economic development (Granstrand, 1999).

The advent of TRIPS and the near-universality implication of this global IPR system necessitates careful scrutiny of this Agreement on developing countries. This paper attempts to build a TRIPS-compliant index

^{*}PhD Candidate at the EPFL-CDM-CEMI, Lausanne, Switzerland. Contact information: École Polytechnique Fédérale de Lausanne (EPFL), CDM-CEMI, Odyssea Station 5, CH-1015, Lausanne. E-mail: intan.hamdan@epfl.ch; office tel. #: +(41) 21 693 0037.

[†]I would like to thank Josefita Pardo de Leon, Fernando Pierola, Marisa Goldstein and Will Meredith for their kind help and comments. All errors remain my own.

¹Hereinafter referred to as TRIPS or the Agreement.

to serve this purpose by tracking developing countries' compliance with this multilateral agreement. This paper attempts to track developing countries' compliance with TRIPS and builds a TRIPS-compliant index that would be useful for economic analysis and research. I examine the legislations, various IPR-specific reports and consult practitioners and legal experts, wherever possible, to achieve this goal. My research focuses on member countries who have acceded to the World Trade Organization² in the year 1995 and examines how the IPR regimes in these countries have changed in-line with their TRIPS obligations. The results of this research work will later be used to analyze the impact of the TRIPS agreement on economic activities.

Preliminary analysis of the data collected show three implementation trends. Firstly, almost all countries availed themselves to the transition periods afforded by the Agreement and in most cases have exceeded the time limit imposed by the transition period, excluding the LDCs. Secondly, implementation efforts of developing countries vary, and not necessarily because of their income levels. And lastly, countries in regional trade agreements (RTAs) include IPR obligations tend to have their compliant legislations in place sooner than those who are not. The results collected in this study show that TRIPS does imply a convergence of global IPR protection across countries, and that the implementation of this Agreement is an external factor that is not entirely influenced by the country's level of economic development.

The rest of the paper is structured as follows. Section 2 argues in favor of a new TRIPS-compliant index and provides an overview of available IPR indexes. Section 3 describes how implementation of the TRIPS agreement changes the global IPR landscape. Section 4 explains how the index is constructed and discusses some drawbacks of the index. The penultimate section analyzes the results of the data collected on various IPR legislations and the final section concludes.

2 Cross-country IPR regimes

The following paragraphs highlight the need for a new index that adequately captures the Agreement and overviews other IPR indexes. Certain methods of the existing IPR indexes are used to construct the new TRIPS-compliant index, which is expounded in Section 4.

2.1 Need for TRIPS index

There are many IPR indexes available today but none of them can be used to analyze the impact of the Agreement on economic activities. These indexes do not capture the scope and the implementation timing of TRIPS, thus incorrectly measuring the existing regimes in the countries studied.

TRIPS identifies seven categories of IPR and outlines the respective scopes of protection. Available indexes focus on patent protection and at times use membership to international IPR agreements as proxy for the local IPR regimes. Two problems arise with these methods. Firstly, countries party to the Paris

²Hereinafter referred to as WTO.

Convention on industrial property rights, for example, are likely to fall short of compliance with TRIPS, as is shown in Section 3. Secondly, focusing on patent protection ignores other IPR categories that should influence innovative activities in various sectors of the economy. For example, computer software is protected as literary works under copyright of TRIPS and not necessarily under patent, while circuit board is covered by layout designs of integrated circuits. Solely focusing on patent strength would capture activities of patent-specific industries such as pharmaceuticals and chemical products and omit other industries that do not rely on patent for protection of their intellectual property.

The implementation of the seven IPR categories identified by TRIPS is usually staggered across different years. Use of the transition periods, legislative procedures, budget, expertise and other constraints influence the implementation times of any one of the IPR types. Thus indexes that attempt to capture TRIPS implementation effort by using WTO membership as proxy disregard the transition periods given to developing countries, and would incorrectly identify the date when the Agreement would take full effect. Countries chosen for study in this paper are WTO members since 1995 and yet most of them only begin to fully comply with their TRIPS provisions from the year 2000 onwards. Several countries have not complied with their obligations despite passing the transition period deadline. Jamaica is a prime example of member countries that have not managed to reach full TRIPS compliance by the deadline imposed.

Therefore, any research that attempts to study the influence of this Agreement has to consider all seven IPR categories and note the implementation times of these categories correctly.

2.2 Other IPR index

Attempts in quantifying the strength of IPR have been predominantly based on three types: legislation- and survey-based approaches, and combinations of the two. The legislation-based approach has been criticized for overestimating the level of protection accorded because it does not take into consideration the enforcement of those rights. On the other hand, the survey-based approach with its connectedness to the professionals are argued to be subjective, relying on the way the questions have been posed and possibly reflecting some “ideological tendencies” as mentioned by Kauffman, Kraay, and M. (2004).

Legislation-based patent index was pioneered by Gadbow and Richards (1988) and later followed by Rapp and Rozek (1990). This index notes whether a country’s IPR legislation is in conformity with the minimum standards of IPR proposed by the U.S. Chamber of Commerce Intellectual Property Task Force (1987), ranging from 0 (absence of IPR protection) to 5 (full compliance with the minimum standards of the US Chamber of Commerce). Rather than focusing on national legislations, Ferrantino (1993) built an index using membership in WIPO basic conventions as an input measure of IPR strength for 75 countries. Later, Ginarte and Park (1997) constructed the most widely used IPR-index to date which uses both national patent legislations and membership to international IPR conventions, which covers large number of countries over the period 1960 – 1990 and allows for variations in cross-country patent laws (Maskus, 2000). The criteria used to measure the strength of a country’s patent regime are (i) membership in international treaties,

(ii) extent of patent coverage, (iii) restrictions on patent rights, (iv) enforcement and (v) duration of the patent protection. Updating this widely used index, Park and Lippoldt (2007) constructed three indexes that incorporates elements of TRIPS by increasing the scope from patent-specific to include trademark and copyright legislations. However it falls short of being TRIPS-compliant mainly because of the double-counting of memberships in international treaties. The TRIPS agreement references both the Paris and Berne convention, basically incorporating main elements of those treaties into the TRIPS. Therefore, tracking a country's membership of both the Paris and Berne convention in addition the TRIPS agreement is redundant.

Lee and Mansfield (1996) conducted the first survey-based IPR index, which asks 100 major U.S. multinational firms how a country's IPR regime affected its investment strategy in the host country, i.e. transfer of technology to wholly owned subsidiaries, investment in joint ventures with local partners or licensing of technology, and averaged the responses for 14 developing countries. Seyoum (1996) and Ostergard (2000) followed this method to construct their respective IPR indexes. These surveys were oftentimes over a specific time period, making it difficult to assess the dynamic impact of IPR protection. The ongoing surveys on the strength of IPR across different countries by the World Economic Forum (WEF) and the IMD correct this time period problem. The WEF questionnaire is posed to market participants of both developing and developed countries on the strength of IPR protection in their respective countries. It asks the question, "[I]ntellectual property protection in your country is: (1=weak or non-existent, 7=equal to the world's most stringent)" to professionals residing in those countries. The result of the survey is published in their annual Global Competitiveness Report. The IMD questionnaire, on the other hand, queries whether IPR "are adequately enforced" to senior business leaders in those respective countries, ranging from 1 to 10 with 10 being the highest achievable score.³

The problems associated with the legislation- and survey-based indexes may be addressed by using the two approaches together. Kondo (1995), Sherwood (1997) and Smarzynska Javorcik (2004) were the first few. Kondo built his index based on a similar criteria used by Ginarte and Park (1997) and weighted each subcomponent of the patent regime using results from market practitioners' input on the enforcement level. Sherwood probably offers the most extensive coverage in determining the strength of nations' IPR regime by examining issues of copyright, patents, trademarks, trade secrets, life forms in addition to enforceability, administration, public commitment and international treaties signed of the IPR regime. However, only 18 developing countries were covered and the weights assigned to the components of IPR regime were based primarily on his personal knowledge and personal interviews with professionals from those countries. Smarzynska Javorcik (2004) built on the Ginarte and Park (1997) index but added the element of enforcement by accounting for countries that have been flagged by the United States' *Special 301* as countries that have weak IPR regimes. Lastly, there is the index created by Lesser (2002) which used secondary data to build a patent-specific, but TRIPS compliant, index. Lesser then used factor analysis to weight the important of each criterion and allocated the aggregate factor values to weigh each criterion in his construction of the IPR

³A simple Pearson pairwise correlation shows that the IMD and WEF survey results are strongly correlated.

index, cross referencing them to responses from a survey sent to patent attorneys and licensing executives of agricultural and pharmaceutical firms in the United States and Europe.

There have been attempts at looking at the implementation of TRIPS such as those undertaken by Musungu and Oh (2006) and Thorpe (2002). Both papers aim to study the use of TRIPS flexibility by developing country members. Musungu and Oh (2006)'s paper focuses on public health issue and thus considers patent-related information only. Thorpe (2002)'s research is more exhaustive in that he surveys different countries in different regions and analyzes the patent, copyright and related rights, and undisclosed information. Unfortunately these study papers only examine the current legislations in force, exclude the exact date of implementation and omit other IPR categories in their studies. Thus there have not been an IPR index that adequately captures the TRIPS agreement, as this paper attempts to do.

3 Change in global IPR landscape

TRIPS agreement changes the global IPR landscape, harmonizing and setting the minimum level of protection for intangible goods and services. It identifies seven IPR categories: (i) copyrights and related rights, (ii) trademark; (iii) geographical indications; (iv) industrial designs, (v) layout designs of integrated circuits, (vi) patents, and (vii) undisclosed information, which are above and beyond the pre-existing international IPR conventions. For each of these categories, the WTO principles of most-favored nation (MFN) and national treatment basis are applicable, unlike in before when reciprocity was a principle for extending IPR protection to foreigners.⁴ TRIPS' enforceability at the multilateral level due to the effective dispute settlement mechanism of the WTO represents a credible threat to comply with the obligations (Watal, 2001; Gervais, 2003). Therefore, the harmonized scope of IPR protection and its enforceability would lead toward convergence of IPR regimes across developing countries. Furthermore, this convergence should be relatively independent of the respective countries' economic development because implementation deadlines imposed.

3.1 Pre-TRIPS

National IPR landscape prior to the TRIPS agreement seemed more flexible, with countries implementing the IPR provisions when it was in their national interest. For example, Hong Kong, Singapore, South Korea and Taiwan adopted "soft" IPR regimes, enabling themselves to adopt, adapt and assimilate technologies from developed nations (Kumar, 2002). Some of the other developing countries were more inclined to adopt the IPR systems of their former colonial rulers than build a system suitable to their own. For example, South Africa, Kenya, Zambia, Namibia, Swaziland and Morocco had a few TRIPS compliant legislations before the WTO agreement was signed in 1995. However, enforcement of these IPR legislations were oftentimes

⁴MFN and national treatment are principles of the WTO trading system. Simply put, MFN rule obliges each member country to treat every one of its trading partner as its closest partner, while national treatment policy requires that every foreign trader should be treated like a local one.

weak because of limited resources and/or lack of political will. As a consequence there was a noticeable and significant relationship between the extent of IPR protection and level of economic development, whereby higher income countries provided more IPR protection than lower income countries (Evenson and Westphal, 1997).

Patent protection is an area of IPR where the international agreement governing industrial policy, the *Paris Convention for the Protection of Industrial Property*⁵, accords considerable policy room for developing countries to apply the rules according to their country's level of economic development or to meet specific industrial policy. India used to protect process and not product patenting of pharmaceutical products, thus creating a legal condition for local pharmaceutical companies to produce generic versions of branded drugs. Surveying the IPR regimes in a selected number of countries, a WIPO submitted document to the WTO show that only three of the 42 developing countries had patent protection for the duration of 20 years, notably South Africa, Zimbabwe and Nigeria (WIPO, 1988). In addition, exclusion of patent protection in areas such as life forms, pharmaceutical and agriculture chemical products, and computer programs were norm, as they depended on each country's perception of patentability. TRIPS agreement has broadened the scope of protection conferred to patented inventions by: (i) protecting process *and* products; (ii) applying this to all technological fields; and (iii) setting a minimum duration of patent protection. However, strengthening patent protection is not the only change that TRIPS has imposed on developing countries.

In the following subsection 3.2, I expound on the main differences between TRIPS and other international IPR conventions, elucidating on how the global IPR landscape is changing under this Agreement.

3.2 Modification in IPR protection

The main multilateral IPR agreements and the practices during the negotiation time period of the Uruguay Round shaped the language and rights of members of the TRIPS agreement. These agreements were the Paris Convention governing industrial property and trademark, *Berne Convention for the Protection of Literary and Artistic Works*⁶ and *Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations*⁷ on copyrights and related rights. A then-recent international agreement on integrated circuits, the *Washington Treaty on Intellectual Property in Respect of Integrated Circuits*⁸, was also included in the TRIPS text. TRIPS merges the scope and breath of protection outlined in these agreements, as well as the practices related to the implementation of these conventions, and formalizes them under one umbrella. Thus obligating members of the WTO to comply with relevant provisions of these agreements, even if they were not formerly signatories to the agreements aforementioned. The new obligations imposed by TRIPS narrow the policy room for many developing countries to tailor their IPR system according to their development needs.

⁵Hereinafter referred to as Paris Convention.

⁶Hereinafter referred to as the Berne Convention.

⁷Hereinafter referred to as the Rome Convention.

⁸Hereinafter referred to as the Washington Treaty. Also known as the IPIC treaty.

3.2.1 Patents

Patent protection under the Paris Convention included both products and processes in all fields of technology but allows member countries to determine their own standards of protection in regards to duration of protection, patentable subject matters and exceptions to patent rights, as long as the principles of national treatment is consistently applied throughout. TRIPS incorporates substantive elements of the Paris Convention but curtails the flexibility accorded by the Paris Convention. All WTO members have to ensure that the duration of patent protection is set at 20 years from date of patent application filing, instances in which suspension of the protection could be invoked are limited, exceptions to subject matters excludable from patenting are clearly defined, and patentees rights are extended to include associated rights of offering for sale or importing.

In general, TRIPS' provision on patent protection is applicable to both product and process inventions for all technological fields except for certain subject matters that are considered public goods, biologically occurring products and processes of plants or animals, and any methods for treatment of human or animals. Plant varieties are protected either under patent or by an effective *sui generis* legislation. Additional five years of transition time is accorded to developing countries that have not provided patent product protection for an area of technology on the enforcement date of their TRIPS obligations, i.e. 1st January 2000.⁹ Specifically, developing countries that have not provided protection for pharmaceutical and/or agrochemical products prior to 1st January 1995 are required to set up a *mailbox* system of patent application and provide exclusive marketing rights (EMR) from the 1st January 1996 (TRIPS Art. 70.8).¹⁰ Failure to comply with this provision implies non-compliance with the agreement even when developing countries are accorded transition periods to phase in the TRIPS-compliant IPR regime (see WTO (1997)'s *India-Mailbox* dispute).

3.2.2 Undisclosed information¹¹

Undisclosed information was not a category of IPR protection until the TRIPS agreement.¹² It was oftentimes protected by general civil law or tort, contract and/or criminal laws in many countries. At the international level, reference to its protection was mandated by Art. 10*bis* of the Paris Convention particularly vis-à-

⁹For LDCs this implementation period is extended to 1st January 2016 because of the Doha Ministerial Declaration.

¹⁰Under the *mailbox* system, a mechanism is set up to allow for the filing of patent applications of pharmaceutical or agrochemical products. The patent application would be reviewed from the date on which patenting in the field of pharmaceutical and agrochemical products are allowed. Once an application is subject to the mailbox application and it has obtained marketing approval then that product will be granted EMR for five years, a right that is similar to patent protection (Watal, 2001).

¹¹Also referred to as "trade secrets", "confidential information" and the like in many national laws. The term "undisclosed information" was purposely chosen by negotiating parties of the Uruguay Round of negotiations so as to avoid referring to expressions of any legal system (Gervais, 2003).

¹²During negotiations, developing countries did not recognize undisclosed information as an IPR category and were against its inclusion. They argued that extending protection to this subject matter would push their obligations beyond patent protection because of the limitless term of protection accorded to this category and the absence of disclosure tradeoff for protection, unlike patents (Watal, 2001).

vis unfair competition, whereby the information is safeguarded from misappropriation in an unauthorized manner. TRIPS underscores the importance of undisclosed protection by setting it as an IPR category and extending it to include data submitted to governments for marketing approval of pharmaceutical and agricultural chemical products.

There are two parts to protecting undisclosed information under the agreement: the general need to protect information that is secret and valuable, and the requirement to protect information disclosed for marketing approval from the government. It is defined as information which was generated from a specific investment, considered valuable, known to few people in the industry, and where effort has been undertaken to maintain its secrecy. As for data submitted to governments for marketing approval, the data has to be undisclosed, the product tested to generate the data uses “new chemical entities”, and “considerable effort” has to be spent to produce the data. These information are protected for as long as they are not revealed by the owner or an independent third party.

The implementation of TRIPS Art. 39.2 on secret information is likely to be straightforward, since many have already provided protection for this category. But the differing interpretations and implementations of Art. 39.3 on data submitted to governments and their respective agencies could lead to varying treatments of protection of data submitted for marketing approval across WTO members. Firstly, it is unclear if protection under this IPR category requires “exclusive rights” protection. If the protection mandates exclusive rights protection, then the common practice in developing countries of allowing for the sufficiency of establishing bioequivalence for generic drugs with the original test data would no longer be acceptable, for a specific time period. Secondly, the ordinary reading of Art. 39.3 could be interpreted as mandating protection only to “new chemical entity”, implying that new uses of existing chemical product would not be covered, which can be controversial for some other member countries, such as the United States (Correa, 2002).

3.2.3 Copyrights and related rights

The Berne Convention was the highest protection afforded at the international level for copyrights before TRIPS. It mandates that all literary and artistic works that meet the originality and intellectual creation criteria should be protected automatically from the date of creation without subject to any formalities for the duration of the author’s lifespan plus 50 years. A separate duration of at least 25 years is extended to works of applied arts and industrial design, although members are allowed to determine the extent of application and conditions of this protection. Brazil, for example, protected computer programs as works of applied arts and thus applied the 25 year protection. More importantly, the Berne Convention allows for broader scope of exceptions to copyright protection and provides flexible implementation obligations to developing countries. A predominant exception practiced by many countries is the *fair use* doctrine where use of the copyrighted material is sanctioned in instances of private, not for profit and educational purposes, i.e. uses that generate positive spillover (Blair and Cotter, 2005). The appendix to the Berne Convention outlines special provisions applicable to developing countries. For example, translation of copyrighted materials into

the national language is allowed if it meets the 3-step criteria for limited uses of exceptions to copyright.¹³

Related rights, also known as neighbouring rights, is mainly governed by the Rome Convention. It obliges protection of performers, producers of sound recordings and broadcasting organization for 20 years from the date of performance, broadcast or fixation without subject to any formalities. Protection includes the right to control the reproduction of their work. The Convention, however, did not offer any enforcement provision in case of infringement but most countries offered civil remedies.

TRIPS combines the rights of copyrights and related rights under one heading, thus merging relevant elements of the Berne and Rome Conventions. However, the marginal addition and legal clarifications of TRIPS provisions on copyrights and related rights, as well as the compliance of many developing countries with the pre-existing international laws on this subject matter made this the least controversial IPR category of TRIPS. Nevertheless, there were some oppositions from developing countries in regards to the obligations under rental rights (Art. 11) and related rights (Art. 14). Art. 11 of TRIPS introduces rental rights protection for computer programs and sound recordings, which most developing country negotiators considered as a Berne-plus obligation. Furthermore, Watal (2001) states that Art. 14 of TRIPS on related rights creates new obligations that are higher than those mandated by Rome Convention but points out that this was not met with much resistance from several of them as they were already providing such protection.

3.2.4 Layout designs of integrated circuits

Protection of layout designs of integrated circuits is a relatively new addition to the global IPR system. The upsurge in United States' semiconductor companies and export to other countries gave rise to this protection. At the time of Uruguay Round of negotiations, the Washington Treaty governed the protection of this IPR category at the global level. However lack of adequate number of ratifications by members of this treaty ensured that the treaty did not come into force.¹⁴ TRIPS remedies this situation by enforcing it as part of the IPR package. In addition, TRIPS expanded the scope of protection to include protected designs and set the term of protection for a minimum of 8 years from filing date or date of first commercial exploitation.

Layout designs of integrated circuits protects the configuration of a circuit board, whereby changes made to the board increases its functionality. These changes oftentimes require high degree of skills and large amount R&D, thus qualifying it for patent protection in some jurisdictions.

3.2.5 Industrial designs

Industrial designs protection has been protected under the Paris Convention and is included as an IPR category. Prior to TRIPS, countries were able to protect industrial designs with copyright laws, unfair

¹³The 3-step test used to establish if the instance to avail to copyright exception is: (i) granted in special cases only; (ii) not conflict with normal exploitation of work; and (iii) not unreasonably prejudice the legitimate interests of the author.

¹⁴Developing countries were actively participating in the negotiations of this treaty, and thus reflected many of its views. However, the United States and Japan did not sign onto the treaty as it was perceived as providing inadequate protection level (Gervais, 2003; Watal, 2001).

competition or by establishing *sui generis* legislation on the matter. Protection in this area is in regards to the aesthetic, and sometimes functional, aspects of any product that is industrially produced. It can also be protected under copyright laws, thus obtaining concurrent and simultaneous protection. However unlike copyright, protection under industrial designs safeguards from independent development of similar design.

TRIPS did not create additional obligations under industrial design protection. It merely reinforces the common practices and rules of Paris Convention, whereby the term of protection is for least 10 years.

3.2.6 Trademark and GI

Trademark and geographical indication (GI) protect consumers from being misinformed about the products that they are purchasing due to false advertisements or similar appearances. Trademark has been protected under Paris Convention but is only extended to goods and not services. TRIPS marginally increases the protection level of trademark in both developed and developing countries. It clearly defines trademark, outlines the treatment of well-known foreign marks, and provides limited protection for services trademark (Watal, 2001).

GI was protected under Madrid System for the International Registration of Marks¹⁵ and Lisbon Agreement for the Protection of Appellations of Origin and their International Registration¹⁶ in regards to appellations of origin. Prior to TRIPS, GI was provided by a few countries and there was diversity in the protection methods and standards. TRIPS included GI as one of the IPR categories but left implementation of this particular area to members, with a caveat that members will continue their negotiations in this matter to define its scope and depth of protection.

4 TRIPS index: method

There are eight parts to the TRIPS agreement detailing members' obligations, which upholds the basic tenets of the WTO (part I), highlights the minimum substantive protection in the different IPR categories (part II), outlines the various process procedures to be implemented or modified (parts III and IV), mandates publications of new or modified legislations and that disputes would be conducted under the WTO's Dispute Settlement Understanding (DSU) agreement (part V), sets the transitional arrangements for developing countries (part VI), and describes institutional arrangements and other final details of the agreement (part VII). All of these TRIPS provisions are equally binding but the relevant provisions that pertain to IPR scope and depth of protection are contained in parts II and III.

¹⁵Hereinafter referred to as the Madrid Treaty.

¹⁶Hereinafter referred to as the Lisbon Treaty.

4.1 Data collection

I choose to focus on the substantive elements of the Agreement to capture institutional changes that would affect innovative activities and simplify data collection effort. Procedural aspects of TRIPS is likely to affect the behaviors of IPR users in regards to time for filing or challenges to patent, trademark or copyright grants but they are less likely to affect the undertaking of innovative activities. Compliance with the Agreement is noted when the term of protection for each of the IPR category reflects those mandated by TRIPS.

Data collection of each of the fifty-three developing member countries are based on careful examination of primary and secondary sources and in consultation with IPR experts, wherever possible.¹⁷ Following Lesser (2002), I scour the WTO official documents which reviews members' efforts in implementing TRIPS provisions¹⁸ and cross-reference them with the documents produced by the WTO Secretariat on these members' overall trade policies. These documents, referred to as the TRIPS Review Mechanism and Trade Policy Review reports, are reliable sources to note the legislative changes undertaken or soon to be undertaken as they are based on members' own submissions and the WTO Secretariat's objective research. I note compliance of each IPR category based on whether the legislation reported meets the minimum term of protection mandated by TRIPS. When the minimum required term of protection is met, I note the name of the legislation mentioned and consult WIPO's Collection of Laws for Electronic Access (CLEA) database for the year that the legislation is implemented.¹⁹ I use the *implementation* instead of the *in force* dates of the legislation because this is when everyone is made aware of the new or modified legislation.²⁰ Furthermore, for most countries the *implementation* and *in force* dates are within the same year except for low income and a few other countries. This finding will be further discussed in the following Section 5.

The method I propose in this paper is ideal because it takes into consideration the transition period offered by TRIPS for developing countries. An additional time period of four years is accorded to countries considered as *developing*, and ten years for least-developed countries from the 1st January 1996.²¹ The Doha Ministerial Conference allowed LDCs a further extension until 1st July 2013 to ensure that complete TRIPS-compliance.

¹⁷There are forty-four developing countries members of the WTO that acceded to the organization on the 1st January 1995. I drop Central African Republic, Myanmar and Zimbabwe because these countries are experiencing political unrest and thus are unstable. I then added Jamaica, Guatemala, Colombia, Egypt, Madagascar, Malawi, Nicaragua, Poland, and Turkey to add diversity to the sample. These countries acceded to the WTO over the course of 1995, and thus are able to use the transition period for implementation according to their income levels.

¹⁸This includes the question and answer portion of the TRIPS Review Mechanism.

¹⁹There are two dates that corresponds to legislation - the *implementation* and *in force* date. The *implementation* date is usually the date wherein which the legislation is signed and approved, while the *in force* date refers to when the legislation comes into force.

²⁰I assume that all agents would make their decisions on all information available to them during that period. And thus, even if a legislation may not be in force, the important fact is that the agent expects the legislation to be in force within a specific time period and thus will base her future actions on the information she has today.

²¹The WTO follows the United Nation's categorization of least-developed countries (LDCs). However, the status of *developing* country is based on self-selection.

4.2 Creating the index

Copyright, trademark, geographical indication, industrial designs, patents, layout designs of integrated circuits and undisclosed information are the seven categories of IPR identified by TRIPS. For each of the categories mentioned, I create dummy variables to reflect members' compliance with the respective terms of duration. I assign 1 to the category, and 0 otherwise, if the IPR legislation mandates the protection term that is in-line with the Agreement. I create three subsections for under the headings of patent and copyright and related rights, and two subsections for the undisclosed information because of the additional demands imposed by the Agreement on these IPR categories.

The three subsections created under the patent heading accommodates the obligation to provide 20 years term of patent protection, including extension of the patent protection to pharmaceutical and agricultural chemical products, and the *sui generis* plant varieties legislation. Data collection of dates for implementation of these three patent subsections show time implementation discrepancies. In comparison to the 36 member countries who currently offer the 20-year patent protection term, 12 members have different date of implementation for pharmaceutical and agricultural chemical products, while for plant varieties there are 26 members.

Copyright and related rights category in TRIPS refers to the copyright law as protected under Berne Convention and related rights, which falls under Rome Convention. Given that most countries were already complying with the main Berne Convention provisions, I note TRIPS compliance when the country meets the additional obligations imposed by the Agreement. These additional obligations that were not specifically covered in the Berne Convention are the treatment of computer programs as literary works, inclusion of rental rights and related rights. These add-ons raise the level of protection on copyrights and related rights and are important economic perspective. Firstly, protecting computer program as literary work entails longer term of protection. Secondly, rental rights obligations on computer programs and cinematographic work are important in countries where rampant pirating of these works render the copyright protection useless (Watal, 2001). And lastly, protection of performers, producers of phonogram and broadcasting organizations rights ensure adequate legal protection for these entities. Therefore, I count these add-ons as my three subsections towards compliance under the copyright and related rights category. Six and seven countries of those that implemented the treatment of computer programs as literary works have different implementation dates of rental rights and related rights, respectively. This shows that these add-ons should be considered separately.

I also treat undisclosed information differently from the rest of the IPR categories. *Undisclosed information* is broken down into two subsections because of the protection afforded by TRIPS under this heading. It is defined by TRIPS as information kept secret plus data submitted to governments and their respective agencies for marketing approval. Information kept secret, oftentimes referred to as *trade secret*, has previously been protected by governments under contract law or even under common law as part of the unfair competition policy. However there has been differing approaches to the protection of data submitted to governments for marketing approval. In most of the developing countries studied, there has not been any

expressed protection of data submitted for marketing approval. And for those countries that did provide for this particular protection, most national health authorities have allowed the use of this data to establish bioequivalence of a similar product.²² The results of the data collected under undisclosed information category show that some 14 odd-countries out of 37 member countries that do provide TRIPS-compliant trade secret compliance did not implement data submitted for marketing approval protection until later.

Noting compliance of the remaining IPR categories, trademark, layout designs of integrated circuits, industrial design and geographical indication are more straightforward than the earlier three categories. I consider these categories as TRIPS-compliant when the term of protection as listed by TRIPS is implemented in the national legislation, as mentioned earlier. Table 1 shows how the TRIPS index is calculated.

IPR Category		Total
Copyright and related rights		1
<i>Computer program</i>	$\frac{1}{3}$	
<i>Rental rights</i>	$\frac{1}{3}$	
<i>Related rights</i>	$\frac{1}{3}$	
Trademark		1
Geographical indications		1
Industrial designs		1
Patents		1
<i>Patents</i>	$\frac{1}{3}$	
<i>Pharmaceutical patents</i>	$\frac{1}{3}$	
<i>Plant varieties</i>	$\frac{1}{3}$	
Layout designs of integrated circuits		1
Undisclosed information		1
<i>Trade secrets</i>	$\frac{1}{2}$	
<i>Data submission</i>	$\frac{1}{2}$	
Total		7

Table 1: TRIPS index method

Table 1 summarizes how a country's IPR legislations sum towards its TRIPS-compliance index number. Each of the seven IPR categories enter the index unweighted, reflecting the equal importance of each provisions considered under international law and practice.²³ This index ranges from 0 to 7, from non-compliance

²²Interestingly, protection of data submitted for marketing approval of pharmaceutical or agricultural chemicals was an attempt by the United States negotiators to curb the use of data collected by its pharmaceutical and chemical industries by generic producers and other competitors.

²³Every part of this Agreement is technically equally binding. Thus, there is no hierarchy between enforcing either *Trademark* and *Undisclosed Information* rights. This is referred to as the principle of effective interpretation. (See Appellate Body Report, WTO (1999).

to full TRIPS compliance. Full compliance, or an index total of 7, implies that the country has legally met TRIPS obligations, while 0 implies that the particular country has not yet undertaken any efforts to comply with the Agreement. It allows us to see how far these developing countries members have implemented their TRIPS obligations over the time studied (1994 – 2007).

However, the index does not necessarily reflect the strength of the country’s IPR regime. Each incremental increase of the index only reflects the country’s implementation effort with any one of the seven IPR categories, in no particular order. Strength of these IPR provisions depend on the government’s willingness to enforce the legislation, the judicial system and the ability of the IPR holders, as well as the challengers to IPR grant, to bring their case to court.²⁴ For the purpose of this paper, the index in its current form is adequate.

I discuss and analyze the results of this compilation of IPR legislations of the fifty-three countries in the following section.

5 Analysis of data collected

I examine and cross-check the IPR legislations, Trade Policy Reports and TRIPS Review Council documents of fifty-three countries to build the index necessary for this paper. The sample consists of countries from the European (7%), Asian (21%), African (32%) and Latin American and Caribbean (40%) continents with varying income levels. Most of the countries in the sample are classified as upper-middle (36%), lower-middle (34%) and low income countries, high income countries only account for 3%. There are seven LDCs among the countries studied, all from the African continent except for Bangladesh, in Asia. I subdivide the countries by region and income levels to get a comprehensive picture of the efforts undertaken. The result of the data collection effort below refer to the legislations in those countries that are *in force*. Approximately 12 countries have TRIPS-compliant legislations that are not *in force* and so I omit them from the information presented below.

Data compiled using the method described earlier in Section 3, provide an interesting picture of how developing countries have been implementing their obligations under TRIPS agreement. Three trends appear from these countries’ implementation activities. Firstly, almost all countries availed themselves to the transition periods afforded by the Agreement and in most cases have exceeded the time limit imposed by the transition period, excluding the LDCs. Mexico, Romania, and South Africa of the developing countries and Côte d’Ivoire of the LDCs are the few that have implemented their TRIPS obligations before the deadline. The figures in the appendix show to this effect.

Secondly, implementation efforts of developing countries vary, and not necessarily because of their income levels. Figure 1 shows the evolution of TRIPS-compliant legislation implemented in these African countries

²⁴These may include, but are not limited to, opposition of patent grant procedures, legal fees, and the transparency of IPR system.

from the years 1994 until 2007. The two dotted vertical lines in the figure mark the original deadlines for developing countries and LDCs, 2000 and 2006 respectively.²⁵ South Africa, Morocco and Côte d'Ivoire are the only African countries that have managed to fully become TRIPS-compliant by the year 2000 deadline, and they are from upper-, lower-middle and low incomes respectively. When examining the implementation efforts of low income countries in Figure 2, compliance does not appear to be completely affected by income level. Furthermore, comparing the efforts of low income countries and upper-middle income countries of Figures 2 and 3 show that the implementation efforts are similar, albeit with a particular caveat. 35% of low income countries are LDCs, which implies that these seven countries are able to postpone the implementation of their TRIPS obligations until 2013. An advantage that most upper-middle income countries have over low-income countries is that they are likely to have more TRIPS-compliant legislations already in place before the WTO agreement was signed and comes into force.

And lastly, countries in regional trade agreements (RTAs) include IPR obligations tend to have their compliant legislations in place sooner than those who are not, as evidenced in Figure 4. The RTAs in question here are the Andean Community, European Communities, OAPI, and NAFTA. This trend lends support to the argument that engagements in RTAs are beneficial and could complement progress at the broader multilateral level.

Pearson pairwise correlation of the TRIPS index with various variables of innovative activities show positive and significant relationship, indicating that there may be links between the institutional change of IPR regime and these activities. Pearson pairwise correlation allows us to see the relationship, if any, between two variables. The advantages of using this correlation to determine the association between two variables is that it does not require that the variables under study to have the same units of measurement and avoids casewise deletion.²⁶ Table 2 shows values of Pearson pairwise correlation of the TRIPS index with the various indicators of economic activities. The columns show the different correlation models for varying income levels.²⁷ Model 1 refers to all of the countries in the sample, model 2 refers to all countries that are not considered high income, model 3 are middle income countries (both upper- and lower-middle incomes), model 4 are low income countries and model 5 are LDCs, a subset of low income countries, each model corresponds to the columns in the table below.

²⁵The new deadline for LDCs is 2013, and 2016 for pharmaceutical and agriculture chemical products.

²⁶For a detailed comparison of casewise versus pairwise deletion see <http://www.statsoft.com/textbook/stbasic.html#ccasewise>

²⁷Note that in the WTO developing country term is politically motivated, however for this paper I refer developing countries as those not considered high income countries, whether in the OECD group or not.

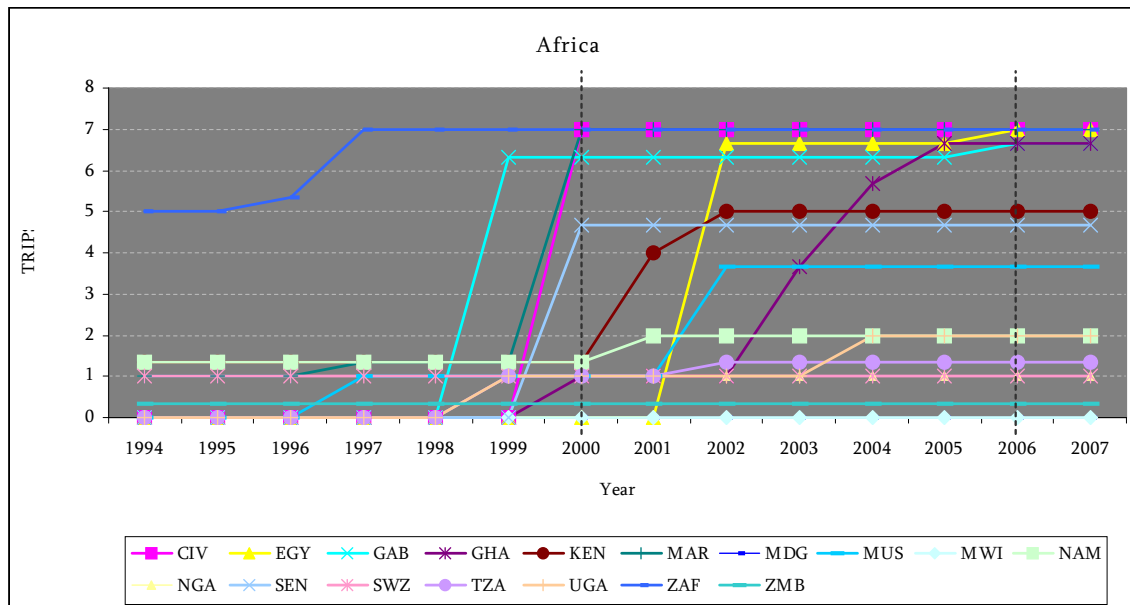


Figure 1: TRIPS compliance for African countries, 1994 – 2007

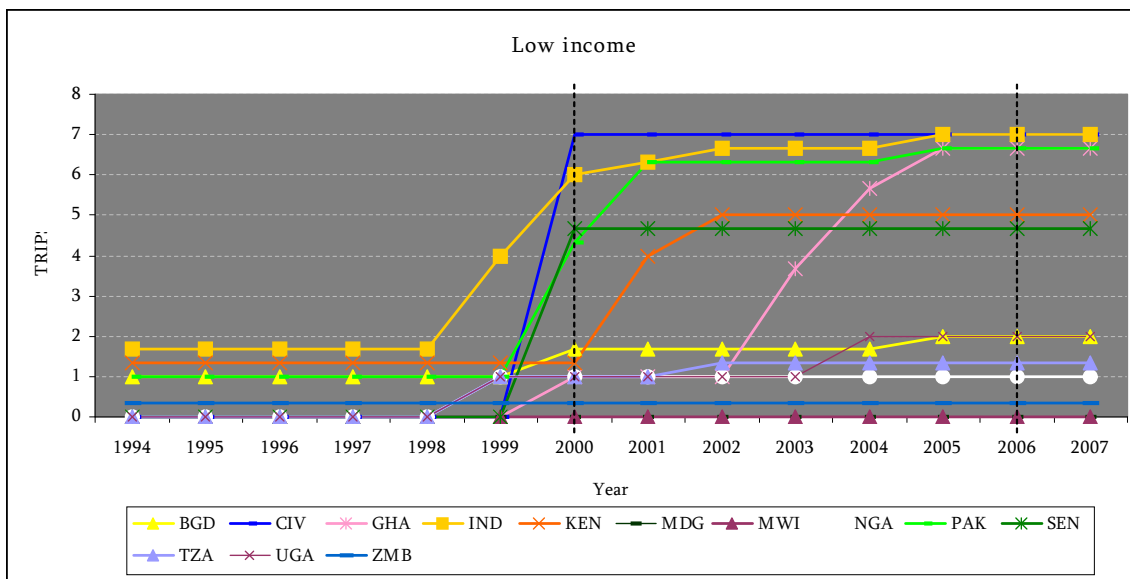


Figure 2: Figure 2: TRIPS compliance for low income countries, 1994 – 2007

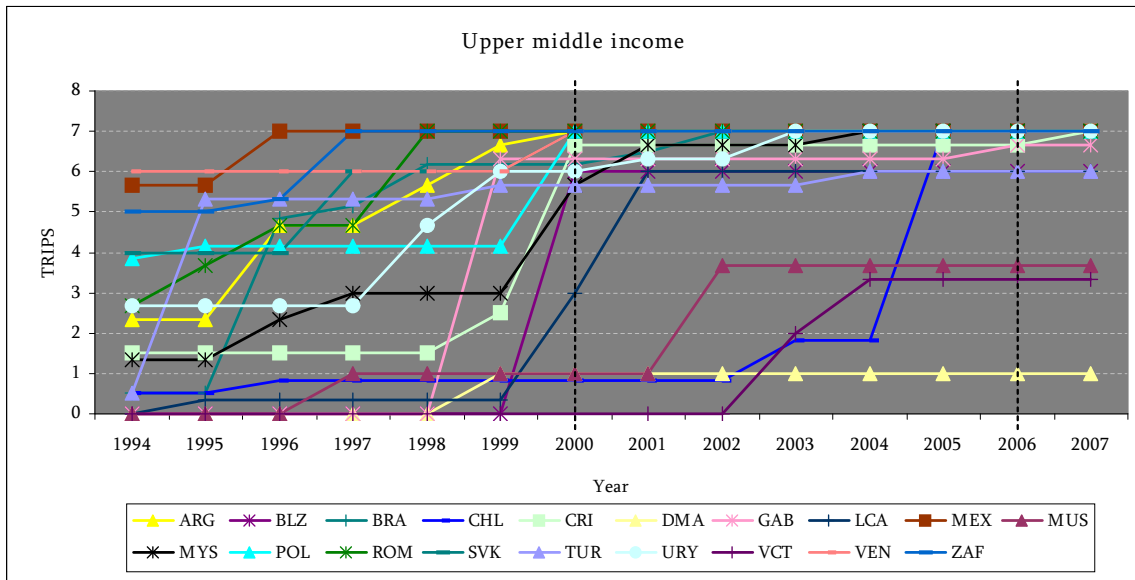


Figure 3: TRIPS compliance for upper-middle income countries, 1994–2007

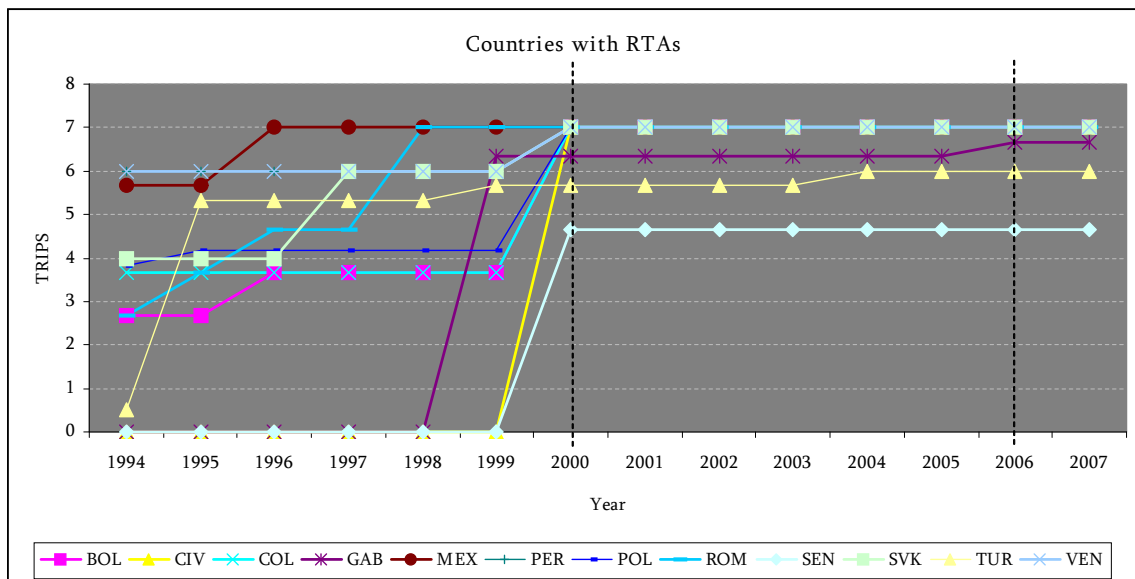


Figure 4: TRIPS compliance for countries with RTAs, 1994–2007

Correlation	TRIPS index				
	1	2	3	4	5
ρ					
FDI	0.2996*	0.3112*	0.2919*	0.2835*	0.1933
High Technology	0.2650*	0.2279*	0.1785*	0.0866	0.1965
Royalties payments	0.2889*	0.3861*	0.3458*	0.4424*	0.0243
Royalties receipts	0.2360*	0.2820*	0.2358*	0.4344*	-0.0517
Trademark nonresident	0.4857*	0.4102*	0.2855*	0.7517*	0.6053*
Trademark resident	0.3358*	0.3284*	0.2735*	0.3788*	0.7921*
Patent filing at EPO	0.1778*	0.2031*	0.3429*	0.3583*	0.1722
Patent filing at JPO	0.1298*	0.1466*	0.2856*	0.3329*	0.1333
Patent filing at national patent office	0.1492*	0.1783*	0.1573*	0.2004	-0.2449
Triadic patent filing ²⁸	0.1444*	0.1396*	0.2889*	0.3295*	0.131
Patent filing at USPTO	0.1556*	0.2074*	0.3656*	0.3980*	0.1814
GDP per capita	0.2932*	0.3662*	0.2332*	0.5788*	0.5541*
% chemical value added in manufacturing	0.0264	0.0333	0.1967*	0.0623	-0.1497
Export as % of GDP	0.077	-0.0751	-0.2309*	0.0196	-0.0103
Trade as % of GDP	0.0243	-0.1419*	-0.2955*	-0.0753	-0.0211

Table 2: TRIPS index correlation table

Examination of Table 2 show that although there is a positive and significant relationship between the TRIPS index and national income per capita, the relationship is not very strong for each of the income categories with correlation varying from 29% to 58%. This simple association test concur with our graphical analysis that the implementation of the TRIPS-compliant regime is not necessarily dependent on economic development level. Across all income levels (models 1 to 4), there is positive and significant relationship between the index and FDI, both royalty payments and receipts, trademark, and patent filings at the EPO, JPO and USPTO. Interestingly, patent filing at the national patent office is positive and significant for models 1, 2 and 3 but not for 4, which consists of low income countries, possibly reflecting some local constraints at these national offices. In addition trade is negatively correlated with the TRIPS index for developing and middle income countries only, showing that as the IPR regime becomes more TRIPS-compliant the net trade moves in the opposite direction; for middle income countries (model 3) there is a negative relationship with export as a percentage of national income. Further examination of the relationship between these values and the TRIPS index is needed to determine if there is a causality affect, and this will be undertaken in future research papers.

6 Conclusion

The purpose of this paper is to track the TRIPS agreement implementation efforts of WTO member countries that are considered developing. As hypothesized earlier in the paper, there is a convergence of IPR regimes across the globe attributable to the WTO's TRIPS agreement. Three trends stand out from the collection effort undertaken for this study. First, almost all countries availed themselves to the transition periods afforded by the Agreement and in most cases have exceeded the time limit imposed by the transition period, excluding the LDCs. Secondly, implementation efforts of developing countries vary, and not necessarily because of their income levels. And lastly, countries in regional trade agreements (RTAs) include IPR obligations tend to have their compliant legislations in place sooner than those who are not.

The TRIPS index compiled for this study will be used in future research studies to examine the impact of the TRIPS agreement on local economic activities.

References

- ARROW, K. (1959): "Economic Welfare and the Allocation of Resources for Invention," *The RAND Corporation Paper Series P-1856*.
- BLAIR, R. D., AND T. F. COTTER (2005): *Intellectual Property Economic and Legal Dimensions of Rights and Remedies*. Cambridge University Press.
- CORREA, C. M. (2002): "Protection of Data Submitted for the Registration of Pharmaceuticals: Implementing the standards of the TRIPS agreement," Discussion paper, South Centre.
- DEARDOFF, A. V. (1992): "Welfare of Global Patent Protection," *Economica*, 59, 35–51.
- EVENSON, R. E., AND L. WESTPHAL (1997): *Handbook of Development Economics* chap. Technological Change and Technology Strategy. Elsevier North-Holland: Volume 3A, Amsterdam.
- FALVEY, R., N. FOSTER, AND D. GREENAWAY (2006): "Intellectual Property Rights and Economic Growth," *Review of Development Economics*, 10(4), 700–719.
- FERRANTINO, M. (1993): "The Effect of Intellectual Property Rights on International Trade and Investment," *Weltwirtschaftliches Archiv*, (129), 300–331.
- GADBAW, R., AND T. RICHARDS (eds.) (1988): *Intellectual property rights: global consensus, global conflict*. Westview Press, Boulder, CO.
- GERVAIS, D. (2003): *The TRIPS agreement: Drafting history and analysis*. Sweet & Maxwell, London, second edn.

- GINARTE, J., AND W. PARK (1997): “Determinants of Patent Rights: A Cross-National Country Study,” *Research Policy*, 26, 283–301.
- GRANSTRAND, O. (1999): *The Economics and Management of Intellectual Property: Towards Intellectual Capitalism*. Edward Elgar.
- KAUFFMAN, D., A. KRAAY, AND M. M. (2004): “Governance Matters III: Governance Indicators for 1996–2002,” Discussion paper.
- KONDO, E. (1995): “The effect of patent protection on foreign direct investment,” *Journal of World Trade*, 29(6), 97–122.
- KUMAR, N. (2002): “Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries,” Study Paper 1b, Commission on Intellectual Property Rights, London.
- LEE, J. Y., AND E. MANSFIELD (1996): “Intellectual Property Protection and U.S. Foreign Direct Investment,” *The Review of Economics and Statistics*, 2, 181–186.
- LESSER, W. (2002): “The Effects of Intellectual Property Rights on Foreign Direct Investment and Imports into Developing Countries in the Post TRIPs Era,” *IP Strategy Today*, No. 5-2002.
- MANSFIELD, E. (1994): “Intellectual Property Protection, Foreign Direct Investment and Technology Transfer,” Discussion paper.
- MASKUS, K. E. (2000): “Lessons from studying the international economics of intellectual property rights,” *Vanderbilt University Law Review*, 53(53), 2219–2240.
- MASKUS, K. E., AND M. PENUBARTI (1995): “How Trade Related are Intellectual Property Rights?,” *Journal of International Economics*, 39(3), 227–248.
- MUSUNGU, S., AND C. OH (2006): “The use of flexibilities in TRIPS by developing countries: can they promote access to medicine?,” *South Perspective Series*.
- OSTERGARD, R. L. (2000): “The measurement of intellectual property rights protection,” *Journal of International Business Studies*, 21(1), 156–178.
- PARK, W. G., AND D. C. LIPPOLDT (2007): “Technology transfer and the economic implications of the strengthening of intellectual property rights in developing countries,” *OECD Trade Policy Working Paper*, 62.
- RAPP, R. T., AND R. ROZEK (1990): “Benefits and Costs of Intellectual Property Rights Protection in Developing Countries,” *Journal of World Trade*, 24(5), 75–102.
- SEYOUM, B. (1996): “The impact of intellectual property rights on foreign direct investment,” *The Columbia Journal of World Business*, pp. 50–59.

- SHERWOOD, R. M. (1997): “Intellectual property systems and investment simulations: the rating of systems in eighteen developing countries,” *IDEA*, 37(2), 261–370.
- SMARZYNSKA JAVORCIK, B. (2004): “The composition of foreign direct investment and protection of intellectual property rights: Evidence from transition economies,” *European Economic Review*, 48, 39–62.
- SMITH, P. (1999): “Are Weak Patent Rights a Barrier to US Exports?,” *Journal of International Economics*, 48(1), 151–177.
- THOMPSON, M., AND F. RUSHING (1999): “An Empirical Analysis of the Impact of Patent Protection on Economic Growth: An Extension,” *Journal of Economic Development*, 24(1), 67–76.
- THORPE, P. (2002): “Implementation of the TRIPS agreement by Developing Countries. Author: Phil Thorpe.,” Study Paper 7, Commission on Intellectual Property Rights.
- VARSAKELIS, N. C. (2001): “The Impact of Patent Protection, Economy Openness and National Culture on R&D Investment: A Cross Country Empirical Investigation,” *Research Policy*, 30, 1059–1068.
- WATAL, J. (2001): *Intellectual Property Rights in the WTO and Developing Countries*. Kluwer Law International, The Hague/ London/ Boston.
- WIPO (1988): *Existence, Scope and Form of Generally Internationally Accepted and Applied Standards/Norms for the Protection of Intellectual Property* WTO document MTN.GNG/NG11/W/24, (May 5, 1988).
- WTO (1997): *India—Patent Protection for Pharmaceutical and Agricultural Chemical Products*.
- (1999): *Korea — Definitive Safeguard Measures on the Imports of Certain Dairy Products (Dairy)* WTO Document WT/DS98/AB/R, para. 81 (Dec. 14, 1999).

A Graphical compliance of countries by region and income level

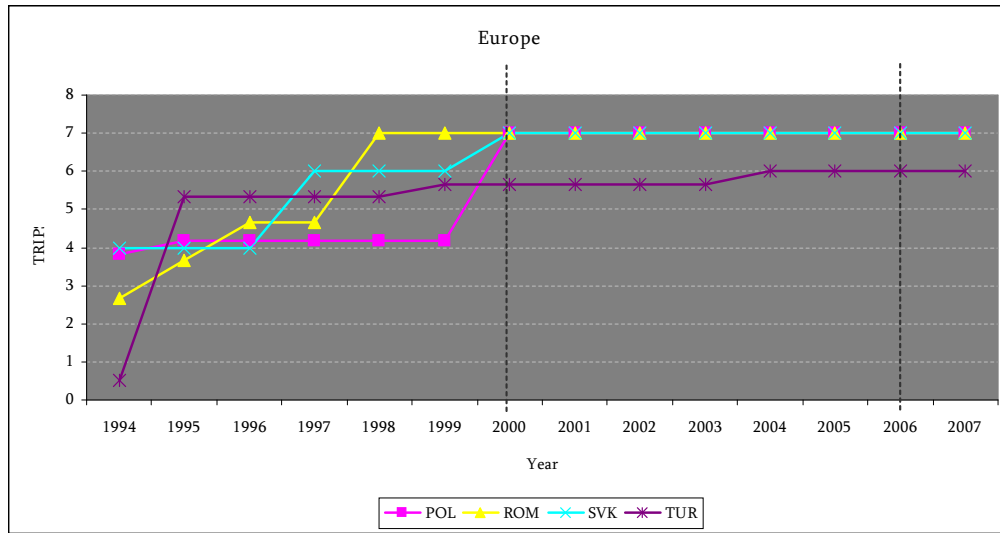


Figure 5: TRIPS compliance for European countries, 1994 – 2007

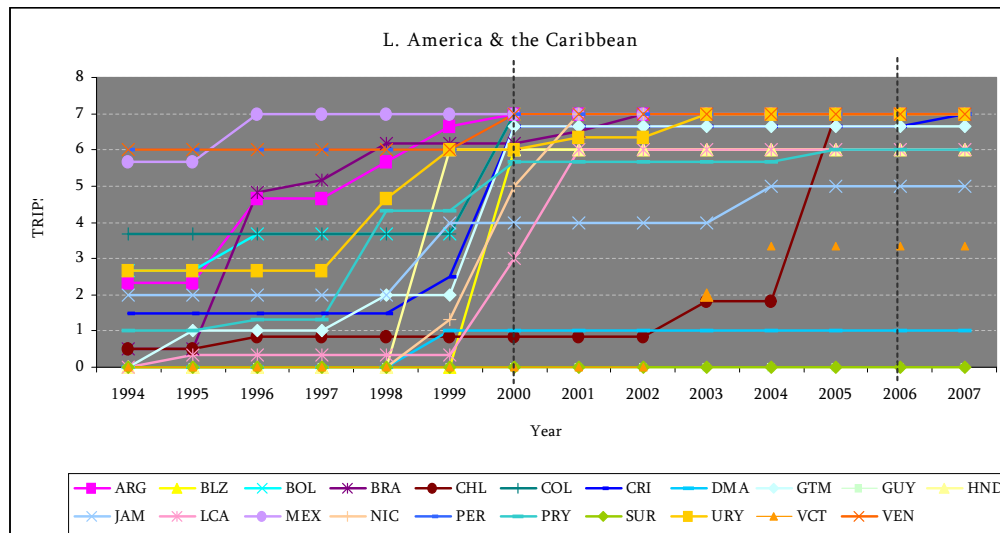


Figure 6: TRIPS compliance for Latin American and Caribbean countries, 1994–2007

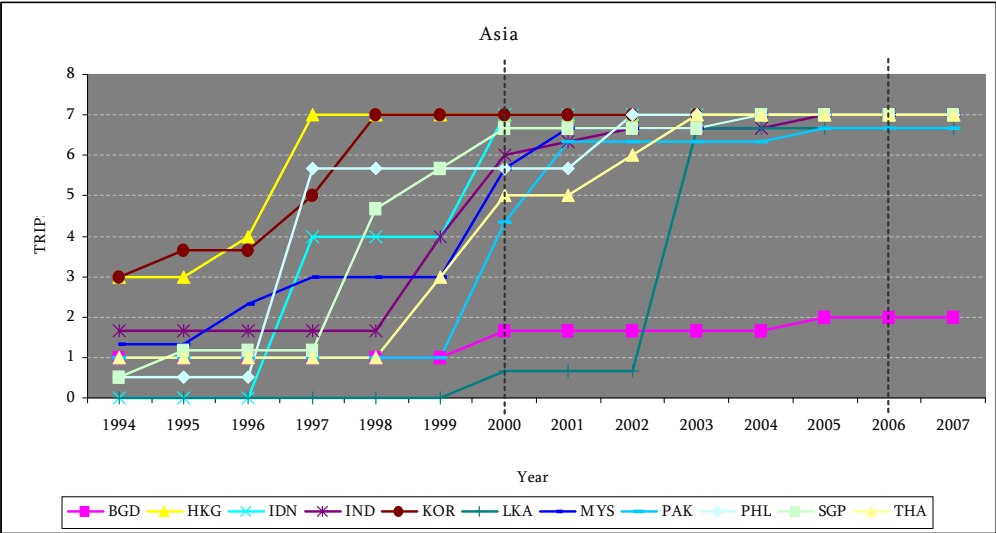


Figure 7: TRIPS compliance for Asian countries, 1994-2007

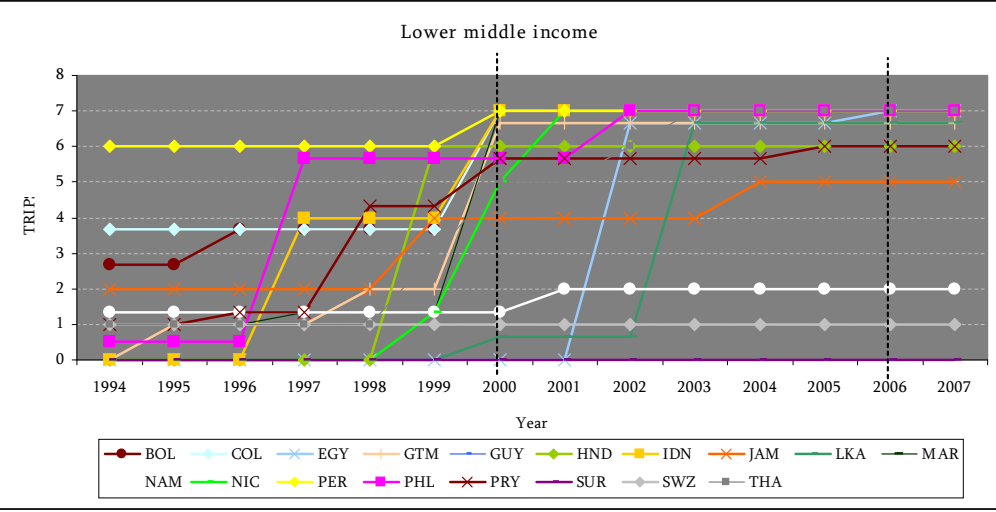


Figure 8: TRIPS compliance for lower-middle income countries, 1994-2007

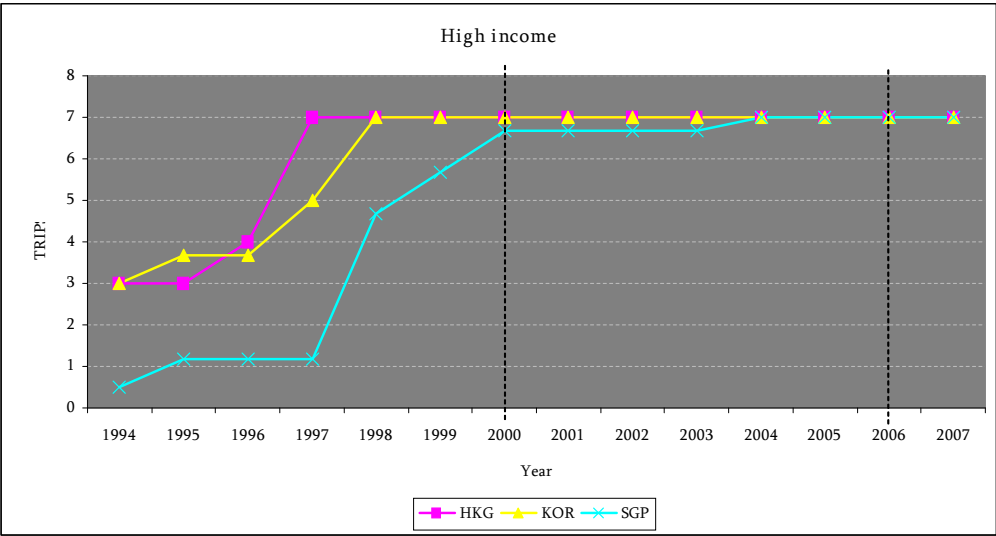


Figure 9: TRIPS compliance for high income countries, 1994–2007