The economics of intellectual property protection in the global economy

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Introduction

In March 2001, bowing to public pressure, the pharmaceutical company Merck announced that it would sell its AIDS drug at cost in South Africa. Other US drug companies such as Bristol-Myers Squibb did similar things. This case illustrates vividly the tension between the North (the developed countries) and South (the less developed countries) in the protection of intellectual property rights (hereinafter IPR). The case of AIDS drugs in South Africa is certainly an interesting case study, but we should save it for future discussion. The present paper addresses some more general questions. While there are legal, political and social dimensions of the global protection of IPR, this paper examines the economic issues and their economic analyses. It lays out the important issues, discusses the literature and suggests what researches are left to be done.

The Issues

1. The ﬁrst issue of interest is the economic analysis of the Agreement on Trade-Related Aspects of Intellectual Property Rights (hereinafter TRIPS agreement). The agreement, which is part of the outcome of the Uruguay Round of GATT negotiations, lays out a set of universal minimum standards for all members of the WTO to adopt. Consequently, the South is meant to increase the legal protection as well as enforcement of IPR protection. Since most of the modern innovations are created in the North, while a lot of imitations are carried out in the South, the TRIPS is primarily a North-South issue. Is the TRIPS good to the world, the North, or the South? What are the gains and losses to the various parts of the world? Should IPR protection continue to be included in the WTO agenda in future negotiations?

2. The second issue is how IPR protection a®ects rate of innovation, economic growth, terms of trade and welfare of the South and North.

3. The third, and related, issue is the optimal design of a global system of IPR protection. How does it compare with a system with non-cooperative equilibrium outcome? Should the South protect less than the North in the optimal system? Should there be harmonization of standards between the North and South for the sake of global welfare? Can harmonization be good for all regions in the world, without compensation? What is the best level of harmonization?

4. Fourth, how does it a®ect international technology transfer from the North to the South through FDI, licensing and joint venture?

5. Fifth is the interaction between IPR protection and other policies. What are the con°icts, substitutability or complementarity between IPR policy on one hand and trade, investment (e.g. tari®s, FDI policies) and competition policies on the other hand? Should there be international coordination of competition policy to counterbalance the international coordination of IPR policy?

6. Is IPR protection currently too strong or too weak in the developed world?

What have been done

1. It has been argued elsewhere (e.g. Maskus 2000) that TRIPS is possibly the most important international IPR agreement ever signed, because of the number of countries involved and the scope of changes implied, especially in the developing countries. Important as it is, formal economic analyses of TRIPS are scarce. Some lawyers (e.g. Reichman 1995) have argued that TRIPS is basically backward-looking in nature, enshrining what the North had been adopting as the world minimum standard. Reichman goes on to argue that the only reason the TRIPS agreement is sustainable is that the North promises to open up its market of traditional goods to the South in exchange for the South agreeing abide by TRIPS. These two aspects of TRIPS are captured in a formal theoretical analysis by Lai and Qiu (2000). The paper presents a multi-sectoral bargaining model with di®erentiated goods and traditional goods. It ¯nds that TRIPS is globally welfare-improving, although it bene¯ts the North at the expense of the South. The (static) costs of increased IPR protection are the

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deadweight losses, while the (dynamic) bene¯ts are the increase in innovations. The paper demonstrates that the TRIPS's bene¯ts outweigh the losses. This creates a case for quid pro quo between the two regions as mentioned above. The extent to which the North opens up its traditional goods market to the South depends on the bargaining power of the South vis-a-vis that of the North. Moreover, the South may well prefer to adopt a less rigorous IPR standard than the Northern one, if it had the choice.

An important feature of international IPR protection is the positive inter-regional exter-nality | as a region protects IPR more, the rest of the world gains because the latter regions' innovating ¯rms make more pro¯t in the foreign region. The loss in consumer surplus, how-ever, is solely borne by the region that strengthens the protection. This positive externality points to the suboptimality of the non-cooperative Nash equilibrium. This explains why, in Lai and Qiu (2000), it is globally welfare-improving for the South to unilaterally strengthen IPR protection. Our recent work (still in progress) reveals that global welfare can be max-imized by raising the IPR standard of both regions from the Nash equilibrium. There is a continuum of IPR systems that can achieve this with Pareto improvement for both regions. Whether or not strict harmonization is an element of this set depends on whether the North and the South are su®ciently similar in terms of the capability to innovate and the size of the market.

An interesting empirical study by McCalman (2000) points out that TRIPS generates large income transfer between countries, with the total sum of net outward transfers from all countries equal to $US 6230 million. The US gets more than 70% of all inward transfers, followed distantly by Germany, France, and Italy. Surprisingly, developing countries account for only 40% of all outward transfers. More surprisingly, the largest amounts of outward transfer come from Canada, Brazil, UK, India, Mexico and Japan. This is certainly a mixed basket of Northern and Southern countries. This reveals the fact the many developed countries did not protect IPR as strongly as the US before the TRIPS. However, the (later version of the) paper does not estimate the total deadweight losses or the bene¯ts that arise out of TRIPS.

2. How does IPR protection a®ect rate of innovation, economic growth, terms of trade and welfare of the South and North? Grossman and Helpman's [hereinafter G&H's] (1991) endogenous growth models can be used to answer these questions. In a highly stylized growth model of expanding-variety type, G&H (1991, Chapter 11) ¯nd that an increase in the cost

of imitation (which can be regarded as an increase in IPR protection) increases the rate of innovation and reduces the terms of trade of the South. However, Lai (1998) points out that the result can be reversed when FDI is allowed. In fact, Lai ¯nds that the e®ects on terms of trade can also be reversed. In the quality-ladder growth model (1991, Chapter 12), G&H ¯nd that the e®ect of an increase in cost of imitation on rate of innovation is ambiguous. Therefore, the results are mixed. The mixed result in fact makes a lot of sense, since it would depend on a number of factors. An increase in the cost of imitation would encourage FDI and international technology transfer from the North to the South. First, this would increase the demand for South-produced goods, which in turn increases the South's terms of trade. Second, it would increase the incentive for Northern ¯rms to innovate. However, an increase in cost of imitation means that more production activities would stay in the North, which bids up factor costs in the North, making innovation more expensive and thus discouraging innovation. Another reason why increased IPR protection might lower the rate of innovation, as pointed out by Horowitz and Lai (1996), is that a longer period of protection reduces the innovator's frequency of innovation when innovation is necessary to drive the imitators out of the market. Also, see Glass and Saggi (2001) for e®ects of IPR protection on FDI and innovation.

Using cross-country data on growth and IPR protection, among others, Gould and Gruben (1996) ¯nd evidence that intellectual property protection is a signi¯cant determinant of economic growth. The e®ects appear to be slightly stronger in relatively open economies and are robust to both the measure of openness used and to other alternative model speci-¯cations. However, the question is still open as to whether both growth and IPR protection are both caused by a third factor, such as the rule of law.

3. There have been theoretical and empirical studies of the welfare e®ects of the global systems of IPR protection. Both Chin and Grossman (1990) and Deardor® (1992) examine welfare e®ects of extending IPR protection from the North to the South. They ¯nd that many results depend on the size of the South's market. Their study are based on two important assumptions. First, they assume that the South does not have innovative capability. Second, they examine only the case where the South has either full or no IPR protection. Diwan and Rodrik (1991) also consider various degrees of IPR protection in the North and the South. Interestingly, they ¯nd that to maximize the global welfare, which is the equally weighted sum of the North's and the South's welfare, the rates of patent protection in the two regions must

be identical. They emphasize the taste difference between the two regions and assume no innovative capability in the South. Helpman (1993) uses a general equilibrium North-South model, where the North specializes in innovation and the South specializes in imitation, to study IPR protection, growth and welfare. He finds that tightening IPR protection in the South hurts the South and may or may not benefit the North.

4. How does IPR affect trade, and international technology transfer from the North to the South through FDI, licensing and joint venture?

Similar to Lai (1998), Markusen (2000) shows that (intellectual) property rights enforcement may lead to a shift from exporting to a local subsidiary, and this mode shift improves the welfare of both the MNC and the host country. See also Yang and Maskus (2001) for the effects of IPR on licensing and innovation in the context of an international product cycle model. Glass and Saggi (2001), on the other hand, study the effects of IPR protection on licensing versus direct investment, which in turn have an effect on economic growth.

On the empirical side, Smith (1999) find that weak patent rights are a barrier to US exports, but only to countries that pose a strong threat-of-imitation. In this case, stronger patent rights required under the WTO increases US exports to these high-threat countries. Exports to low-threat countries, however, are lowered by stronger patent rights because of the increased monopoly power of the US firms in the importing countries. Lee and Mansfield (1996) find that perception of weak intellectual property rights protection by US firms deterred them from engaging in FDI in less developed countries. Yang and Maskus (2000), in a study on 23 countries in a panel covering 1985, 1990 and 1995, find that countries with more stringent patent laws attract larger volume of arm's length licensed technology transfer.

5. Interaction between IPR and other policies

Theoretical:

Qiu and Lai (2001) point out that, in a world where the North specializes in innovation and the South in imitation, a Northern tariff supplements IPR protection, while a Southern tariff is anti-innovation. They find that the globally optimal Northern tariff increases as IPR protection in the North or the South decreases. Consequently, global welfare may rise as Northern tariff increases, but necessarily declines as Southern tariff increases. Zigic (2000)

¯nds a similar motive for the North to protect trade, and that a Northern tari® can be globally welfare improving, though he uses a more complicated four-stage game to do so.

6. Is IPR protection currenlty too strong or too weak in the developed world? Some commentators (such as Reichman, 1998, p.588) think that it is too strong, while there is no hard evidence to show one way or the other. Kwan and Lai (2000) is an attempt in this direction. Using an expanding-variety type endogenous growth model a la Romer (1990), they ¯nd that IPR protection in the US may well be way too weak rather than too strong.

What else need to be done

1. A general question is, in theoretical as well as empirical work, should the analysis of patent, trademark, copyright and trade secret be di®erent? A quick re°ection would suggest that they should be. The degree of protection of trademarks is mainly a question of enforcement, while the degree of protection of copyrights and patents is very often a matter of judgement by the judicial system, in addition to enforcement. Just like there are patent length and patent breadth, there are copyright length and copyright breadth. The breadth of patent or copyright would determine how easily one can `invent around the patent' or `create around the copyright'. These questions are yet to be addressed by the literature.

2. Do we need new ways to model or analyze IPR related to the `new economy', e.g. computer software, plant varieties, electronic data bases, biotechnological products, information on the internet, copyright protection for e-commerce?

3. Analysis of the TRIPS |

Theoretical: Should parallel imports be allowed in TRIPS? What would be the economic impacts of if they were allowed? [Some theoretical work has been done by Maskus and Chen (1999).]

Empirical: What are the gains from TRIPS?

4. Globally optimal system of IPR protection

Theoretical: Can we identify and characterize a globally optimal system of IPR protection? How can this system be implemented in an incentive-compatible way? (e.g. lump sum

transfer?) How would the global trend towards increases in FDI, joint venture or licensing compared with arms-length international trade a®ect this global optimum?

Empirical: Can we use the existing data and ¯ndings about deadweight loss, income transfer, etc. in the TRIPS such as those found by McCalman (2000) to back out what the optimal patent length should be?

4. E®ects of IPR in the North and South on economic growth

Theoretical: The work done so far seems to be quite exhaustive.

Empirical: There should be more hard evidence on the conditions under which stronger IPR would really increase innovation (and therefore growth) in developing countries (human capital, technology institutions, etc.)

5. E®ects of IPR on the di®erent modes of international production transfer, viz. FDI, licensing, joint venture

Theoretical: How does IPRprotection a®ects the trade-o® among these di®erent modes of technology transfer? How does it a®ect ¯rms' choice of the mode of technology transfer.

Empirical: Why do MNCs sometimes do and sometimes do not take IPR seriously in their decisions to engage in FDI in a country? (e.g. in China) Do di®erent modes of IPR (i.e. patents, copyrights, trademarks, etc.) have di®erent degrees of sensitivity to di®erent forms of production transfer?

6. Interaction between IPR policy and other policies

Theoretical: What is the optimal combination of IPR policy and competition policy? If competition policies are to be coordinated across countries, how should it be done?

7. Is the North overprotecting IPR? More rigorous empirical work need to be done on this very important issue.

8. Relation of IPR issues with other issues | e.g. harmonization of other standards such as environment, labor, health-related products, etc. Can we use similar modeling technique for analyzing IPR to analyze harmonization of other standards? There are certainly similarities, e.g. there are obvious inter-regional externalities involved in setting environmental, labor and health standards.

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