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THE IMPORTANCE OF INTELLECTUAL PROPERTY RIGHTS IN INTERNATIONAL TECHNOLOGY TRANSFER

Summary: It is widely accepted that the dissemination of knowledge and technology transfer are essential factors for the economic growth. Motivated by a trend of the past two decades towards tightening intellectual property rights (IPRs) protection this paper considers a fundamental issue whether IPR protection plays a facilitating or hindering role in technology transfer to developing economies. The first part of the paper reviews international protection of IPR. In the spirit of TRIPS Agreement developed countries shall provide incentives for domestic companies to promote innovation and technology transfer. In the second part the article presents an analysis of welfare implications of the South states as a result of increased IPRs The final part gives recommendations for domestic policies.

Keywords: intellectual property rights (IPRs), international technology transfer, TRIPS, imitation, developing countries, foreign direct investments (FDI).

1. Introduction

In the recent decades the protection of intellectual property rights (IPRs) has become an important issue in the field of patents, foreign investments and multilateral trade negotiations. Through the 1970s and 1980s many countries implemented stronger standards in the field of intellectual property what harmonized with a remarkable rise in foreign investments at the time. Once IPRs systems became highly trade-related, economic literature was provoked to take a deep insight into the impact of IPR policies on the volume of international technology transfer between countries. Henceforth, the importance of IPR regimes is considered in the context of possible enhanced welfare in both developing countries as well as in high-income developed countries which take part in the global distribution of knowledge. The attention has shifted towards the implications of IPR protection on technology transfer, particularly on foreign direct investment (FDI) flows and research and development (R&D) expenditures.

More recent IPR literature of the 1990s by using endogenous growth models concentrated on the issue if stringent IPR regimes applied by South spur economic

growth. As a matter of fact the analysis of the time has been shifting back and forth from the negative scenario asserting the unequal distribution of gains and reduced welfare in developing countries. Thus, the overwhelming theoretical literature has investigated the impact of IPR protection policies under the provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) on welfare in the South. Nevertheless, the current debate on IPR protection is still polarized between advocates of the view that IPR systems generally serve as a trigger for technology transfer and skeptics supporting the belief of detrimental IPR effects. In fact, IPR protection has been a matter of a rising interest in both industrialized countries and developing ones[1].

2. International protection of IPR

The history of international IPR protection takes back to the 19th century. The Paris Convention of 1883 and the Berne Convention of 1986 were the first international efforts to establish a system of equal protection of property rights. The later convention, an international copyright law, was more foreseeing and set minimum standards for equal treatment of domestic and foreign firms.

More recent multilateral efforts to establish IPR standards for the purpose of regulation of global transfer of knowledge found the effect on 15 April 1994 with the TRIPS Agreement, an annex of the Marrakesh Agreement of the World Trade Organization (WTO). In the light of the agreement IPRs denote a temporary ownership over products and processes which yield the right to exclusive use of knowledge to the proprietor. TRIPS imposes on its signatories a commitment to strengthen their IPRs systems. Despite the obligation for developing countries to fully implement TRIPS requirements to meet the deadline of January 1, 2006, many of them will not fully comply even until 2016[2]. Thus, the complete implementation of the agreement remains an ongoing process.

TRIPS Article 7 explicitly articulates that the protection and enforcement of IPR shall contribute to the promotion of innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a conducive manner to social and economic welfare, and to a balance of rights and obligations. Specifically, intellectual property embraces patent rights, trademarks, copyright, industrial designs, confidential information (trade secrets) and contracts. Very innovative products and processes are given the umbrella of twenty year protection.

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[1] A. Naghavi, *Strategic Intellectual Property Rights Policy and North-South Technology Transfer*, Fondazione Eni Enrico Mattei Working Paper, No. 18, 2005, p. 3.

[2] TRIPS Agreement gives the right for developing countries and economies in transition to adjust (it is a 4- year transition period with the possibility of extension for the next 10 years for least developed countries upon request).

The crucial provision of TRIPS is Article 66.2 which urges developed economies, the main source of advanced technologies signatories of WTO Agreement, to provide incentives to home enterprises to increase technology transfer to least-developed countries. The advantages of TRIPS law are that for the first time intellectual property law was introduced to international trading system, ensuring instruments of accurate enforcement measures and dispute settlement procedures. Despite many controversies around equal treatment and weak enforcement measures adopted by signatories, the TRIPS Agreement remains the most comprehensive international agreement on intellectual property to date.

For the purpose of the paper the analysis focuses on the relationship between IPR protection and technology transfer from the North to the South.

3. The South: the impact of IPRs on technology transfer

In the wake of legal reforms that strengthened IPR regimes in the 1980s it was worth testing whether IPRs protection results in an increase in transborder technology transfer between multinational corporations.

For the purpose of the analysis a subtle distinction between modes of imitation, which refer to the stage of economic development and industrialization, is needed. Middle-income developing countries with primitive absorptive capacity and weak IPRs policy apply *duplicative imitation* of foreign mature technology that multinational enterprises (MNEs) do not wish to protect and adapt into heavy and labour-intensive industries. Higher production, if harmonized with governmental investments in the education of higher-skilled specialists, causes the diversification of local production. After the years of advancement of local technological capacity the stage of duplication turns into *creative imitation* when imported technologies are transformed in more sophisticated manner. Usually the pattern is that: as a country follows the technology ladder and boosts economic growth it is time to adapt a stringent IPRs policy[3].

In the context of strategic IPR policies, a comprehensive model of North-South technology transfer provides the evidence that the South may always benefit from strengthening IPR regimes in terms of enhancing economic development and prosperity[4]. Strategic IPR protection in the South serves as a mean of manipulation towards multinationals' decisions on geographical distribution of knowledge and the modes of technology transfer to the South. According to that, MNEs decide between trade and FDI, which both create the risk of spillover of innovations but enable to avoid trade tariffs. Despite the fact that inward FDI flows to primary

[3] B.M. Hoekman, K.E. Maskus, K. Saggi, *Transfer of Technology to Developing Countries: Unilateral and Multilateral Policy Options*, World Bank Policy Working Paper, No. 3332, 2004, p. 18, 20.

[4] A. Naghavi, op.cit., p. 5-6.

industries with less R&D and MNEs may still protect the entry to high-technology sectors, the spillover of innovations occur in the long run[5]. The level of the latter technology transfer is exactly a consequence of the strength of IPR regime adopted by the South.

The valuable analysis of affiliate-level data among U.S. multinational firms by Branstetter, Fisman and Foley[6] in the period of 1982-1999 reveals clear evidence of direct response in the field of technology transfer between countries according to stronger reforms of hosting countries' IPRs. Namely, technology flows from affiliates to parent firms in the form of royalty payments for use of intangible assets increased in countries that had implemented stringent IPR standards. Moreover, following IPR reforms equally strong positive relationship occurred in higher research and development (R&D) spending by affiliates and higher rate of foreign origin patent applications at the UPSTO (United States Patent and Trademark Office). The very significant result was that in the wake of legal changes an increase of licensing flows was partly boosted by the implementation of new technology. On the one hand, the innovative side of the analyzed correlation cannot be overstated. On the other hand, no specific evidence was found for domestic changes of the number of patents among residential firms as well as licensing flows from multinational and external local firms.

In turn, in the adverse view[7] stronger IPR protection in the South negatively affects imitation, innovation and FDI. The primary finding is that even MNEs operating in the South are secured from imitation. It does not mean that their technology is higher in absolute terms of protection than innovative technology from the North which still remains better secured[8]. Tighter protection of IPR increases the cost of imitation (stemming from stricter requirements for uniqueness) for local enterprises that are forced to engage greater resources for the purpose of the efficient catching up. This in turn generates resource scarcity in the South which crowds out FDI. Two effects are indentified. Namely, an imitation disincentive effect stems from the higher cost of imitation and a resource wasting effect refers to fewer resources for innovations left for foreign firms[9]. The core result is that the inflow of FDI to developing countries decreases with a strengthening of IPR protection in the South. However, this perspective could be easily debunked if assumed the absence of IPRs. Then it would in majority discourage MNEs from engaging in serving a foreign market.

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[5] Ibidem

[6] L.G. Branstetter, R. Fisman, C.F. Foley, *Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U.S. Firm-Level Panel Data*, „Quarterly Journal of Economics" 2006, Vol. 121, No. 1.

[7] A.J. Glass, K. Saggi, *Intellectual Property Rights and Foreign Direct Investment*, "Journal of International Economics" 2002, Vol. 56, Issue 2, p. 388, 408.

[8] Ibidem, p. 388.

[9] Ibidem, p. 389.

Even though there is a lack of acceleration of innovations at the time of IPR reform, a reasonable allegation says that rapid technology transfer is likely to serve as a condition for IPR reform in order to foster economic growth[10]. Similarly, there is an interesting evidence on asymmetric IPR protection across countries. When two countries adopt mutually opposed IPR policies and one favours only domestic innovators for instance, it distorts the pattern of world trade and decreases the global rate of economic growth[11].

The paper by Hall[12] summarizes empirical cross-country evidence in the face of encouragement technology transfer if the stronger patent protection looks at specific U-shaped relationship between IPR strength and the level of economic development. The examination of 64 developing countries in the 1975-2000 period offers a finding that IPRs have a positive effect on innovation in U-shaped mode: with tightening of IPR economic development first decreases and then increases.

Although the evidence on the influence of patent protection on inward technology transfer is mixed, recent studies find a positive correlation in middle-income and large developing countries. One of these is the project under the auspices of the International Centre for Trade and Sustainable Development (ICTSD) with collaboration of the United States Conference on Trade and Development (UNCTAD)[13] on the relative importance of IPRs in developing countries. The analysis provides an explanation that the effects of TRIPS (interpreted as the tightening of IPRs) on technology transfer to the South vary according to the hosting countries' levels of economic development and to the technological features of their industries[14]. As incomes and technological advancement rise, the advantages of having strong IPRs regime also increase. This is true if we remember that economic growth is spurred by a significant rate of innovation. If it is so, attaining a certain threshold level of industrialization is a precondition to gain long-term benefits from tightening IPRs regime.

On the other hand, it is widely accepted that it is very unlikely that poor countries are responsive to strong patent rights. Without a certain income level and mature technological basis it is impossible to maintain a strong regime (as costs exceed the costs of primary developmental needs) and achieve long-term benefits.

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[10] L.G. Branstetter, R. Fisman, C.F. Foley, op.cit., p. 25.

[11] K. Saggi, *Trade, Foreign Direct Investment, and International Technology Transfer: A Survey*, "The World Bank Research Observer" 2002, Vol. 17, No. 2, p. 224.

[12] B.H. Hall, *Does Patent Protection Help or Hinder Technology Transfer?*, paper prepared for the KDI-WIPO Conference on Intellectual Property for Economic Development: *Issues and Policy Implications*, Seoul, South Korea, 18-19 February 2010, p. 7.

[13] See: UNCTAD-ICTSD Capacity Building Project on Intellectual Property Rights (IPRs), http://www.iprsonline.org/unctadictsd/description.htm

[14] S. Lall, M. Albaladejo, *Indicators of the Relative Importance of IPRs in Developing Countries*, QEH Working Paper, No 85, 2002, p. 2; paper prepared for the ICTSD/UNCTAD Capacity Building Project on IPRs and Sustainable Development, 2003, http://ictsd.org/downloads/2008/06/cs_lall.pdf

4. MNEs' perspective

In the realm of technology transfer patent protection plays an essential role of legal basis for the disclosure of technological know-how and innovations in intra-firm operations between parent company and its foreign affiliates and also between corporation and external licensees. In fact, strengthening IPR enforcement increases the cost of imitation, not welcomed both by locals as well as foreign firms.

Among MNEs' motives to engage in technology transfer the strength and transparency of IPR regime is perceived as one of the essential conditions not only to enter a foreign market but also to determine the scope of operational engagement of affiliates[15]. A multinational firm of innovative industry, like chemistry or pharmaceutics, will not engage in R&D and manufacturing projects in the market devoid of at least weak intellectual property protection. Regardless of industry features, MNEs may be more likely to establish only such simple production or sales that risk no technology leakage.

There is a significant change in the advancement of technology according to the tightening of IPRs protection. With stronger IPR protection the complexity and forms of technology rise as MNEs feel more secure from technology leakage and encouraged to transfer frontier innovations[16]. The same effect occurs with the rise of absorptive capacity of the recipient country. Moreover, from the perspective of MNEs stronger patent rights are crucial not only in terms of avoiding the risks of imitation but also in terms of the rise of financial profits, as the rents paid by the recipient from protected technology inflow also become more expensive[17].

It is also worth considering if increased enforcement of IPR protection by the South causes a change in multinationals' preferences of the mode of transfer. Indeed, IPR enforcement by the South may attract more foreign production (FDI) relative to export. Furthermore, relying on strong patent protection MNEs may feel tempted to shift from foreign licensing, which poses an advantage to transfer more advanced technologies, to FDI. The embedded tradeoff between these two forms of capital engagement is that FDI protect from imitation at the expense of higher production costs[18].

5. Case study: South Korea

A particular case for enhanced industrialization achieved in the wake of stringent IPR regime correlated with the sharp rise of technology inflows is Korea, a country from the first tier of newly-industrializing economies in East Asia. In the 1960s and 1970s Korean economy was bereft of indigenous innovative capabilities. Thus, foreign

[15] Ibidem, p. 2.
[16] B.M. Hoekman, K.E. Maskus, K. Saggi, op.cit., p. 15.
[17] Ibidem, p. 16.
[18] K. Saggi, op.cit., p. 224.

mature technologies were essential for supporting basic processes like an assembly and labour-intensive production of undifferentiated goods at the outset. The absorption of imported technologies soon induced local competition among entrepreneurs eager to successfully assimilate it. Significant governmental investments in training local scientists and engineers marked this stage as a successful duplicative imitation. Subsequently, the improvements in domestic standardized production through reverse engineering and learning-by-doing, higher level of technological knowledge along with emerging competition from other newly-industrializing countries (f.e. Malaysia, the Philippines) led Korea towards creative imitation. The emphasis of the decade of the 80s was put on knowledge-intensive intermediate technologies, technology transfer through formal channels (foreign direct investments or licensing), investments in local R&D, enhanced higher educational system as well as movements of researchers from abroad. Korea at top speed intensified local R&D base and in the decade of the 1980s had the world's higher annual R&D growth rate expenditure per GDP of 24,2 with the private sector which was constituted almost entirely by domestic firms[19]. Korean pattern exemplifies that pivotal role is played by technology transfer to developing countries in their industrialization path.

However, a study of Korean economy by Kim[20] provides a valuable finding that in the very beginning of the industrialization process, in the stage of duplicative imitation of mature foreign technology, IPR protection is likely to halt rather than favour technology inflows. Only after successful achievement of a sufficient rate of indigenous technological capabilities and engagement in creative imitation it is feasible for IPR protection to play a critical role for technology transfer enabling a country to move up through industrialization stages.

Nonetheless, Korean successful path of upgrading innovative capability was, to a considerable degree, a function of local IPR system. Indeed, patent statistics of the intermediate technology stage reveal that in the period of 1965-1978 patent activity increased in about 50% and almost tripled in 1979-1989 and later. More significant is that the strong IPR regime facilitated innovative activity not only for multinationals but also provoked a rise in patent application by local firms, both at home and abroad.

6. "One size fits all" controversy

There is a rising controversy around multinational standardization of IPR systems worked out on multilateral basis of TRIPS. Some authors[21] warn against the "one size fits all" harmonization which does not take into account profound differences in the levels of economic development and innovative capabilities of countries,

[19] L. Kim, *Technology Transfer and Intellectual Property Rights: The Korean Perspective*, "Bridges" ICTSD, November-December 2002, No. 6(8), p. 6.

[20] Ibidem, p. 8.

[21] L. Kim, op.cit., p. 8; B.H. Hall, op.cit., p. 2.

especially of the least-developing ones. It is a matter of fact that the negotiation process of the TRIPS Agreement was initiated as a result of complaints of Northern multinationals' lobby arguing to have lost substantial amounts of money due to weak IPR protection policies in the South. This by implication provoked a question if the reinforcement and standardization of IPR regimes among members of WTO led to unilateral enhanced welfare in the North.

There has also been a serious contention from the developing world in regard to the requirement compelling developing economies to design IPR protection in a manner found already in industrialized countries. Perhaps, given that globally equal standards provide transparency in international trade, they may also pose a threat of adverse effects for the South. Thus, African concerns over the protection of pharmaceutical drugs are valid. On the other hand, it is equally reasonable that technology transfer and technology spillovers are the only means to ensure economic growth in least developed countries. Moreover, it is much more likely that these objectives may be reached only by equal IPR treatment.

Eventually, in respect of TRIPS inadequacy there is an urgent need that it should be profoundly reconsidered so as to balance IPR with economic and social needs of the developing world.

In recent years least-developed countries raised an outright objection around weak implementation of Article 66.2 by developed economies. The postulates for more effective incentives and mechanism ensuring a monitoring of technology transfer, however, found a place in Doha agenda.

7. Policy options and recommendations

In respect thereof developing countries should seek such IPR systems that will be adequate to their level of economic development and industrial advancement at most. IPR standards should not be adopted entirely from the North to avoid accusations for giving the monopoly to Northern inventors. A reasonable compromise to the friction over IPRs which are unbalanced with the developing world is that if any valuable state policies facilitate FDI inflows, IPR regime ranges among them.

According to the recommendation of Kim's work (2002): "Developing countries should work together to change current trends towards a standardized all-encompassing multilateral IPR system. They should strive to make IPR policies more favourable to them in the short term. But they should also strengthen their own absorptive capacity for a long-term solution that would enable them to identify relevant technology available elsewhere, strengthen their bargaining power in its transfer to them in more favourable terms, assimilate it quickly once transferred, produce creatively imitative new products around IPRs, and generate their own IPRs"[22].

[22] L. Kim, op. cit., p. 8.

Thus, the crucial for the developing world is policymakers' foresight not only to accumulate foreign technology but most of all to assimilate it in the way to upgrade and master domestic R&D and production base. A valuable recommendation would be an application of the principle of Open Innovation which refers to technological licensing transactions by domestic enterprises contracted with both other companies within developing country and foreign firms[23]. This would benefit high-tech companies from the developing world with equal share in technology dissemination as well as a bargain power in market competition. Finally, a reasonable policy option for developing and poor countries is that they should seek and attract such a foreign technology that will help to solve most urgent developmental issues like fundamental medicine shortage, tropical diseases, inefficient agriculture and deficiency in industrial machinery.

With regard to developed economies' possible initiatives, apart from opening markets for developing producers' goods and technical or financial assistance for improving the absorptive capacity of poor countries, the incentives may include obtaining patents for free use in developing countries. This would maintain the incentive to invest in R&D with the fall in the cost of acquisition for poor countries. Essential stimuli for tightening patent rights in the South could be a mandatory licensing of technology to developing countries with the graduate reduction of royalty fees as well as relatively shorter patent duration[24]. Once the later expires, technology will disseminate freely within local high-tech producers.

8. Conclusion

Summing up, a few conclusions must be derived. First, the empirical literature gives unambiguous evidence that stronger IPR protection facilitates patent applications and technology transfer to middle-level developing countries. Second, the importance of IPRs depends particularly on two variables, namely on the income level of hosting economy and the mode of technology transfer which is to the large extent a function of cheap labour costs, nature of activity as well as IPR regime. As it was demonstrated, there is a U-shaped relationship between the strength of IPRs and incomes. At first, in the aftermath of intensive imitation income rises but the intensity of IPR falls. The correlation remains persistent until countries reach a certain level of income, reflecting the augmentation of local innovative capabilities. Then the situation inverts, income rises, so does the strength of IPR. This, however, does not find clear evidence for low-income economies left behind the contemporary

[23] P. Magic, *International Technology Transfer & Intellectual Property Rights*, 2003, p. 12, at: http://userweb.cs.utexas.edu/users/fussell/courses/econtech/public-final papers/Peter_Magic_International_IP_Rights.pdf (accessed on 31.03.2010).

[24] Ibidem, p. 10-11.

technological frontier, which are generally no responsive. Nevertheless, a stringent IPR system seems to be optimal for the South as it triggers technology transfer, at first by inducing FDI in less R&D intensive primary industries. Following that, second finding says that the sophistication of technology modes and channels increases with stringent property rights. This is especially evident in the shift from licensing to FDI. But on the other hand, the rise in patents in the wake of tight IPR regime is narrowed to very advanced sectors in which it is relatively easy to copy new products such as pharmaceutical, medical, chemical as well as computer industries. A significant tradeoff was found regarding fundamentally adverse perspectives on IPR worldwide harmonization. Even though IPR may seem to benefit only developed countries as they are a primary source of intellectual property and technology, for developing economies foreign technology remains a part of the bargain in which they have agreed to protect ownership rights. The crucial political recommendation with respect to the role of IPR policies in technology transfer is that technology transfer may affect the international legal framework but the later should not shape technology movement.

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ZNACZENIE PRAW WŁASNOŚCI INTELEKTUALNEJ W MIĘDZYNARODOWYM TRANSFERZE TECHNOLOGII

Streszczenie: Powszechnie uznaje się, że rozprzestrzenianie wiedzy i transfer technologii to czynniki niezbędne dla wzrostu gospodarczego. Motywowany trendem ostatnich dwóch dekad w kierunku zacieśniania ochrony praw własności intelektualnej niniejszy artykuł rozważa fundamentalną kwestię, czy ochrona praw sprzyja, czy też utrudnia transfer technologii do krajów rozwijających się. W pierwszej części dokonany został przegląd międzynarodowej ochrony praw własności intelektualnej. W duchu Porozumienia TRIPS kraje rozwinięte powinny zapewniać krajowym przedsiębiorstwom bodźce stymulujące wytwarzanie innowacji oraz transfer technologii. Przedmiotem analizy są implikacje, jakie zaistniały w obszarze dobrobytu krajów Południa w następstwie wzmocnionej ochrony praw własności intelektualnej. W końcowej części zawarto rekomendacje dla polityk krajowych.