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The Global Policy Framework: Intellectual Property Rights and Wrongs?

As discussed in earlier chapters, the global regime of IPRs protection strengthened dramatically in the 1990s, primarily through TRIPs but also through unilateral initiatives and intellectual property chapters in regional trade agreements. I presented the legal structure of TRIPs in chapter 2, and defined the concepts in chapter 3 in order to set the stage for the positive economic analysis of international economic effects of IPRs in chapter 4 and of IPRs and economic development in chapter 5.

We are now ready to complete the circle by discussing important normative aspects of the new regime. This chapter focuses primarily on the TRIPs agreement itself, in terms of both its implementation and its potential effects on the international balance of costs and benefits. I also discuss the implications of differential standards for IPRs in regional trade agreements. The normative analysis, though grounded in data and economic logic, is necessarily rather speculative. I present it largely as a basis for wider discussion.

Putting TRIPs into Action

The TRIPs accord is still being implemented; it is also being reviewed for eventual revision. That makes it premature for us to make confident claims about how it will affect the well-being of people in particular countries. However, it is worth discussing in detail a number of important issues TRIPs brings up, among them problems in its implementation and administration. Moreover, it is important to understand that the minimum TRIPs standards still leave considerable flexibility for nations to select

regulations promoting welfare-enhancing competition in their markets. Their decisions will be decisive in determining the ultimate distribution of gains and losses from the new global regime.

Implementation Issues

The TRIPs agreement is not solely about reform in developing nations. Several developed economies have changed their intellectual property laws in order to comply with TRIPs. For example, the United States, while retaining its unique system of awarding patents to applicants who demonstrate they were the first to invent a technology, now ensures that the term of patent protection is 20 years from the date of filing. Other countries award patents to the first to file successful applications.

Ireland has failed to adopt the EU's directive on rental rights, including rental rights for films, which complies with TRIPS.[1] The United States lodged a dispute at the WTO in May 1997 that is still pending. Thus, to an important degree the agreement updates protection even among those nations with strong prior regimes. To a far greater degree, the TRIPs requirements place significant demands for reform of the IPRs regimes in many developing countries. Primo Braga (1996) compiles some useful information: as of 1994, 25 developing nations (of 98 GATT contracting parties in this category) excluded pharmaceutical products from patent protection. Further, 13 of those countries failed to protect chemical products. In the full sample, 56 countries provided terms of protection for patents that were shorter than the 20 years required by TRIPs. Relatively few developing countries were members of UPOV and only six provided sui generis protection for plant varieties, although patent protection for plant strains was available in principle in a number of nations. Only 36 developing countries provided copyright protection for software as of 1994. Sherwood (1995) claimed that 8 of the 12 Latin American nations he studied would require changes in their compulsory licensing laws, as indeed would nearly any country that had adopted compulsory licenses before TRIPs entered into force. These figures point to the need for significant legal and institutional change in a broad sweep of the developing world.

Six years into the transitional periods, implementing laws and regulations are in place in a number of countries. Evidence of this may be seen in the significant increases in accessions to the WIPO Conventions and UPOV noted in table 4.1.[2] For example, Brazil passed new patent legislation in 1996 that was effective in 1997. The law extends the term

1. Rental and Lending Directive, 92/100/EEC.

2. TRIPs does not require entry into UPOV, though some countries find it convenient to do so as they implement plant variety protection.

of protection to 20 years from filing date, makes pharmaceutical products and agricultural chemicals patentable, and reverses the burden of proof in process patents. However, it retains fairly broad procedures for issuing compulsory licenses, subject to the limitations imposed by TRIPs. For this reason the Pharmaceutical Research and Manufacturers' Association (PhRMA), an international industry association headquartered in the United States, has called it inadequate.

As the Brazilian example suggests, implementation strategies adopted over the near term promise to be contentious. American trade authorities claim that adequate implementation and enforcement of obligations are US priorities that should be met before any further negotiations on IPRs.[3]

Administration and Enforcement

These expectations are likely to be disappointed for some time, for two fundamental reasons. First, it will take years for developing countries to actualize strong commitments to effective administration and enforcement of IPRs. The administrative mechanisms in many poor countries remain skeletal. The costs of establishing a system adequate to handling even counterfeiting cases, let alone complex conflicts over patent infringement, can be daunting. Institutional infrastructure has significant fixed costs in the form of examination and registration offices and equipment, drafting administrative procedures, and training examiners, judges, attorneys, and police and customs authorities. There are further recurrent costs for training, hiring new personnel, and upgrading IPRs systems—costs that will rise as IPRs come into greater use.

UNCTAD (1996) provides some rough estimates of the administrative costs of complying with TRIPs in various developing countries.[4] In Chile, additional fixed costs of this upgrade were estimated at $718,000 and annual recurrent costs at $837,000. An Egyptian expert thought fixed costs in Egypt would be perhaps $800,000, with additional annual training costs of around $1 million. Bangladesh anticipated one-time costs of administrative TRIPs compliance (drafting legislation) of $250,000 and over $1.1 million in annual costs for judicial work, equipment, and enforcement efforts. These estimates do not include training costs. Note that in Egypt and Bangladesh trained professional administrators and judges are extremely scarce, suggesting that these estimates may be low. One of

3. Interview with Joseph Papovich, Assistant US Trade Representative, *Inside US Trade*, 16 July 1999.

4. See also Finger and Schuler (1999) for a broader view of the costs of implementing the Uruguay Round in the least-developed countries.

the largest costs of implementing an effective administrative system is that it would divert scarce professional and technical resources into such administration and out of other productive activities. It should be noted that these estimates are based on survey responses provided by intellectual property experts in each nation, rather than on extensive studies using a standardized methodology. In that sense, they are questionable, if intriguing.

The existence of considerable fixed costs (in both a budgetary and an opportunity-cost sense) should mean that the demand for IPRs must be relatively large in order to induce a country to absorb these costs efficiently through the exploitation of economies of scale.[5] In itself, this means that small, poor countries are likely to have little commitment to adequate institutional reform.

Countering this problem are three factors. First, intellectual property offices may charge fees for examination and registration procedures to defray their costs. There is clearly a question of incentives here. The higher the fees, the lower the willingness of firms to apply for IPRs. Because such fees particularly disadvantage small start-up firms, some authorities have differential fee schedules depending on the size of the firm and the nature of the technology, potentially a useful prodevelopment strategy. Under TRIPS, such schedules must be applied on a national treatment basis, so it matters whether intellectual property offices are instructed to meet revenue targets or to facilitate applications and registrations.

Second, poor countries may petition for technical and financial assistance from industrial countries and WIPO and the WTO to help absorb the fixed costs of implementing new administrative and enforcement procedures. In practical terms, such assistance would need to come predominantly from the developed countries, because WIPO and the WTO have few resources for this task.

Third, developing country authorities may join cooperative international agreements to help cut their costs. Membership in the Patent Cooperation Treaty, for example, provides significant economies because examiners may read the opinions made by major patent offices about novelty and industrial applicability, rather than undertake such technical examinations themselves. Similarly, international trademark registries can cut the costs of looking for prior registration. These costs are further reduced by access to electronic databases on the internet. Thus, assistance in linking to these internet databases is useful.

Another difficulty lies in the straightforward political economy of IPRs. To enforce patents, trademarks, and copyrights is to shift market power from imitators to innovators. This has a number of subtle effects, but in

5. However, recall the econometric finding in chapter 4 that market size had little impact on the strength of patent rights.

the intermediate term the main effect is a transfer of rents, as amplified further in the next section. Owners of patents in developing countries are overwhelmingly foreign; there is little likelihood of that changing for a considerable period of time. The figures provided in table 3.2 attest to this situation. In Mexico, only 389 patent applications in 1996 came from domestic residents, while over 30,000 came from foreign residents. Brazil's domestic patent applications in 1996 amounted to just 8 percent of total applications. India's domestic applications were 20 percent of the total, but the absolute numbers were small in relation to India's size, reflecting its weak patent system. Canada and Australia also have low percentages of domestic patent applications; they remain significant net importers of intellectual property. South Korea and China are unusual in having experienced massive growth of domestic patent applications in the 1990s.

Countries in which patents and widely recognized trademarks are largely owned by foreign interests are unlikely to experience much domestic political pressure for reform or for effective enforcement. Instead, the profits and employment made from piracy and imitation constitute a powerful force against reform. As incomes grow and demands develop for higher-quality goods, and as firms are established and become more capable of innovation, interests in stronger rights emerge endogenously. But, as chapter 3 suggested, such processes in the patenting arena mature only at per capita income levels much higher than those found in most poor nations. Domestic preferences for protection of trademarks likely emerge at lower income levels, but those preferences must be strong enough to overcome the countervailing forces of infringement.

Copyright enforcement can be important for particular sectors in developing countries, such as boutique films and applications software for local markets, but such interests are faced with considerable consumer enthusiasm for pirated copies of music, films, and software platforms. These latter sectors often face significant entry barriers associated with high fixed costs of designing, producing, and marketing performances, films, and computer programs. Successful entry by information industries in many developing nations is difficult and probably far off.

Thus, domestic interests in developing economies are likely to oppose effective enforcement for the medium term. Continued external pressure and awareness campaigns may shift preferences marginally toward stronger protection but intellectual property owners in developing nations should expect infringement to continue in spite of new laws and regulations covering enforcement. Indeed, this view is consistent with American concerns about the potential ambiguity in the enforcement obligations in TRIPs.[6] For example, the requirement in article 42 that procedures be fair and

6. Papovich interview, op. cit.

equitable does not also require that they effectively deter counterfeiting. Judges must be given the authority to impose fines and sentences, but in practice they may not do so. These issues promise to engender disputes between intellectual property developers and industrial property authorities, even after TRIPs is fully implemented. It is likely that dispute settlement panels will be required to assess the true extent of the enforcement obligations over time.

Selection of Standards

Enforcement is important, but in dynamic terms the more critical question for the long term is whether the standards put forward in the implementation stage are appropriate for various countries. TRIPS sets out a list of minimum standards and countries cannot escape their obligations to implement them. However, these standards are generally quite broad, allowing considerable flexibility in their construction. This flexibility means that it is not necessary for countries to emulate the highly protective practices of the United States and the EU, which go well beyond those required by TRIPs in numerous dimensions. Rather, it is possible to select from a menu of IPRs standards and limitations with a view toward promoting certain economic and social objectives.

Designing and implementing appropriate standards is a complex business. In effect, TRIPs encourages nations to pursue their own goals in intellectual property rights, subject to two significant constraints:

1. The procedures adopted must meet at least minimum thresholds, which are considerably higher in some cases, notably in patents, than most previously in place in developing countries.
2. The regulation of IPRs cannot discriminate against foreign interests and cannot seriously prejudice the exploitation of IPRs by foreign firms. Either would invite the wrath of authorities in the technology-exporting countries and could backfire by discouraging the use of intellectual property assets in local markets.

Within this framework, it is possible to set out reasonable approaches to meeting TRIPs obligations while still paying attention to a country's needs. Economic development is a dynamic process; IPRs may be used fruitfully to push it forward. The dynamic shortcoming of absent or weak IPRs is that economies are liable to remain technologically isolated and increasingly to lag behind the information frontier. Such economies emphasize free riding on the technical advances of others, a strategy that has short-run competitive advantages but suffers from inadequate access to new technology and a growing inability to develop local strategies for fostering R&D and technical change.

The task in selecting IPR standards is to ensure that they promote dynamic competition, encouraging the transfer of technology from abroad that may be learned and diffused through the economy in acceptable ways. In short, TRIPs represents an opportunity to structure intellectual property rights to convert "free riders" into "fair followers" in Reichman's (1993) apt phrase. It is evident that countries at different levels of economic development would prefer to set standards of varying degrees of liberality.[7] The least-developed countries might opt for TRIPs-consistent minimal standards with wide limitations. Middle-income industrializing economies should see the value of more protective standards and firm recognition of trade secrets. Countries where most technology developers reside would prefer strict standards combined with regulation of competition. Given this variability in interests, definition of the word "fair" is problematic, depending on income levels, cultural traditions, and preferences.

A brief review of how standards may be varied is instructive.[8] First, consider patents, which must apply to all fields of technology for a minimum 20-year term under TRIPs. Yet countries may take advantage of exclusions from patent eligibility for purposes of maintaining public order, national defense, and environmental protection. They may exclude therapeutic, surgical, and diagnostic techniques, though not medical equipment.

Consistent with practice in many developed economies, patents need not be extended to scientific principles, mathematical formulas and algorithms, and discoveries of nature—a provision that could support excluding genetic discoveries. Patents need not pertain to higher life forms, nor must plant varieties be patented if they are protected by another system. Finally, the stipulation in TRIPs that computer programs be protected with copyrights as literary devices seems to envision that patent protection need not be extended to software. This exclusion appears in the patent laws of Brazil, Argentina, and China.

Beyond the eligibility question, countries have flexibility in defining the conditions for protection: Article 27.1 leaves the determination of these conditions up to each country. Developing countries could choose high standards of novelty and nonobviousness in order to certify an invention as patentable, though requirements much in excess of global practices would be of questionable utility. Patent authorities might be instructed to recognize only narrowly written claims, in order to promote the ability of competitors to invent around patents. In this context, a system of utility models or petty patents, with significantly lower thresholds defining the "inventive step," is procompetitive in principle, for it encourages domestic incremental innovation.

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7. See Evenson and Westphal (1997) for a fuller explication of such strategies.

8. See also Oddi (1996), Watal (2000), UNCTAD (1997), and Reichman (1993).

Authorities could also permit (1) opposition proceedings before the grant of a patent and (2) early disclosure of patent applications. So long as the right of priority is recognized and frivolous opposition is deterred, such procedures do not unduly prejudice the interests of applicants, and they encourage learning and information diffusion throughout the economy. Indeed, the United States has recognized the value in this approach by introducing legislation in 1999 to publish applications within 18 months of filing, consistent with European and Japanese practices, in order to promote dissemination of new information.[9]

Article 30 of TRIPs provides that member states may allow for unauthorized use of patented inventions under certain circumstances, so long as these exceptions do not unreasonably interfere with exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent holder. In practice, this allows countries to permit limited use for private and noncommercial purposes, for research and experimental or teaching purposes, and for preparation of individual medicines by pharmacies. It might also be invoked in the process of approving generic drugs, though a WTO dispute between the EU and Canada is testing this interpretation. Such limitations appear in the patent laws of many developed countries.

TRIPs places new limitations on the use of compulsory licenses of patented information but clearly recognizes their potential usefulness as competition-enhancing devices to ensure access to critical technologies. Indeed, on close reading Article 31 offers much leeway for specifying conditions under which compulsory licenses may be used (Watal 2000). It reflects a carefully crafted compromise between technology developers and potential users and does not unduly burden policymakers wishing to employ compulsory licenses in specified circumstances. Significantly, Article 31 does not limit the grounds for compelling licenses to abuses of patent rights, as some had sought. It is silent on how countries may define "working requirements." Nonexclusive and nonassignable licenses may be issued when patent holders have failed, within a reasonable period of time, to negotiate voluntary licenses with applicants offering reasonable commercial terms. Licenses must be used predominantly in domestic markets in order to protect the rights-holder's interests abroad. The rights holder should be paid adequate remuneration based on the economic value of the authorized use. Less stringent requirements pertain to compulsory licenses issued to correct practices that have been demonstrated by authorities to be anticompetitive.

The TRIPs language thus amounts to an increase in the cost of acquiring licenses but not a significant interference with conditions under which

9. This procedure would apply only to those inventions for which overseas protection is also sought, because those applications are subject to disclosure abroad in any event. Those applying only domestically could prevent 18-month disclosure.

licensing may be compelled. Recall, for example, that the new Argentine patent law expressly envisions the use of compulsory licenses, potentially permitting domestic pharmaceutical firms to retain relatively flexible access to foreign-owned patented drugs and chemical processes. It remains to be seen how sparingly such conditions will be applied.

As noted earlier, TRIPs requires member states to afford some protection for plant varieties, via either patents or an effective special regime. This is a new obligation. Such protection is not common in developing countries; and it is unlikely that many developing nations will provide patents for the foreseeable future. Rather, while countries are not required to join UPOV, they may be expected to follow its general framework of protection.[10] In particular, countries may provide for a breeders' exemption and a farmers' privilege. The farmers' privilege in particular, though unpopular among plant variety developers, is widely seen as an effective antidote to higher seed prices.

From the standpoint of dynamic efficiency and learning, it is sensible for technology-follower countries to encourage reverse engineering as an honest competitive practice, fully consistent with TRIPs. Such a right allows potential rivals to use unpatented information, but only at the cost of undertaking their own, potentially costly and time-consuming engineering and design efforts. While the issue has not been studied systematically, the procompetitive aspects of trade secrets in otherwise com-petitive economies has been supported analytically by Friedman, Landes, and Posner (1991) and advanced forcefully by Reichman (1994). Indeed, a regime protecting confidential information but with liberal treatment of reverse engineering could promise considerable dynamic benefits for industrializing economies.

For reasons discussed earlier, trademark protection can be similarly valuable in developing nations, for it provides incentives to develop brand recognition for domestically produced high-quality crafts, clothing, and foods, among other goods and services. It also could reduce the costs of transferring technology and monitoring licensees, tending to expand technology trade and franchising. Because the potential supply of trademarks is limitless, there is likely to be little effective market power associated with all but well-known international marks, which must be protected from speculative registration. To the extent that trademark owners impose

10. UPOV was originally negotiated in 1961 and revised in 1978 and 1991. Countries may adhere to either of the latter versions if they are members. UPOV 1978 requires provisions for the farmers' privilege (including the right to retain seed for own use and for noncommercial exchange or sale) and the breeders' exemption discussed earlier. However, UPOV 1991 disallows the exchange or sale of seeds and mandates that authorization of the rights holder be obtained for use of a variety that is essentially derived from a protected variety. Because of these and other less restrictive conditions, many developing countries have opted for UPOV 1978 over UPOV 1991. However, currently only the latter is open for accession (Watal 2000).

unreasonable or anticompetitive commercial conditions on licensees or engage in monopoly pricing, recourse may be made to competition policies and the international exhaustion doctrine.

In copyrights, TRIPs allows countries to set their own parameters of fair use or the unauthorized use of copies for achieving social objectives. Clearly, copying on a commercial scale cannot come under the rubric of fair use, for it would limit the value of the copyright. However, it is acceptable to allow limited copying for educational and research purposes; some countries extend the doctrine to a single "private use" exception. There are provisions in many countries, including the United States, for compulsory licensing of cable television broadcasts in order to serve remote areas. The scope of copyrights may also be limited by the first-sale doctrine and parallel imports.

In computer programs, wholesale copying must be prohibited, along with slavish copying of computer code. However, copyright by definition protects only expression; TRIPs therefore allows reverse engineering of software by honest means. In this context, programs that deliver essentially similar functional performance as original software are legitimate forms of competition, despite concerns about this standard on the part of major software developers in the United States. This ability to decompile software in order to understand the unprotected aspects of the code is partially responsible for the growth of applications software industries in numerous economies, developed and developing.

Copyrights and neighboring rights have considerable potential for encouraging cultural industries in developing countries, including film, broadcasting, literature, and music. To advance this potential, countries should establish an institutional framework, including national collection societies, to transfer consumer benefits to creators and performers. Finally, copyright protection should enhance the access of citizens and institutions in developing countries to electronic databases—at protected prices.

Beyond these and other functional areas of protection, both developing and developed countries must make choices about collateral regulations that bear directly on IPRs. Important among these policies are competition regulations and the treatment of parallel trade. Chapter 5 noted the strong implication that IPRs function best in open, competitive economies; competition maintenance is a crucial supporting mechanism. However, the issues are complex, as I discuss in the next chapter.

Within this broad milieu, nations have considerable latitude to set standards for IPRs and to regulate the behavior those IPRs engender. In principle, governments may be expected to establish standards that, while consistent with minimum TRIPs standards, could tilt the balance of competition toward technology users. It is evident that many choices made during the implementation period will not be to the liking of intellectual property developers in industrial nations. Their concerns will be reflected

in diplomatic representations and WTO disputes lodged by trade authorities, claiming that particular standards counter the intentions of TRIPs or that enforcement efforts are inadequate. Such cases will clarify TRIPs over time as panel reports accumulate judicial interpretations. In this important sense, perhaps above all, the TRIPs agreement remains a work in progress.

The Balance of Advantages and Costs in TRIPS

With its enormous complexity and the uncertainty about its implementation and operation, it is too soon to be confident about how TRIPs will affect economic interests in various nations. However, the issue is so important that some form of preliminary assessment is required. To do so, it is informative to organize the discussion into a temporal framework and to clarify the costs and benefits, only some of which may be quantified even roughly, that might emerge.

Short-Term Effects: Whither the Rents?

Despite considerable enthusiasm for the long-run implications of stronger IPRs, it is impossible to escape the logical conclusion that, in the short run, the policy reform essentially creates more market power where there was less. Because the ownership and exports of intellectual property are concentrated in the hands of firms in a few developed economies, the effect of TRIPs will be to shift the terms of trade in their favor, away from intellectual property importers. In turn, profits will be shifted from both developing countries and developed countries with a comparative disadvantage in intellectual property marketing, toward a few developed economies, the United States in particular. This process has been characterized as "a form of disguised US strategic trade policy" (Harris 1996, 361). Rodrik (1994, 449) claims that "to a first-order approximation, TRIPs are a distributive issue: . . . the effect of enhanced IPR protection in LDCs will be a transfer of wealth from LDC consumers and firms to foreign, mostly industrial-country, firms."[11]

Indeed, this is essentially the point of partial-equilibrium analyses of the potential effects of stronger patents in pharmaceuticals (Maskus 1990; Maskus and Eby-Konan 1994; Subramanian 1995; Watal 1999; Fink 2000). The conclusion from those analyses is that the rent transfers in awarding pharmaceutical product patents—assuming current patented market shares would continue as new products come on line but that market structure would be transformed—could range from small to large.

11. LDC stands for less-developed country.

This rather unsatisfying statement should be recognized for its qualitative importance. Additional market power awarded to predominantly foreign interests must reduce short-run welfare in technology-importing countries. If the market power is significant, as would be the case where initial market structures are competitive but the potentially patented share of the market is large, the transfers could be costly. Such calculations pertain strictly to monetary measures; they do not attempt to assess any spillover costs from reduced nutrition and health status as a result of higher-priced foods and medicines.

McCalman (1999b) made a more serious attempt to look comprehensively at the rent transfer issue. Rather than inferring the existence of market power indirectly from trade statistics, he followed Eaton and Kortum (1996) in looking at 1988 bilateral patent statistics for 29 countries, incorporating both industrial and developing nations. However, rather than assessing only the extent of technology transfers through the patenting channel, he also analyzed the implicit price of those transfers as it is influenced by patent rights. In particular, using an approach pioneered by Pakes and Schankerman (1984) he was able to infer the value of patent rights in each country by relating local parameters to the decision to patent. These parameters include the fiscal cost of patenting, the strength of patent protection, demand, and market structure variables that otherwise permit appropriation of the rents to an innovation. To make the idea concrete: an American firm, in deciding whether to patent in Mexico, would pay attention not only to patent costs and patent protection, but also to whether local imitation is likely to be effective without patents. If patents were costly or unnecessary for protecting the invention, the firm would choose not to absorb the cost and would supply the market through another channel, if at all.

McCalman used the Ginarte-Park (1997) index of patent rights, which is useful in this context for it decomposes patent laws into components reflecting specific characteristics. This permitted a closer attempt at capturing the patent changes TRIPs requires country by country. For example, Canada has strengthened patent enforcement by making infringement subject to criminal action and by providing for preliminary injunctions; it has raised the private value of patents by removing local production working requirements. Many developing countries must adopt similar enforcement mechanisms, remove working requirements, provide for reversal of burden of proof, and lengthen patent duration. Because each of these components, and others, may be identified in the GP index, their impact on patent value could be estimated econometrically using dummy variables. These coefficients are then applied to bilateral patent data to compute the anticipated rise in patent value, reflecting higher rents to domestic and foreign patent owners.

The econometric model was based on a theory that inventors license their technologies (intermediate inputs, which may or may not be patented

locally) to domestic firms, who then compete with potential imitators. Inventors charge a price that leaves domestic firms just willing to use the technology, taking into account expected obsolescence from imitation. Thus, before imitation occurs, inventors earn rents to new technologies.

In essence, the effect of stronger patents is to reduce the likelihood ("hazard rate") that imitation will be successful at any moment in time. The extent of this reduction depends on institutional changes to the patent laws, in addition to local demand and market structure effects. By making imitation more costly, stronger patents permit higher license fees for inventors, which translate into greater net rent transfers abroad to the extent that licensers are foreign. In turn, the higher license fees on existing patents move licensees up the demand curve, generating some additional deadweight losses.

McCalman's results are sufficiently striking that I list in table 6.1 estimates that I have updated from his computations. Before discussing these, it is important to understand the basic calculations. The counterfactual exercise was to ask what the additional net present value of patents would have been in 1988, had each country in the sample provided patent rights that complied with TRIPs. Because innovation and patenting rates were held constant, it was inherently a static calculation and an exercise in shifting rents.

I have used national GDP deflators and exchange rates to update McCalman's figures to millions of 1995 dollars. The figures were updated solely to reflect price changes between 1988 and 1995. The experiment still was McCalman's calculation of patent-valuation changes. While the update increased the magnitudes of the estimates somewhat and changed the net rent transfer ranking of some countries, it did not affect the central message.

In table 6.1, the overwhelming share of rents transferred by stronger global patent rights would accrue to the United States. Because its patent policy was already essentially TRIPs-compliant in 1988, the US was not required to strengthen its laws more than marginally, implying only a small outward rent transfer on existing patents. However, its massive ownership of patents abroad, in conjunction with stronger aspects of patent laws, would have earned an additional $5.85 billion in inward transfers, for a net transfer of $5.76 billion. In the terms of modern trade theory, this is an example of strategic trade policy, par excellence. Of course, it is equally appropriate to consider the weakness of international patents pre-TRIPs as a strategic trade intervention of technology-importing countries.

Other developed countries that would receive net inward transfers are Germany, France, Italy, Sweden, and Switzerland. Though the United Kingdom would experience a sizable gross inward rent flow of around $588 million, it would have an even larger outflow of around $1.22 billion, because TRIPs required the UK to provide for preliminary injunctions, to establish reversal of burden of proof in certain process patent

Table 6.1 Estimated static rent transfers from TRIPs-induced strengthening of 1988 patent laws (1995 $ millions)

Country	Outward transfer	Inward transfer	Net transfer
USA	92	5,852	5,760
Germany	599	1,827	1,228
France	0	831	831
Italy	0	277	277
Sweden	13	230	217
Switzerland	474	510	36
Panama	0	0.3	0.3
Australia	177	154	–23
Ireland	71	12	–59
New Zealand	79	8	–71
Israel	125	32	–93
Colombia	132	2	–130
Portugal	138	0	–138
Netherlands	453	314	–139
South Africa	183	15	–168
Greece	197	2	–195
Finland	281	47	–234
Norway	277	25	–252
Denmark	330	77	–253
Austria	358	83	–275
Belgium	470	111	–359
India	430	0	–430
South Korea	457	3	–454
Spain	512	31	–481
Mexico	527	1	–526
Japan	1,202	613	–589
UK	1,221	588	–633
Canada	1,125	85	–1,040
Brazil	1,714	7	–1,707

Source: Author's update of McCalman (1999b).

cases, and to make willful patent infringement subject to criminal action.[12] In the econometric model, these changes combined to increase substantially the value of UK patent protection in an amount much larger than the rise in the value of foreign patents held by British inventors. The Japanese case is similar.

12. These calculations reflect McCalman's interpretation of how well the GP index captured both existing patent laws and those required by TRIPs. For example, it is questionable whether TRIPs in fact required the United Kingdom to adopt criminal enforcement in patent cases, as he claims. Thus the estimates could suffer from two sources of measurement error and, indeed, McCalman's point estimate of the net UK transfer had a high standard error (that is, a relatively low degree of confidence). Nonetheless, the central message is important and the relative ranking seems accurate.

Among developed economies, Canada would realize the largest net loss from net changes in patent values. Again, the reason is that Canadian patent changes would sharply increase the value of patents held there. However, because foreign patents held by Canadian firms are overwhelmingly located in the United States, their value would not increase by much.

Among developing countries, the gross outward transfer would rise with the size of economies and the extent to which patents were strengthened. Because it owns so few patents, India would receive negligibly higher inward transfers, but the value of foreign-owned patents would rise by $430 million. The result for South Korea is similar, but outdated. Since 1988 South Korean firms have been granted far more patents abroad, suggesting that in current terms, the gross inward transfer could be much larger. Brazil would experience the largest net outward transfer among all countries in the sample.

These rent transfers are significant in both statistical and economic terms. McCalman compared these magnitudes to the benefits from liberalization of goods trade reported by Harrison, Rutherford, and Tarr (1996). That report used a computable general-equilibrium (CGE) framework to compute the international distribution of benefits from tariff cuts on manufactures, liberalization of agricultural protection, and elimination of the Multifiber Arrangement, as negotiated in the Uruguay Round.

Comparisons of the results of these two papers are questionable, though interesting. Harrison and colleagues found that the short-run gains for the US from multilateral trade liberalization were about $14 billion (in 1995 dollars).[13] Thus, the rent transfer gain on patents of $5.9 billion would raise this benefit by 42 percent.[14] Canada's short-run gains would be cut by 94 percent, from $1.106 billion to $66 million, and Brazil's by 76 percent, from $2.239 billion to $532 million. Accounting for the patent-valuation aspect of TRIPs, Mexico would actually experience a net welfare loss in the short run.

McCalman went on to compute the deadweight losses in each country from stronger patents. As discussed in chapter 3, these deadweight losses refer to the surplus lost when technology purchasers move up their demand curves. Net static welfare impacts would be the sum of net rent transfers in table 6.1 and deadweight patent losses. In his calculations, only the United States, France, Germany, and Italy registered net welfare gains from this effect of TRIPs. For all countries, the additional deadweight losses induced by stronger patents amounted to as much as 20

13. These gains comprised both efficiency effects and the recapture of rent losses on agricultural and textile quotas.

14. McCalman's static calculations are not meaningful in the long run, so I do not provide a comparison to the long-run results in one study by Harrison's group.

percent of the global efficiency gains from trade liberalization. These are big impacts, with benefits accruing largely to the United States.

The way to think about these results is that, as Eaton and Kortum (1996) demonstrated, there are technology spillovers across borders through international patenting. The bulk of those spillovers were channeled from American R&D to foreign competitors. The point of McCalman's analysis is that patent rights in many countries were inadequate to allow American inventors to extract more than partial rents from this licensing. Thus, TRIPs clearly shifts the rules of the game to favor US inventive firms. The net static result is losses for countries that are essentially technology importers or must strengthen their patent rights, or both, but gains for technology exporters with strong patents. As a whole, the world must lose in static terms because the effect of stronger patent rights is to raise global market power, engendering deadweight efficiency losses.

Moreover, similar processes would apply when other IPRs, including copyright and trademark enforcement, are strengthened. Careful analysis has yet to be done, but given the substantial sales of software, recorded entertainment, and consumer goods in developing countries, the transfer effects could be significant. Again, the conclusion is inescapable: the short-term impact of TRIPs is redistributive, with profits being shifted from imitative interests largely but not solely in developing economies to a few developed countries.

Long-Term, Will TRIPs Lift all Boats?

It follows that advocates of stronger IPRs in technology-importing countries must rely on claims that dynamic long-run benefits will emerge that outweigh the short-run costs. Economic analysis is less amenable to quantifying such gains because they are inherently uncertain. Significant shifts in policy, as represented by TRIPs, engender more than just price effects on existing volumes of goods, services, and technologies. They also change the structure of market competition and alter the payoffs on innovation and technology transfer.

As I indicated in chapter 4, there is considerable evidence that trade, FDI, and licensing react positively to the strength of IPRs. By themselves, increases in such activities do not imply increases in welfare in the host country, though there may be a presumption in that direction associated with competition, learning, and skill acquisition. It does seem that at least FDI is positively correlated with growth processes in economies that strengthen their IPRs.

In this context, it is interesting to compute the potential long-run effects of stronger patent rights on trade, FDI, and licensing volumes in selected countries (see table 6.2). The first column lists the GP index values as of 1995. Those in the second column are my rough estimates of what those

Table 6.2 Estimates of how TRIPs patent changes affect international flows of economic activity for selected countries (1995 $ millions)

Country	GP1	GP2	Mfg. imports[a]	High-tech mfg. imports[a]	FDI assets[b]	Unaffiliated royalties & license fees[c]
USA	4.86	4.90	308	–3	n.a.	n.a.
Canada	3.24	4.30	2,713	–42	–7,873	227
Germany	3.86	4.60	2,823	–64	–3,781	322
UK	3.57	4.60	3,726	–68	–17,229	351
Ireland	2.99	4.30	656	–14	–1,609	n.a.
Netherlands	4.24	4.60	109	–2	–1,133	24
Switzerland	3.80	4.60	880	–24	–2,382	60
Spain	4.04	4.60	2,734	422	–413	56
Portugal	2.98	4.00	1,973	309	290	n.a.
Greece	2.32	4.00	2,637	365	327	n.a.
Australia	3.86	4.30	338	–7	–846	44
New Zealand	3.86	4.30	80	–2	–135	7
Japan	3.94	4.50	1,610	–37	–4,078	1,261
Israel	3.57	4.30	971	149	200	19
Mexico	2.52	3.80	7,349	1,942	4,068	174
Brazil	3.05	3.75	1,351	271	1,391	49
Argentina	3.20	3.75	719	123	414	37
Chile	2.74	3.75	1,056	144	510	n.a.
Panama	3.53	3.75	7	na	134	n.a.
Colombia	3.24	3.75	417	68	156	n.a.
South Africa	3.57	3.75	184	25	27	24
South Korea	3.94	4.30	2,072	446	188	271
China	2.00	3.25	16,020	2,693	657	n.a.
Thailand	2.24	3.25	6,384	1,390	1,017	n.a.
Indonesia	2.27	3.25	3,163	318	861	79
India	1.17	3.25	6,552	653	573	260
Bangladesh	1.99	3.00	145	15	n.a.	n.a.

mfg. = manufacturing.
n.a. = not available.
a. Updated from Maskus and Penubarti (1995).
b. Computed from Maskus (1998a).
c. Computed from Yang and Maskus (2000c).

values would be after full TRIPs implementation. In brief, these estimates cluster countries at particular index levels, depending on prior existing protection and per capita income. For example, within the EU, low values are assigned to the poorer member states in recognition that their standards and enforcement efforts will continue to lag those of the richer states. Mexico is assigned a higher index than the other middle-income Latin American nations by virtue of its membership in NAFTA. The mini-

mum index is 3.0, which is calibrated to a lower-bound implementation of TRIPs standards.

Some of the hypothesized changes in the GP index are quite large, such as those for Greece, Mexico, and India. In such cases the application of elasticities estimated from an econometric model is particularly questionable because the underlying relationships are not likely linear. Thus, large changes in the policy variable may not engender changes that are consistent with the linear model. In the present case changes in the patent index have large impacts on predicted activity flows. In consequence, the estimates for countries with big index shifts are likely overstated.

With this caveat, consider the changes in imports of manufactures that could be induced by tighter patent regulations after TRIPs is phased in completely. These calculations, listed in the third column of table 6.2, result from applying the elasticities estimated by Maskus and Penubarti (1997) to 1995 imports. The volume effects depend on patent revisions, market size, and the extent to which the imitation threat would be relaxed by TRIPs. Results range from a small impact in the United States, which is not required to undertake much legal revision, to substantial increases in imports in China, Thailand, Indonesia, India, and Mexico, which must make significant changes.[15] Mexico has accelerated updates of its IPRs regime in part because of NAFTA commitments. The result here suggests that a substantial component of Mexico's increase in manufacturing imports in the 1990s may be attributed, other things being equal, to stronger patent protection.

It is instructive that many of the largest predicted impacts are in nations with strong imitative capacities. In contrast, Bangladesh would experience relatively weak impacts, though still positive.

The fourth column of table 6.2 reports similar computations for imports of high-technology manufactures, defined as pharmaceuticals, electrical machinery, and professional instruments. The sectoral regression estimates from the Maskus-Penubarti study implied that stronger IPRs in developed economies would actually reduce such trade because of a market-power effect and a diversion of trade to developing countries, which had strongly positive import elasticities in these goods.

Overall, the trade volume effects estimated here are significant for developing economies that undertake extensive patent revisions. For example, the increase in manufactured imports for Mexico of $7.3 billion would amount to 12 percent of its manufactured imports in 1995. Though this is likely an overestimate because of the large increase in patent rights entertained in the calculation, it does suggest that the effect of stronger patent rights could be important. This effect would take years to emerge because the patent obligations would be phased in over time.

15. China has largely met TRIPs requirements in anticipation of joining the WTO.

The increase in China's high-technology imports of $2.7 billion would amount to 2.5 percent of its manufacturing imports in 1995. Applying again the result from Coe, Helpman, and Hoffmaister (1997), this finding suggests that the stronger IPRs required by TRIPs could raise Chinese TFP by perhaps 0.25 percentage points per year, a significant productivity impact.

Consider next the potential impact of TRIPs on the international distribution of FDI. The figures in the fifth column of table 6.2 result from applying the elasticities of asset stocks (majority-owned by US-based MNEs) to changes in patent strength, taken from Maskus (1998a). Recall that the assets equation generated a negative coefficient on patent rights, suggesting that on average stronger patents would diminish local asset stock. However, there was a large positive coefficient on patents interacted with a dummy variable for developing countries, resulting in a positive elasticity. This result likely means that at low protection levels internalization decisions encourage FDI as patents get stronger, but that as protection exceeds a particular level, a substitution effect favors licensing over investment. In brief, there is negative elasticity of FDI with respect to patent rights in high-income economies but strongly positive elasticity among developing economies.

Using these estimated elasticities in conjunction with anticipated changes in patent rights engineered by TRIPs predicts the effects on asset stocks indicated in table 6.2. Reductions in asset stocks in the United Kingdom, Canada, and Japan would be large in absolute terms, around 2 or 3 percent of 1995 FDI assets. However, FDI is predicted to rise significantly in Brazil, Mexico, Thailand, and Indonesia as a result of stronger patents. Indeed, the increase in Mexican FDI assets would be 7.1 percent of US-owned assets in that country; in Brazil it would be 3.2 percent.

Turning finally to licensing, the figures in the final column of table 6.2 update results from Yang and Maskus (2000c), who estimated the effects of international variations in patent rights on the volume (in 1990 dollars) of unaffiliated royalties and licensing fees (a proxy for arm's-length technology transfer) paid to US firms. The elasticity of licensing with respect to patent rights was estimated to be 2.3, suggesting a significant sensitivity of technology trade to IPRs protection. Applying this elasticity to anticipated changes in patent rights, using existing fees in 1995, generates the predicted changes in volume. Japan would have a large absolute response, reflecting the importance of licensing in the Japanese economy. However, large responses, relative to prior licensing fees, were also predicted for Korea, Mexico, India, and Indonesia. Indeed, the analysis suggests that arm's-length licensing volume in Mexico would rise by a factor of nearly three and in Indonesia would more than double.

Recall that this analysis cannot distinguish between a higher technology content of licensing contracts and higher costs of acquiring technology

licenses. To the extent the predictions relate to the former, there would be additional technology learning available in recipient economies.

The findings just reported predict long-run impacts of the TRIPs patent provisions on imports, FDI, and market-based technology transfer. These figures may be uncertain but they are sufficiently robust for us to conclude that stronger IPRs could have potentially significant positive impacts on the transfer of technology to developing countries through each of these channels, especially in large developing countries with significant imitative capabilities. The results are less striking for the least developed economies, where the effects, though positive, are smaller.

Perhaps it is a leap of faith for poor countries to trust TRIPs to enhance their growth. However, there is a substantial body of anecdotal evidence that points to growth-enhancing structural changes in competition as various IPRs are strengthened. The strongest advocate is Robert Sherwood (1990, 1997), who has extensively studied these processes in Latin America. He cites an interviewee in Mexico, for example, who claimed that small companies developing a process or product innovation found it easier to attract investment after the new Mexican patent law provided greater certainty about its exploitation. Others have claimed that there was a significant increase in biotechnology patent applications after the 1991 patent law came into effect and that larger Mexican companies stepped up their internal R&D programs.[16]

In a similar vein, the interviews we conducted in Lebanon (Maskus 1997b) and China (Maskus, Dougherty, and Mertha 1998) provided evidence that product development and firm entry are elastic to the protection of trademarks, even in widely disparate markets. Further, trademark and trade secrets infringement was at least as costly to domestic as to foreign firms, who had greater resources to deal with it and more options to withdraw from the market.

Of course, anecdotal evidence does not demonstrate robust correlations across countries and time periods. Indeed, for every country that has been pushed forward by IPRs, it is possible to identify countries that engineered effective technological catch-up behind weak intellectual property protection. Japan, for instance, had a diffusion-oriented patent system after World War II and a policy of encouraging technology transfer on concessional terms; South Korea offered wide exclusions from patent eligibility until the late 1980s. Arguably, this also characterizes the United States, which provided no copyrights to foreign authors in the 19th century and until recently had weak trade secrets protection in many states.

Thus, as is typical in the intellectual property arena, it is difficult to make strong claims about the overall net distribution of gains and losses that could emerge from implementation of TRIPs. It seems clear that, in

16. Despite this claim, Mexican nationals have not appreciably increased their propensity to patent in the United States (www.uspto.gov).

the short run, countries that provide weak protection for imported technology, software, and entertainment products will find it more—perhaps significantly more—costly to acquire these items. The problem may be particularly severe for the poorest countries, though there are reasons to question how much more effective their IPRs will become as a result of TRIPs. In those countries, prospects for greater domestic innovation and enhanced dynamic competition seem remote. Their chances of benefiting from TRIPs stem mainly from its inclusion in the Uruguay Round agreements, which offer scope for effective compensation through greater market access abroad in textiles, apparel, and agriculture.

The potential rent loss extends to larger, semi-industrialized developing economies. However, in such countries domestic interest in advancing IPRs protection is emerging and might successfully transform their imitative skills into effective technical capabilities for legally adapting foreign technologies. Improving IPRs in a competitive and open economy could not only attract markedly more investment and technology licensing from abroad, it could also provide important incentives for domestic entrepreneurs to build new firms and market new products.

Net technology importers even among developed countries, such as Canada, Australia, and New Zealand, will find costs rising as a result of TRIPs. These negative effects stem not only from somewhat stronger domestic patent rights but also from the fact that the large potential increase in IPRs among industrializing, middle-income countries could reduce the relative attractiveness of such countries for investment. However, these are two-edged swords: markets in these countries are rapidly moving toward the home development of advanced technologies and new products in niche markets, as recent evidence suggests in Australia (Maskus 1998d). Such technologies and goods will also find expanding markets in developing countries as those nations strengthen their IPRs.[17]

The essential message from this analysis is that the economic implications of TRIPs will be different in each country, depending on a variety of complex factors. Among these are each nation's means of implementing TRIPs and its management of IPRs within its broader economic policy. At least as important are competitive market structures and endowments of human capital and technical skills. Thus, it is possible to be optimistic about the potential long-run effects of TRIPs, even in countries that currently lag well behind the technological frontier, as long as nations surround their IPRs with growth-enhancing supplemental policies. I return to this subject in the next chapter.

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17. McCalman's bilateral results indicated, for instance, that TRIPs would result in a net rent transfer from India to Australia of $16.4 million and from Mexico to Canada of $5.5 million.

TRIPs as an Economic Optimizer

Is TRIPs a movement toward a global economic optimum? This is a difficult question—perhaps even an unfair one. In theoretical terms, one could imagine a global economic planner setting policies to maximize net consumer surplus, with utility depending negatively on prices and positively on the introduction of new goods and cost-reducing innovations. Maximization would be subject to resource constraints and production functions, including those for developing and commercializing new knowledge. The solution to this problem would be to set IPRs (and other policies, such as tax incentives for R&D or human capital subsidies) so that the marginal benefit of additional products exactly balances the marginal cost of enhanced market power and induced investment in R&D. If the marginal gains to new products were larger than the marginal costs, it would be appropriate to tighten global IPRs protection. In the full economic solution, the planner would ensure Pareto efficiency by directing some compensatory payments (market access commitments) to individuals or countries because of the redistributive impacts associated with asymmetric comparative advantages in knowledge creation.

Such arguments support including TRIPs in the multilateral trading system. Intellectual property protection left entirely to national discretion suffers from two externalities, in principle: (1) Weak and variable patents could generate international spillovers from innovation with inadequate compensation, tending to reduce global growth. (2) The ability of domestic enterprises to free ride on international inventive activity could translate into policy competition that keeps national protection levels below what they would be in a globally welfare-maximizing configuration. The need for policy coordination provides a primary justification for a multilateral agreement on IPRs.[18]

In reality, things are not so neat. IPRs are by nature second-best solutions to the problem of static and dynamic failures in markets for information. They seek to provide adequate incentives for creators to invest in new information and to ensure users reasonable access to it. Necessarily this requires creating market power. Market failures often are magnified in an international context, where preferences vary across borders and over time. No instrument like TRIPs can be expected to operate efficiently on all margins in creating and disseminating information and, indeed, no such set of policies could be designed or negotiated. Unlike the competitive ideal of free trade that drives trade liberalization, there is no clear benchmark against which to assess the efficiency of a global IPRs agreement.

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18. One model making this case is put forward by McCalman (1999a). The arguments have not been tested empirically.

TRIPs may be expected to promise important dynamic global benefits if three questions are answered affirmatively:

1. Has the world been underinvesting in R&D, in the sense that socially valuable innovations have not been developed?
2. Does TRIPs set up sufficient incentives to induce significantly larger amounts of R&D?
3. Would there be adequate distribution of the fruits of this R&D across countries and regions?

On the first point, surveys suggest that there are high returns to private R&D in many developed economies and that the social returns considerably exceed the private returns.[19] Evidence on whether this is true globally is scarce, but given the findings in developed countries there may be a presumption in that direction. If so, the argument for stronger global IPRs through a mechanism like TRIPs is supported. To the extent that TRIPs promotes harmonization of technology protection policies at high levels, it would have the dynamic advantage that R&D resources would be aimed at projects with the highest global payoff, rather than toward projects only in countries with existing protection. If more innovation were targeted at developing countries with currently weak IPRs, they would achieve a dynamic benefit as consumers, providing a partial affirmative answer to question 3. Thus, TRIPs presents some promise of increasing the dynamic efficiency of global R&D allocation over time.

It is possible also to anticipate a positive answer to question 2. With TRIPs, major net exporters will reap greater returns on their intellectual property. According to McCalman's calculations (1999b), the additional returns could well be large enough, even in static terms, to induce further innovation. Moreover, because TRIPs improves the appropriability of future inventions, uncertainty in making such investments should be diminished. As markets expand in the presence of higher average levels of intellectual property protection, it is plausible also to expect increased innovative activity.

This positive view must be tempered by two observations. First, the survey evidence mentioned in chapter 4 indicated that, except in a few sectors, firms did not consider patents important stimulants to investment in R&D. Rather, imitation lags and marketing advantages provided sufficient lead time for first movers to extract most of the rents from innovation. If so, strengthening patent protection abroad would add market power generally but would induce more R&D only in such industries as pharmaceuticals, agricultural chemicals, and biotechnology. While promoting innovation in those sectors is important, the broader outcome

19. See the articles in Griliches (1984).

would be disappointing. However, this evidence is likely outdated. International imitation lags have fallen and second-comer firms in more countries have become effective competitors in many sectors.

Second, firms endowed with greater market power may optimally choose to earn higher rents without necessarily investing them in product innovation. It is possible to doubt, for example, whether Hollywood film production or American software innovation needs the stimulus of stronger foreign copyrights to induce them to market more products.[20]

As for whether TRIPs effects a reasonably broad distribution of gains across countries in the long run, an affirmative answer would require belief in the ability of IPRs to induce more rapid growth in developing nations. A number of mechanisms could support this possibility. Surely, however, the likelihood of such positive outcomes varies sharply by country.

It is therefore not surprising that developing nations insisted that TRIPs require only partial harmonization of IPRs by specifying minimum standards with a number of exceptions and limitations. Thus, while TRIPs clearly will upgrade protection around the world, it affords flexibility in designing national IPRs regimes.

The question of whether TRIPs will achieve a global economic optimum cannot be answered because we cannot identify the optimum. However, it moves incentives toward greater protection of new information, which could expand innovation and open new channels of technology acquisition. Recognizing the clear redistributive effects that would emerge from strong harmonization, it retains some flexibility for nations to choose their own regimes. By encouraging countries to recognize IPRs as fundamental conditions for promoting business, it should improve prospects for growth in many parts of the world.

Nonetheless, these beneficial impacts could be offset by exercises of market power on the part of IPRs holders and by arbitrary and excessive use of regulatory powers by government authorities. Thus, the answer to whether TRIPs moves the world closer to an optimum must be that it depends on the reactions of participants. Moreover, TRIPS is at least as much a political-economic equilibrium as it is an attempt to promote dynamic efficiency. Thus, it remains a work in progress and subject to additional reforms, as analyzed in the next chapter.

Regional Initiatives

The negotiation of TRIPs has not precluded the emergence of regional agreements on intellectual property protection, typically within the con-

20. This possibility is consistent with the finding by Mutti and Yeung (1997) that the enforcement of Section 337 by US trade authorities tended to raise complainant profits without increasing their R&D.

text of broader preferential trade areas (PTAs). Taking a page from the extensive policy coordination among countries of the EU through the Single Market Program, PTAs increasingly aim at deep regulatory integration. IPRs lead this integration. To the extent that regional standards become more protective and more harmonized than global standards under TRIPS, some interesting analytical questions emerge. In this section I address these issues qualitatively. To illustrate the concepts, consider the North American Free Trade Agreement: chapter 17 sets out substantive requirements for minimum IPRs standards that must be pursued by member nations. There is broad overlap between NAFTA and TRIPs; indeed, provisions in the former accord at times served as inspiration for provisions in the latter. Nonetheless, NAFTA standards are stronger in several important areas (Maskus 1997a). For example:

- In copyright NAFTA declares illegal the use of decoding devices for intercepting satellite transmissions.
- NAFTA requires pipeline protection for pharmaceuticals in the process of achieving regulatory approval, rather than the exclusive marketing rights provided in TRIPs.
- NAFTA establishes a five-year exclusive-use provision for confidential test data, which is absent from TRIPs.
- NAFTA sets out somewhat stronger protection than TRIPs for computer chips and trade secrets, and has tougher enforcement requirements.
- Finally, NAFTA gives participants less leeway in national implementation. For example, Mexico would find it more difficult to adopt fair-use exemptions and compulsory licensing procedures under NAFTA than under TRIPs.

The region that has advanced most toward international harmonization is the European Union. Membership in the EU requires the adoption of a series of policy directives issued by the European Commission on treatment of areas as diverse as database protection, confidential information, and biotechnological inventions. Moreover, the widespread membership of EU nations in the European Patent Office provides considerable uniformity in patentability standards. Given the EU's high average incomes, it is no surprise that EU standards are typically stronger than those of TRIPs.

There are also less extensive regional agreements on IPRs in the Andean Group and among several African nations.[21] In negotiating its Euro-Med trade agreements with several Mediterranean and North African nations,

21. On the Andean Group see Correa (1999).

the EU requires the partner country to adopt standards that are at least consistent with those in TRIPs. Similarly, the United States has actively pursued stronger standards in developing countries through bilateral investment treaties. For its part, the Asia Pacific Economic Cooperation Forum (APEC) typically exhorts its members to establish schedules for improving their intellectual property regimes.

The interesting point here is that in significant ways the IPRs provisions are stronger in NAFTA and the EU than in TRIPS. This situation raises questions about the efficiency implications of strong regional standards. Any answers would be only speculative at this point, and may always be, because identification of the effects would likely be impossible.

The issues relate to the inherently second-best character of both regional trade preferences and IPRs. The essence of PTAs is to provide discriminatory treatment in commercial policy; thus, there could be intellectual property *creation* (IPC) and intellectual property *diversion* (IPD). The former occurs when more intellectual property is created and marketed within a region strictly due to the expansion of regional demand and the replacement of inefficient local technology developers with more efficient ones. More fully integrated North American markets for technology and product development plus harmonized IPRs should help rationalize R&D programs in all three NAFTA member countries. For example, in some industries, such as chemicals, food products, and advanced textiles, plant-level scale economies tend to be high relative to firm-level scale economies. Given high transport costs to Mexico in those sectors, this situation could induce North American MNEs to transfer some of their R&D to Mexico. At the same time, in sectors with high firm-level economies associated with knowledge capital, such as transport equipment, machinery, and telecommunications, the effect should be to concentrate R&D efforts in the United States. Such rationalization impacts should provide long-term dynamic efficiency gains for the member nations, though perhaps at the expense of medium-term transition costs.

Perhaps more interesting is IPD, which occurs to the extent that less intellectual property owned by nonmember firms is exploited within the PTA. This could take the form of reduced demand for the products of those firms, reduced FDI within the region due to investment diversion, and market-based exclusion of foreign firms from regional technology development programs. This could happen even if the intellectual property standards within the PTA do not discriminate against nonmember countries.

Ultimately the question is whether the emergence of more and larger trading blocs sustaining regionally distinctive IPRs regimes would add to or subtract from the movement toward global uniformity implicit in TRIPs. Thus, while TRIPs is likely to offer more incentives for innovation aimed at global demands, those incentives could be offset by the skewed

incentives created by regional trading arrangements. Such a system could result in significant structural inefficiencies in many countries.

Summary

This chapter discussed the potential implications of the intellectual property norms emerging under TRIPs, arguing that the agreement will significantly upgrade global protection. As many countries are still in the implementation stage, decisions on the standards to be implemented could be contentious in trade policy terms. Nonetheless, countries at varying levels of economic development should recognize that the agreement is essentially a compromise between preferences of technology developers for strong standards and the needs of technology followers for flexibility. Countries should opt for standards that, while fully consistent with the requirements and spirit of the agreement, can promote dynamic competition in and reasonable user access to their markets.

The short-term effect of TRIPs should largely be to redistribute innovation and imitation rents away from intellectual property users to intellectual property developers. What is remarkable is that these benefits would accrue so heavily to the United States, while the net outward transfers would come from a broad swath of nations.

Nonetheless, there is reason for optimism about the longer-term effects of stronger IPRs on a global scale. Particularly in the markets of middle-income developing economies, stronger IPRs could have significantly positive effects on imports of high-technology goods, FDI, and inward technology transfer.

The evidence presented here also sets out a framework for thinking about how such gains in international economic activity could spill over into higher growth. It must be recognized, however, that the likelihood of such gains emerging depends strongly on the competitiveness of economies that strengthen their systems and on broader, collateral, regulatory systems. Thus, while it is important that TRIPs provides flexibility for countries to implement standards, they should be complemented by measures that set the stage for dynamic benefits.