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Review essay

Intellectual property regulation and international trade: national and global economic perspectives

Alexander Cuntz

The WTO, Intellectual Property Rights and the Knowledge Economy ***edited by Keith E Maskus***
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The issue of intellectual property rights (IPR) and international trade has drawn increasing attention among scholars, global managers and policy-makers in recent decades. After screening the ISI Web of Science/Science Citation Index (SCI), about 160 scientific publications from the period 1990–2007 could be identified from the keyword search terms 'TRIPS, WTO, IPR or TRADE' and reasonable combinations of these terms (searched in January 2008). The average growth in this period has doubled the absolute number of published items in each year, with a particularly strong increase at the turn of the century. Recently, the issue has also been embraced by anti-globalization movements and even public opinion.[1]

Global markets and global sourcing for new ideas have forced managers and politicians in the highly industrialized world in the North to intensify their thinking about global intellectual property (IP) protection of research and development (R&D) networks and the protection of innovation life-cycles. In the South, IP has been understood to help initialize and manage the catching up processes of economies, even though the country-specific technological capabilities/infrastructures to absorb know-how and benefit from transfer may differ significantly. Under the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS), World Trade Organization (WTO) members are required to enforce product patents for pharmaceuticals. Many low-income economies claim that patent protection for pharmaceuticals will result in substantially higher prices for medicines, with adverse consequences for the health and well-being of their citizens.

However, this partly contradictory puzzle remains difficult for policy-makers, at either national or international level, to solve. Piecemeal efforts are being made to fully understand the diverse issues at stake. These include the effects of further global harmonization of IP rights and actions e.g. by successfully fighting piracy and counterfeiting of protected IP with improved international enforcement or by protecting via complementary innovation in prevention technologies. Additionally, it is not yet clear whether the transfer of IP is among the most efficient instruments with which to support the development of some Southern countries, even though it may be regarded as a self-sustaining, human capital-related instrument.

The compendium edited by Maskus brings together a range of essays (presented in five chapters) of theoretical and empirical analyses that have contributed to scientific and political discussion of the issues. The collected essays were published in the period 1991–2003 by various researchers and practitioners in the scientific field and from international, governmental institutions (e.g. the World Bank and WTO). While the first two chapters give a general introduction to the economics of IPR and to the global role of the WTO and the TRIPS agreement on IPR, the last three chapters elaborate on the controversies surrounding IPR and economic

Alexander Cuntz holds the chair of Innovation Economics in the Faculty of Economics and Management, Technical University of Berlin, VWS 2, Müller-Breslau-Strasse, D-10623 Berlin, Germany; Tel.: +49 (0)30 314 76816; E-mail: alexander.cuntz@tu-berlin.de

development among scholars and go more deeply into the theoretical and empirical investigations and discuss methodology.

Maskus' stated aim is to offer a range of viewpoints, both supportive and critical, on the impact of the global trading system and the WTO and their relation to IPR, or as Maskus puts it cautiously in his editorial "Ultimately, the objective of this volume is to illuminate the issue whether the globalized IP regime, as it is emerging in the WTO and elsewhere, will improve prospects for innovation and growth in the knowledge economy.".

As a starting point from which to review the compendium, we have chosen to take the scientific impact of the ten contributions in the compendium that were listed in the SCI.

Figure 1 shows four essays (black bars) from the compendium that scored particularly high in relation to the average SCI citations[2] received for publications in a specific year (white squares) for related topics (above sample of 160 items). These were: *Scherer and Watal* (2002), *Diwan and Rodrik* (1991), *Glass and Saggi* (2002) and *Gould and Grouben* (1998).The individual contributions highlight very different aspects and do so from an interesting mix of perspectives.

Scherer and Watal (2002) argue that the ideal interpretation of the TRIPS agreement with respect to essential medicines should guarantee compulsory licensing that allows for technological transfer to lower-income nations. To the extent to which these nations lack the capabilities for technological absorption, the authors favour discriminatory pricing strategies by producers of high-tech drugs from the industrialized regions for worldwide sale and advocate engagement in generic drug production in both worlds. Both strategies focus on the protection of producer innovation incentives and are endangered by factors such as parallel trade phenomena (Li and Maskus 2006) or insufficient licensing compensation[3] (TRIPS obligatory). While parallel trade activities could be reduced by an intelligent tariff system (also bearing in mind the particular roles of multinationals), as a 'lender of last resort' drug donations may give shelter to the poorest of the poor (e.g. small demand-scale, low-income countries with country-specific diseases and no or little technological infrastructure) and could be economized to a certain extent by a change of national tax codes.

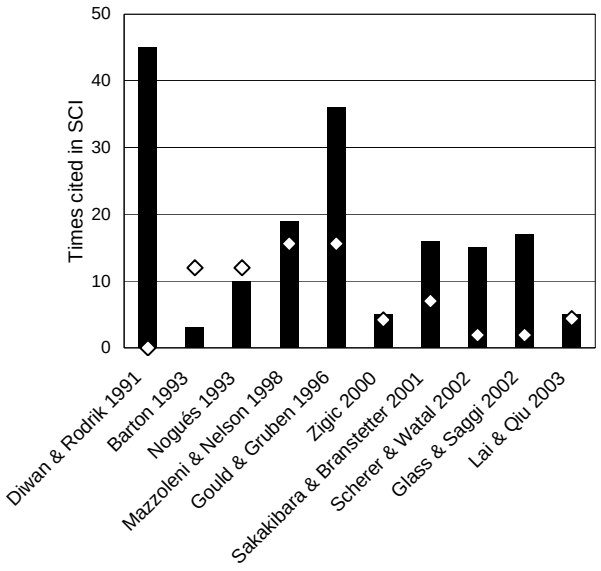

Figure 1. Scientific impact: compendium essay citation vs. SCI topic average

Follow-up research from Barton and Emanuel (2005) has emphasized the role of differential pricing, even though this is probably not in the drug industry's economic interest, but the industry could be persuaded to do so on the basis of its own sense of public service, especially if it was combined with specific legislation or with the threat of compulsory licensing. Alternatively, they suggest public-sector generic producers, whose fixed costs for investment in infrastructure would be covered by the public. This would also increase price competition with private-sector firms and, hence, in the long run, should lower the manufacturing costs and enlarge export potential.

More recent empirical research by Chaudhuri et al. (2006), on the case of quinolones (systemic antibacterials) in India, has found that the overall, static welfare impact of the presence of price regulation is negative, mostly due to consumer losses from the reduced variety in preferential domestic products in the Indian market after TRIPS was enforced and the re-allocation of trade flows. However, some of the questions remain unanswered. Where is it best to locate generic production: in the home-market or in less-developed countries abroad? How can governments effectively control the import and export flows? And, bearing product piracy in mind, how can distribution channels be effectively controlled? The first controversy is, to some extent, discussed in the second part of the compendium by *Diwan and Rodrik* (1991) and *Glass and Saggi* (2002).

In the theoretical, fourth chapter on global IPRs *Diwan and Rodrik* (1991) have developed a simple model of North–South trade with scarce R&D resources in the North where they analyse the impact of an increase in patent protection on innovation activities (both in terms of scale and quality) in each region on the basis of different technological preferences. One of the key results is that for different industries the best answers for the degree of patent protection in each region should vary, as the tastes of Northern and Southern consumers may differ. For minor differences in technological preferences the South has the greatest incentives to free ride on Northern patents while in other sectors with significant taste divergence a weaker patent protection would considerably damage Southern welfare.

Acemoglu and Zilibotti (2001) are in line with the general argument of the previous article that the presence of IPR in the South induces the North to

develop technologies that are more appropriate to the South's needs. In their model, Northern technologies applied in the South lead to a lower productivity that is assumed to arise from a divergence in labour skills between the regions and consequent appropriateness of technological development in tune with Northern preferences and skills. The negative (e.g. output) effects of this mechanism can be reduced by a sufficient system of IP in the South. However, equilibrium results do not point towards an identical appropriateness of Northern innovations for both regions. A critical assumption of both models is that innovations come exclusively from the North, which is based on a static view that does not consider the development or emergence of a Southern industry structure and educational system, maybe even income and human capital growth and, hence, changing technological preferences in the South. The latter may be the present case for emerging countries such as China or India. Additionally, the Acemoglu and Zilibotti model which assumes that Southern production always builds upon the leading edge technologies from the North seems to be counterfactual. Further, it does not discuss whether all or only some of the Southern countries will choose to strengthen the IPR (prisoner's dilemma) that would raise the Northern incentives for transfer.

A slightly different perspective is held by *Markusen* (2001), who does not focus on the design of technologies used for production and calibration of IP protection in both world regions. Rather, based on an agent approach he analyses where multinationals will locate welfare-enhancing production under different IP regimes in the host country, and under which conditions this may lead to a shift from exporting to production in the host economy. In his model, sometimes the local agent (host country) will learn about the technology which may result in the build up of a local rival firm. Hence, to some extent, the model integrates long-term development, emphasizes infrastructure development and the emergence of the structure of the industry.

Further empirical work on the exporting issue (*Smith* 1999) shows that trade flows are influenced by the quality of the addressee's IP system and by the threat of imitation. The model by Vishwasrao (1994) also fits with Smith's results because it suggests that if firms lack information on the quality of the IP system they may change their exporting, licensing and foreign direct investment (FDI) behaviour in the host country.

Miyagiwa and Ohno (1995) have expanded the linkage between protection and technology transfer focusing on general mechanisms and also an analysis of the speed of adoption at firm level in the South. They investigated how tariffs or quotas affect the adoption process. In a similar, dynamic, line of analysis, Helpman's (1993) groundbreaking work combined endogenous growth and international trade theory, introduced locational choices of manufacturing and imitation processes and elaborated on the impact of FDI on the degree of Southern IP regulation. However, cause and effect are not always clear in the case of the IPR regime and FDI flows.

Work from *Glass and Saggi* (2002) models this relationship reciprocally. They argued that stronger protection in the South has effects in both regions. First, the more scarce (labour) resources used in the South will have to be re-allocated from innovation activities to imitation, in order to achieve similar levels of success in imitation. Secondly, Northern resources will concentrate on general home-country production as FDI in host countries will decrease due to a reduced labour supply from the South. In summary, if FDI and imitation are both carriers of technology, with stronger patent rights both regions will reduce their focus on innovation which may slow down global growth.

Branstetter et al. (2006) found empirical evidence that adjustments in IPR do indeed result in real increases in technology transfer by USA multinationals. More precisely, after patent reforms in less-developed countries R&D spending by affiliates in host countries rises and licensing flows from Southern to Northern firms intensify. In the wake of reforms both the level and the rate of change of non-resident patenting in host countries (put differently: patenting by multinationals and Northern innovators) increases, while there is no evidence for an expansion of patenting by the residents.

Gould and Grouben (1998) return to the question already raised above as to whether or not governments (want or can) control trade flows (trade regime) and how this may influence the impact of IP regulation on innovation and growth. One indicator for the level of control is measuring the openness to trade of these countries. The authors have estimated that the differences in trade regimes account for the relevance of IP protection to innovation. Hence, the rate of economic growth can be larger when trade liberalization in developing countries and opening of markets is synchronized with the strengthening of IPRs, as observed in the Mexican case. This essay has primarily raised methodological interest in posterior research in addition to being an accepted milestone for general survey research (Saggi 2002, Maskus 1998) structuring concepts and methods in the literature on international trade.

Bernstein and Weinstein (2002) state that the standard, factor proportions models that use endowments to explain patterns of trade may be misleading for several reasons. In most theoretical work the number of factors and commodities are assumed, either implicitly or explicitly, to be equal. So, those models underestimate the degree of production indeterminacy in trade data sets, that is to say whenever the number of goods is higher than the number of factors, in particular if the trade barriers and/or costs are low. This aspect may even change the regression results in Gould and Grouben (1998).

Work from *Maskus and McDaniel* (1999) again focuses on the contribution of specific IPR regulation to Japanese growth patterns, features such as pre-grant disclosure and narrow claim requirements. Both characteristics are very suitable for the broader and faster diffusion of technologies and incremental innovation for total factor productivity growth in Japan's post-war catching-up process.

Ostergard (2000) has also discussed different measures for the degree of IP regulation, and has expanded the investigation from patent laws to rights enforcement which helps us to understand the true quality of the IP system and should refocus attention on topics such as product piracy. Finally, a study on software products by Husted (2000) searched for macro-level factors that determine the level of pirated software. He found that the country-specific amount correlated significantly with the gross national product per capita, income inequality, and a soft individualism–collectivism measure. Typically, a high level of economic development and the existence of a large middle class are attributed to software piracy activities.

In conclusion, the compendium sets out to advice the reader very broadly on the various IP related aspects of international trade theory and international policy (in particular the introductory chapters 1 and 2), and may be helpful to policy-makers or advanced students.

First, the compendium gives a general impression of the methodological and conceptual developments of theorists in the proceeding decade. It appears that to some extent, the focal points for research have changed: there has been a move from static to means of dynamic analysis, from the main object of studying the impact on general welfare to more itemized components of analysis such as the speed of technology diffusion, micro-level innovation, from a 'North–South' regional perspective to country or industry sector specific studies. In some lines of research these changes have led to an increasing complexity in theorizing and estimation models that have integrated improvements in methodology from distinct fields of economic research, e.g. innovation economics and have benefited from better data availability.

Secondly, the specific merit of the compendium is that it helps to diffuse the key ideas of a broad range of distinguished essays. Many of the issues raised and discussed, such as the analysis of product piracy, specific IP system properties and their growth potential, the role of technologies or production factors for the relevance of the IP system, should be of major interest to present and maybe even future research.

The overall issues addressed in the compendium cover most relevant aspects and provide a stimulus for further investigation. Hence, the selection is excellent. Perhaps, from my own perspective as a researcher, some of the essays in the introductory chapters that may allow accessibility for novices in the field should have been dropped to make room for a more intense and critical debate on the developmental perspectives of global IPR that fuel the on-going public debate. However, a re-reading will be worthwhile because the compendium offers help in facing one of the larger questions beyond global IPR: how is global welfare distributed among economies and how may developing and emerging countries benefit from and contribute to sustainable global growth? These questions are at the top of the people's agenda, and the answers will keep changing as global markets evolve and new world governance emerges.

Notes

1. At the time of upheaval in absolute publication numbers WTO ministerial conferences took place in 1996, 1998, 1999, 2001, 2003 and 2005. Protests had an unfortunate climax at the 1998 meeting in Seattle, WA, USA.
2. Absolute citation numbers are cleaned for self-citations. It should be noted that some of the compendium essays were not cited in SCI.
3. 'Parallel trade' is an arbitrage phenomenon, i.e. wholesalers in a low-price country divert supplies through international trade channels to nations in which the manufacturer is attempting to maintain high prices.

   One option available under TRIPS is to issue compulsory licenses, which authorize a third party to make, use, or sell a patented invention without the patent owner's consent.

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