

INTELLECTUAL PROPERTY CHALLENGES FOR DEVELOPING COUNTRIES: AN ECONOMIC PERSPECTIVE

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The global Intellectual Property system currently is undergoing substantial expansion and modernization, largely through implementation of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). The TRIPS agreement envisions significantly stronger protection for intellectual property rights, investments in regulatory agencies to enforce these rights, and more consistent regimes of protection across international borders. An important economic question is the likely impact of these changes on developing nations. The issues involved in analyzing the role of intellectual property rights in promoting economic development and growth are extremely complex. Many of the relevant concepts are difficult to measure. Expanded intellectual property regimes also have numerous, often contradictory impacts on a nation's development. Despite these complexities, a growing body of research suggests that stronger intellectual property rights, if properly structured, can increase economic growth and encourage technological development.

Developing nations face an important challenge reconciling intellectual property protection with the global push for more open, procompetitive trade. Professor Maskus has traveled to a number of developing countries and performed extensive economic research on the relationship of intellectual property rights regimes, trade, and economic growth. This article outlines the many issues that complicate this analysis, emphasizing the channels through which strengthened international intellectual property rights can stimulate or limit economic growth. After reviewing the current research, the article concludes that a regime of expanded property right protection holds considerable promise for promoting long-term economic growth and technological innovation among developing nations. Finally, the arti-

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cle provides policy and regulatory recommendations to complement intellectual property protection and curb potential system abuses. This article emphasizes the care that developing nations must exercise in implementing a new intellectual property regime.

I. INTRODUCTION

There are complex relationships between intellectual property rights (IPRs) and economic development and growth.¹ How effectively IPRs improve development processes depends on particular circumstances in each country. In theory, a decision by developing countries to adopt more protective regimes could either raise or reduce economic growth. Thus, the issue is empirical in nature and considerably more research needs to be done to understand the complexity involved. Economic evidence currently available is fragmented and somewhat contradictory, in part because many of the concepts involved are not easily measured. Nevertheless, a growing body of work suggests that stronger IPRs could increase economic growth and promote beneficial technical change if these property rights are structured in a way that encourages vigorous dynamic competition.² Developing nations thus face the important development challenge of fitting their new intellectual property regimes into a broader, procompetitive policy agenda.

The global IPRs system is undergoing substantial strengthening and modernization, largely through implementation of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). It is not possible to make strong claims that the new regime will improve prospects for economic growth and development. Consider two reasons for this uncertainty. First, an array of other factors influences growth in ways that could be more important than tighter IPRs. Such variables include openness to international trade and investment, encouragement of an adequate technology infrastructure, support for literacy and technical education, and macroeconomic stability. Second, IPRs could have numerous and contradictory effects on development, the importance of which would depend on the economic and social situation in each country. However, if developing countries embed their intellectual property systems within a broad and coherent set of collateral policies and transparent regulation, the systems bear considerable promise for promoting growth in the long run.

1. This article draws extensively from KEITH E. MASKUS, *INTELLECTUAL PROPERTY RIGHTS IN THE GLOBAL ECONOMY* (2000), especially chapters 5 and 7.

2. See KEITH E. MASKUS, *INTELLECTUAL PROPERTY RIGHTS IN THE GLOBAL ECONOMY* 199–216 (2000); Robert E. Evenson & Larry E. Westphal, *Technological Change and Technology Strategy*, in 3 *A HANDBOOK OF DEVELOPMENT ECONOMICS* 2209, 2228–36, 2288 (Jere Behrman & T. N. Srinivisan eds., 1995); Carlos A. Primo Braga et al., *Intellectual Property Rights and Economic Development: Background Paper to the World Development Report 1998*, at 9–11 (draft Apr. 18, 1999) (unpublished manuscript, on file with the *University of Illinois Law Review*).

In the next section, I analyze theory and evidence about mechanisms through which stronger intellectual property rights could expand or limit prospects for economic development. The main argument is that the complexities of development and IPRs could combine to generate a variety of positive and negative effects. The challenge for governments is to strike an appropriate balance that promotes rigorous but fair dynamic competition. Accordingly, in the final section I briefly discuss these broader policy challenges that developing countries should consider as complements for their expanding systems of intellectual property protection.

II. INTELLECTUAL PROPERTY RIGHTS AND ECONOMIC DEVELOPMENT

The issues involved in analyzing the role of IPRs in promoting economic development and growth are subtle and difficult. Strengthening IPRs may improve growth prospects under some circumstances but offer no improvement, or even discourage development under other circumstances.

One fundamental claim is that IPRs provide an important foundation for the development of modern business structures. Although this argument could be made at nearly all levels of economic development, the nature of IPRs as supporting mechanisms changes with income and technological advance. If structured to promote effective and dynamic competition, and centered within a framework of competitive processes and appropriate regulation, IPRs can foster technical change and growth.³

There are several channels through which IPRs could stimulate or limit economic development and growth. These processes are interdependent and their analysis requires a broad view of the incentives associated with intellectual property rights.

A. *Intellectual Property Rights Could Enhance Domestic Innovation*

A primary question is how IPRs affect technological innovation, diffusion, and learning. In the past many developing (some now developed) countries established systems that favored low-cost diffusion of information through imitation of foreign products and technologies. This approach would be favored to the extent that domestic innovation is insufficiently developed to warrant protection. However, weak IPRs can

3. For extensive reviews, see Evenson & Westphal, *supra* note 2; Keith E. Maskus, *The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer*, 9 DUKE J. COMP. & INT'L L. 109 (1998); and Primo Braga et al., *supra* note 2; see also Richard T. Rapp & Richard P. Rozek, *Benefits and Costs of Intellectual Property Protection in Developing Countries*, J. WORLD TRADE, Oct. 1990, at 75, 77-90 (making a case for a positive role for IPRs); and Robert M. Sherwood, *The TRIPS Agreement: Implications for Developing Countries*, 37 IDEA 491, 492-511 (1997) (same).

stifle technical change even at low levels of economic development, because much innovation is aimed at local markets and can benefit from protection via petty patents, utility models, trademarks, and trade secrets. Innovation in poor countries consists overwhelmingly of minor adaptations of existing technologies, the cumulative effect of which can spur growth in knowledge and economic activity.

To succeed economically, firms in developing economies may need to adopt new management and organizational systems and techniques for quality control. These investments tend to earn high social returns because they raise productivity and encourage wider adoption by competing firms.⁴ They are costly and are likely to be undertaken only when risks of unfair competition and misappropriation are small. Similarly, learning and technical change typically proceed through adapting available technologies to local needs. IPRs provide protection for firms undertaking those costs.

Furthermore, adequate and enforceable IPRs help reward risk-taking among new enterprises. For example, evidence suggests that reliance on utility models improved productivity in some technology-follower countries. In Brazil, utility models helped domestic producers gain a large share of the farm-machinery market by adapting foreign technologies to local conditions; in the Philippines they encouraged successful adaptation of rice threshers.⁵

In an econometric study, Maskus and McDaniel analyzed the channels through which the post-war-Japanese patent system (JPS) promoted Japanese technical progress. They measured growth by increases in the combined productivity of labor and capital, computing an index that economists call total-factor productivity (TFP). The JPS evidently was designed to encourage incremental and adaptive innovation and to promote the diffusion of knowledge throughout the advancing manufacturing sector. The policies used for this purpose included an extensive system of utility models, early disclosure of patent applications with active opposition proceedings, and narrow claim requirements. The authors found that this system induced large numbers of utility model applications for incremental inventions, which were developed in part from knowledge gleaned by reading prior applications for invention patents. In the aggregate, these utility models had a significantly positive impact on productivity growth, and patent applications had a weaker but also positive effect. Thus, utility models were an important source of technical change in Japan, and patent applications both directly and indirectly raised productivity. It is interesting that in recent years as Japan became a global leader in fundamental technology creation, its patent system shifted markedly toward stronger protection of basic inventions.

4. See Evenson & Westphal, *supra* note 2, at 2283–88.

5. See *id.* at 2253.

Recent evidence indicates that product development and entry of new firms is limited by weak trademark protection in poor nations. A recent survey of trademark use in Lebanon provided information on this claim.⁶ Lebanon has an extensive set of IPRs laws, but they are weakly enforced. Clothing firms have a strategy of designing apparel of high quality and style aimed at Middle Eastern markets. This business model has sometimes been frustrated by trademark infringement in Lebanon and in neighboring countries where protection is even weaker. The problem is worse in food products, where firms lose business to extensive misappropriation of their trademarks. Further, this misappropriation has limited attempts to build niche markets for Lebanese foods in the Middle East and elsewhere. Related complaints exist among innovative producers in the cosmetics, pharmaceuticals, and metal-products sectors. The point is that product development and entry of new firms is restrained by trademark infringement targeted at domestic enterprises.

Similar problems exist in China, as analyzed in another survey.⁷ The information garnered from interviews of enterprise managers strongly suggested that trademark infringement significantly and negatively affects innovative Chinese enterprises. Examples were cited of difficulties facing Chinese producers of their own brands of consumer goods, such as soft drinks, processed foods, and clothing. Building brand recognition in China requires costly investments in marketing and distribution systems. Enterprises that achieve this recognition often find their trademarks applied to counterfeit products in a variety of product categories. Such products generally are of lower quality and can damage the reputation of the legitimate enterprise, sometimes forcing enterprises to close down or abandon their trademarks. The authors claimed that the situation likely has an important deterrent effect on enterprise development in China and effectively prevents marketing across regions of the country, which would foster economies of scale. Note that trademark infringement in China is concentrated on labor-intensive products in which China has a strong comparative advantage. From this evidence it seems that trademark violations may particularly frustrate enterprise development in poor nations.

Copyrights also may materially promote business development. In the presence of weak and poorly enforced protection, copyright industries, such as publishing, entertainment, and software, are likely to be dominated by foreign enterprises (which can absorb temporary losses and afford to deter infringement) and pirate firms. Thus, imitative copies are cheaply available but the economy's domestic cultural and

6. See Keith E. Maskus, *Strengthening Intellectual Property Rights in Lebanon*, in *CATCHING UP WITH THE COMPETITION: TRADE OPPORTUNITIES AND CHALLENGES FOR ARAB COUNTRIES* 251, 253–56 (Bernard Hoekman & Jamel E. Zarrouk eds., 2000).

7. See Keith E. Maskus et al., *Intellectual Property Rights and Economic Development in China* 21–24 (July 29, 1998) (unpublished manuscript, on file with the *University of Illinois Law Review*).

technological development is discouraged. This process was also evident in the Lebanese survey.⁸ In Lebanon, there is a small but vibrant film and television industry that believes it could successfully export to neighboring economies with stronger copyright protection. In China, the domestic software industry has successfully developed localized business applications that do not invite much piracy, but the industry has failed to write fundamental program platforms that would be more susceptible to unauthorized copying.⁹ Thus, domestic business interests in stronger protection have emerged and are promoting enforcement.

Copyrights do more than deter piratical copying. They provide a contractual framework within which ownership rights may be organized and transacted. This framework is particularly important for building modern creative industries, such as recorded music, films, and publishing. These industries emerge from the artistic efforts of numerous participants: composers and authors, performers, recording studios, manufacturing firms and publishers, and distributors. Allocating rights to each of these activities is a complex phenomenon that cannot readily be managed in the absence of a legal framework for copyrights.¹⁰ Therefore, even though developing countries may enjoy an abundance of creative musicians and performers, they may not be able to convert that abundance into widely marketable products without policy intervention.

B. Intellectual Property Rights Could Attract Technology Transfer

Domestic innovation could be one source of long-term growth encouraged by IPRs. These benefits could come also from greater volumes of imports, inward foreign direct investment (FDI), and licensing, all of which embody technology transfers in some degree.

Regarding international trade, IPRs were included in the Uruguay Round on the grounds that variable standards distort international trade. Indeed, economic theory shows that weak protection could raise or reduce trade, depending on many factors.¹¹ It also is possible that excessively protectionist IPRs could deter legitimate trade or facilitate collusion. Suppose that a developing country implements stronger patents. This policy establishes a basic trade-off between greater market power for rights-owning firms and greater market demand for those firms as local imitators are made less competitive. The first effect would monopolistically reduce trade volumes, but the second effect would increase

8. See Maskus, *supra* note 6, at 256–59.

9. See Maskus et al., *supra* note 7, at 9.

10. See RICHARD E. CAVES, CREATIVE INDUSTRIES: CONTRACTS BETWEEN ART AND COMMERCE 280–85 (2000); Keith E. Maskus, Comments on Economic Aspects for the Workshop on Developing the Music Industry in Sub-Saharan Africa 9–10 (June 20, 2000) (unpublished manuscript, on file with the *University of Illinois Law Review*).

11. See Keith E. Maskus & Mohan Penubarti, *Patents and International Trade: An Empirical Study*, in QUIET PIONEERING: ROBERT M. STERN AND HIS INTERNATIONAL ECONOMIC LEGACY 95, 95–97 (Keith E. Maskus et al. eds., 1997).

trade. Because no certain prediction may be made, a clear picture must come from empirical analysis.

In a pair of studies, Maskus and Penubarti estimated the relationship between patent rights and bilateral trade in manufacturing sectors. The data set covered twenty-two exporting countries and seventy-one importing nations in 1984. Explanatory variables included importer per capita GNP, tariffs, and a version of the patent index advanced by Rapp and Rozek.¹² The patent index was combined with indicator variables for small and large developing countries in order to capture the effects of market size and economic development. The authors found that within large developing economies the strength of national patent laws had a positive and significant impact on imports in many product sectors. In these countries the market-expansion effect dominated, indicating that weak patents in large developing economies are barriers to manufacturing imports. The impacts were weaker but also positive in the small developing countries.

To determine the economic significance of these findings, I calculated the increases in imports that the model would predict from changes in patent laws in selected countries.¹³ The implied trade elasticities were applied to rough conjectures about the rise in the patent indexes (GP) devised by Ginarte and Park¹⁴ that would result from implementation of the TRIPS Agreement. The scenarios entailed marked increases in the indexes of developing countries but did not impose full harmonization with laws in developed countries. The calculated long-run trade effects would emerge only after TRIPS standards are phased in and markets adjust to the new policy regimes.

Results are provided in the fourth column of Table 1. The volume impacts depend on patent strength, market size, and the imitation threat that would be relaxed by TRIPS. Results range from a small impact in the United States, which does not need much legal revision, to substantial increases in imports in China, Thailand, Indonesia, India, and Mexico.¹⁵ Mexico has modernized its IPRs regime in part because of commitments under NAFTA. The result here suggests that much of Mexico's rise in manufacturing imports in the 1990s may be attributed to stronger patent protection. Overall, the trade-volume impacts estimated here are significant for most developing economies. For example, the increase in Mexican manufactured imports of \$7.3 billion would amount to 12% of its manufactured imports in 1995. Note that many of the largest trade impacts are in countries that may be presumed to have strong imi-

12. See Rapp & Rozek, *supra* note 3, at 77–90.

13. See MASKUS, *supra* note 1, at 186–91.

14. See Juan C. Ginarte & Walter G. Park, *Determinants of Patent Rights: A Cross-National Study*, 26 RES. POL'Y 283, 284–91 (1997).

15. China has largely met TRIPS requirements in its legislation in anticipation of joining the WTO. See Maskus et al., *supra* note 7, at 1.

tation capacities. In contrast, Bangladesh would experience relatively weak impacts.

The fifth column provides results for imports of high-technology manufactures, including pharmaceuticals, electrical machinery, and professional instruments. The regression estimates implied that stronger IPRs in developed economies would actually reduce such trade because of a market-power effect. In contrast, developing countries had strongly positive import elasticities in these goods. The \$2.7 billion increase in China's high-technology imports would amount to 2.5% of its manufacturing imports in 1995. Applying a result from Coe, Helpman, and Hoffmaister,¹⁶ this finding suggests that the stronger IPRs required by TRIPS could raise Chinese TFP by 0.25 percentage points per year, a significant productivity gain.

Smith extended this work by analyzing manufacturing exports of U.S. states to ninety-six countries in 1992. Her econometric results found that the market-expansion effect dominated among the industrial countries, attesting to the effectiveness of their IPRs in deterring imitation. This was especially the case in patent-sensitive industries, such as chemicals and instruments. The market-expansion impact was pronounced in U.S. trade with middle-income economies displaying weak patent rights and strong imitation threats. Thus, countries such as Brazil and Malaysia should observe rising trade volumes as protection increases. Finally, the market-power effect dominated among the group of nations—primarily the least-developed countries—with weak imitation possibilities.

Two important conclusions emerge from this work. First, weak patent rights are significant barriers to manufacturing trade, but primarily within the group of industrializing economies that pose credible imitation threats. As these countries strengthen their regimes they will attract rising import volumes of high-technology goods, which should confer a beneficial growth impact. Second, poor countries are not a competitive threat and their weak patent regimes do not concern technology developers. As they adopt stronger patents their economies could be exposed to monopoly impacts with detrimental effects on their terms of trade.

Turning to FDI, economic theory finds that its relationships with IPRs are subtle and complex.¹⁷ Identifying these relationships requires empirical analysis. Two early studies could not find a relationship between simple measures of IP protection and the international distribution of FDI by U.S. multinational enterprises.¹⁸ Neither could a recent

16. See David T. Coe et al., *North-South R&D Spillovers*, 107 *ECON. J.* 134, 142 (1997).

17. See Keith E. Maskus, *The International Regulation of Intellectual Property*, 134 *WELTWIRTSCHAFTLICHES ARCHIV* 186, 197 (1998).

18. See Edwin Mansfield, *Unauthorized Use of Intellectual Property: Effects on Investment, Technology Transfer, and Innovation*, in *GLOBAL DIMENSIONS OF INTELLECTUAL PROPERTY RIGHTS IN SCIENCE AND TECHNOLOGY* 107, 122 (Mitchel B. Wallerstein et al. eds., 1993); Keith E. Maskus & Denise Eby-Konan, *Trade-Related Intellectual Property Rights: Issues and Exploratory Results*, in

paper detect significant effects in a gravity framework.¹⁹ However, two other studies found positive evidence. In the first, the authors found that weak patents had a significantly negative impact on the location of American FDI.²⁰ In the second, I argued that estimation should account for the joint decisions made by investors.²¹ In particular, multinational firms may choose to export, increase investment, or transfer technology directly in response to stronger patent rights. I estimated a simultaneous set of equations to capture these joint impacts in a set of forty-six countries that are hosts for U.S. FDI, using annual data from 1989 to 1992. The assets equation generated a negative coefficient on patent rights for developed economies. However, there was a large positive coefficient on patents in developing countries. Thus, it seems that at the low protection levels in developing countries, firms choose to expand FDI as patents get stronger. By contrast, as protection exceeds levels consistent with regimes in developed economies, firms tend to substitute away from FDI toward formal licensing.

Applying the implied elasticities to the changes in patent rights associated with TRIPS predicts the impacts on asset stocks in the sixth column of Table 1. Reductions in asset stocks in the United Kingdom, Canada, and Japan would amount to between 2% and 3% of 1995 FDI assets. However, such investments would rise significantly in Brazil, Mexico, Thailand, and Indonesia as a result of stronger patents. The increase in the Mexican FDI asset stock would be 7.1% of U.S.-owned assets there and that in Brazil would be 3.2%.

Economic models also indicate that technology and product licensing would be affected ambiguously by stronger patents. Tighter regimes would reduce the risk of local imitation, thereby raising fees that foreign licensors could charge and causing licensing volumes to fall. Nevertheless, tighter protection would lower the costs of striking licensing agreements, raising incentives to license.²²

The figures in the final column of Table 1 are computed from the results in Yang and Maskus,²³ who estimated the impacts of patent rights on the volume of unaffiliated royalties and licensing fees paid to U.S. firms. The elasticity of licensing with respect to patent rights was estimated to be 2.6, suggesting that technology trade is sensitive to IPRs protection. Applying this elasticity to anticipated changes in patent rights

ANALYTICAL AND NEGOTIATING ISSUES IN THE GLOBAL TRADING SYSTEM 401, 414–15 (Alan V. Deardorff & R.M. Stern eds., 1994).

19. See Primo Braga et al., *supra* note 2, at 9–11.

20. See Jeong-Yeon Lee & Edwin Mansfield, *Intellectual Property Protection and U.S. Foreign Direct Investment*, 78 REV. ECON. & STAT. 181, 182–84 (1996).

21. See Maskus, *supra* note 17, at 186–208.

22. See Guifang L. Yang & Keith E. Maskus, *Intellectual Property Rights, Licensing, and Innovation in an Endogenous Product-Cycle Model*, 53 J. INT'L ECON. 171, 180–82 (2001).

23. See Guifang L. Yang & Keith E. Maskus, *Intellectual Property Rights and Licensing: An Econometric Investigation 5* (May 2000) (unpublished manuscript, on file with the *University of Illinois Law Review*).

generated the predicted changes in licensing volumes. Japan would have a large 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, arm's-length licensing volume in Mexico would rise by a factor of nearly three. To the extent that expanded licensing volumes reflect a higher technology content of licensing contracts, there would be additional information available in recipient nations.

The findings just reported are predictions of long-run impacts of the TRIPS agreement on imports, FDI, and market-based technology transfer. These figures must be treated cautiously, but they suggest that stronger IPRs could have potentially significant and positive impacts on the transfer of technology to developing countries. This result is especially strong in large developing countries with significant imitative capabilities.

C. *Intellectual Property Rights Are Administratively Costly*

Countering these potential long-run gains are economic costs that new or stronger systems of protection could engender. The costs of developing a system adequate for handling mere counterfeiting cases, let alone complicated patent disputes, can be substantial. There are the significant fixed costs of developing examination and registration offices and equipment; drafting administrative procedures; and training examiners, judges, and customs authorities. There are further recurrent costs that will rise as IPRs come into greater use.

UNCTAD²⁴ provides rough estimates of the costs of complying with TRIPS in selected developing countries.²⁵ In Chile, additional fixed costs were estimated at \$718,000 and annual recurrent costs at \$837,000. An Egyptian expert thought the fixed costs would be perhaps \$800,000, with additional annual training costs of around \$1 million. Bangladesh expected one-time costs of administrative TRIPS compliance to be \$250,000 and over \$1.1 million in annual costs for judicial work, equipment, and enforcement. Note that professional administrators and judges are scarce in Egypt and Bangladesh, suggesting that these estimates may be low. Indeed, one of the significant costs of implementing an effective system is that it would divert scarce professional and technical resources out of other productive activities.

24. U.N. CONFERENCE ON TRADE & DEV., THE TRIPS AGREEMENT AND DEVELOPING COUNTRIES, at 23–26, U.N. Doc. UNCTAD/ITE/1, U.N. Sales No. E.96.IID.10 (1996) [hereinafter UNCTAD].

25. *See id.*; J. MICHAEL FINGER & PHILIP SCHULER, IMPLEMENTATION OF URUGUAY ROUND COMMITMENTS: THE DEVELOPMENT CHALLENGE 50–52 (World Bank Dev. Research Group Trade, Policy Research Working Paper No. 2215, 1999) (giving a broader view of the costs of implementing the Uruguay Round provisions in the least developed countries).

These considerable fixed costs suggest that the demand for IPRs must be large to permit a country to achieve administrative economies of scale. Thus, small, poor countries are unlikely to develop much commitment to institutional reform for some time, unless they may recover these costs through fees, avail themselves of technical and financial assistance from abroad, and take advantage of cooperative international agreements to help cut their costs. Membership in the Patent Cooperation Treaty, for example, provides significant economies because examiners may read the decisions of major patent offices about novelty and industrial applicability, rather than undertake such examinations themselves.

D. Intellectual Property Rights Shut Down Infringing Activity

In most developing economies there is significant employment in producing counterfeit goods and pirated copies of music and videos. These workers must find alternative employment as stronger standards are enforced. This need to adjust labor is the primary initial policy challenge.

There is no systematic evidence on the extent of this problem. Some illustrative information was compiled from a recent survey of Lebanese firms.²⁶ Survey results were used to calculate the potential static employment and price impacts of stronger IPRs. For example, software copyrights were assumed to cut piracy by 50%, which would reduce employment by 717 workers. However, it would shift demand toward the goods of legitimate producers and distributors, causing their employment to rise by 426 workers, leaving a net employment loss of 291 workers. Note that employees in legitimate enterprises made far higher wages on average than those in piratical firms. Furthermore, interviews suggested that many of the displaced workers would be hired by the expanding firms or would start their own enterprises. Similar computations showed that there would be net job losses in printing and publishing and in music, video, and film as illegal copying was reduced.

Other industries considered were food products, cosmetics, and pharmaceuticals, which faced both trademark and patent infringement. The pharmaceuticals sector in Lebanon is based on copying and marketing active ingredients that were not patented in Lebanon. In the model, patents were assumed to raise patent licensing fees by 50% and to eliminate trade in infringing products, while trademark enforcement was assumed to reduce counterfeiting by 50% and to raise licensing fees by 20%. These impacts would both reduce infringement and raise costs for legitimate firms. Accordingly, employment would fall in both activities, with a total employment loss of 550 workers. Employment losses in the food products sector were larger still.

26. See Maskus, *supra* note 6, at 262–63, 270–72, 274, 276.

In total the calculations suggested that employment in Lebanon could fall by 5,459 workers, which was 0.5% of the formal labor force in Lebanon. Thus, the problem could be small relative to the overall labor market, though the costs would be concentrated in industries and areas where piracy was common. It is questionable whether this result would hold in other countries. In economies where labor markets are inflexible and economic growth is stagnant, the associated adjustment costs could be substantially greater. This provides another reason to doubt that a firm political commitment to reducing infringement will be forthcoming in many developing countries, even over the medium term.

E. TRIPS Could Transfer Rents

Technology-importing countries are concerned that stronger protection could raise costs for acquiring new technologies from foreign patent owners. McCalman provided striking evidence about this issue.²⁷ He estimated the impacts of stronger patent rights required in TRIPS on the value of 1988 international patent portfolios. The economic value of patents in different countries depends in part on the strength of local protection. The author determined the required changes in patent laws, as measured by the GP index, for twenty-nine countries and applied these changes to international patent stocks in order to calculate the implied changes in economic rents if the stronger laws had been in place. The analysis held patent stocks constant at pre-TRIPS levels and did not account for any induced changes in innovation.

I updated his calculations to millions of 1995 dollars and report particular results here. Overwhelmingly, the United States would gain the most income through such rent transfers, with a net inflow of \$5.8 billion per year. U.S.-headquartered firms owned large stocks of patents in many countries that were required by TRIPS to strengthen their protection, although U.S. law was subject to virtually no change. Germany would earn additional net income of \$997 million on its patent portfolio. Most countries would experience a net outflow of patent rents, both because of significant changes in their laws and because they tended to be net technology importers. The largest net outward shift of \$1.3 billion would apply to Canada, in which many U.S.-owned patents would receive stronger protection. Developing countries also would pay more on their patent stocks, with Brazil suffering a net outward transfer of around \$1.2 billion per year. These calculations suggest that TRIPS could have a significant impact on net incomes earned from international patents. For

27. Phillip McCalman, *Reaping What You Sow: An Empirical Analysis of International Patent Harmonization*, J. INT'L ECON. (forthcoming 2001) (manuscript, at 24-28, on file with the *University of Illinois Law Review*).

example, an additional transfer of \$5.8 billion would amount to 28% of net royalties and licensee fees earned by U.S. firms in 1995.²⁸

These are static zero-sum calculations that ask what the additional income on existing patents would have been under TRIPS. Given the result, TRIPS could be viewed as an outstanding example of “strategic trade policy” on behalf of the United States, though it is equally appropriate to think of weak IPRs in importing countries as a means of appropriating rents from American inventors.

F. Intellectual Property Rights Could Generate Abuses of Market Power

Another concern is that IPRs could support monopoly prices and competitive abuses. For example, establishing product patents in pharmaceuticals and biotechnology, along with plant breeders’ rights, should confer greater market power on rights holders. These firms might reduce sales to establish monopolistic prices in medicines and industrial and agricultural inputs. Evidence suggests that patents support considerably higher prices for protected drugs than for copied and generic drugs.²⁹ Watal³⁰ computed that patent coverage in India could raise average, patentable drug prices by perhaps 50% from a 1994 base.

The degree to which such price increases would occur depends on factors such as the competitiveness of pharmaceutical markets, the share of drug production that is copied from other drugs, and the elasticity of demand for medicines. In India the current market structure is competitive because of extensive imitation. Thus, the introduction of patents could place marked upward pressure on protected drug prices. For instance, prices of protected drugs at small pharmacies in Beijing and Shanghai may have risen by a factor of three or four on average since the introduction of exclusive marketing rights in 1991 and patents in 1993.³¹

There are no systematic studies of how software prices vary across countries with differing levels of copyright protection. It might be thought that program prices would be much higher in light of differences between retail prices of legitimate and copied programs. For example, in December 1997 it was possible in Hong Kong to purchase a pirated copy of Microsoft Office 97 for approximately \$6, but the retail price for a legitimate copy was around \$1,500. In the summer of 1998, the same product sold for approximately \$1,000 in Beijing.³² Thus, if enforcement were

28. INT’L MONETARY FUND, BALANCE OF PAYMENTS STATISTICS YEARBOOK, PART 1: COUNTRY TABLES 848 (1997).

29. See JEAN O. LANJOUW, THE INTRODUCTION OF PHARMACEUTICAL PRODUCT PATENTS IN INDIA: “HEARTLESS EXPLOITATION OF THE POOR AND SUFFERING”? 5 (Nat’l Bureau of Econ. Research, Working Paper No. 6366, 1998).

30. Jayashree Watal, *Pharmaceutical Patents, Prices and Welfare Losses: Policy Options for India Under the WTO TRIPS Agreement*, 23 WORLD ECON. 733, 735–39 (2000).

31. See MASKUS, *supra* note 1, at 162.

32. Notes from Field Research (on file with author).

to support the existing prices of legitimate programs, the impact on software customers would be significant.

However, software firms may choose to sell in countries like Hong Kong and China at low volumes with substantial markups, reflecting inelastic demand from corporate and government users. The markups would accrue partially to local distributors, who may be protected also by restrictive distributorship laws. Thus, as markets deepen over time under copyright protection, software firms could well supply higher volumes of legitimate copies at considerably lower prices. Prices of copyrighted software have fallen sharply in Taiwan since enforcement against counterfeiting began in the mid-1990s, in part because of competition from local developers.³³

Therefore, concerns about monopolistic prices supported by IPRs could be valid. However, if IPRs are enforced within markets in which competition is otherwise rigorous, such impacts should be muted by the presence of market substitutes.

The market power created by IPRs raises risks of anticompetitive efforts to extend the reach of IPRs beyond permissible limits. Perceived abuses are often strategic business decisions, including selling practices and licensing restrictions. There is a large literature on the competitive effects of market power created by IPRs.³⁴ There are few concrete competition rules in the area because of the complex nature of markets for information and technology. Vertical licensing agreements, for example, could ensure downstream product quality—improving competition. However, tie-in sales of unrelated products to technology purchasers may represent an attempt to extend a property right—damaging competition.

Potential competitive abuses include horizontal cartels established through licensing agreements that fix prices, limit output, or divide markets; licensing agreements and tie-in sales that exclude rival firms from competing in particular markets by raising entry barriers; attempts to acquire excessive market power by purchasing exclusive rights to competing technologies and products, with the intention of preventing their commercial use; and bad-faith litigation and opposition proceedings to exclude competitors. These problems may be particularly costly in nations where potential rivals are small and therefore lack the resources needed to defend themselves. The task for competition authorities is to distinguish abusive acts from legitimate exploitation of IPRs. The complexity of this problem perhaps makes it advisable for developing coun-

33. Notes from Interviews in Taipei (Dec. 1997) (on file with author).

34. *E.g.*, ORG. FOR ECON. COOPERATION & DEV., COMPETITION POLICY AND INTELLECTUAL PROPERTY RIGHTS (1989); UNCTAD, *supra* note 24, at 53–57. *See generally* ROBERT D. ANDERSON & NANCY T. GALLINI, COMPETITION POLICY AND INTELLECTUAL PROPERTY RIGHTS IN THE KNOWLEDGE-BASED ECONOMY *passim* (1998) (focusing on the Canadian economy).

tries to adopt the American “rule-of-reason” approach, rather than the E.U. approach of codifying rules covering specific actions.

G. Intellectual Property Rights Promote Growth in Open Economies

The considerable complexity in the relationships among IPRs, competition, and business development suggests that no theoretical prediction may be made about the effects of protection on economic growth. However, economic evidence supports two important conclusions. First, IPRs encourage growth more readily in economies that are open to international trade and investment. In addition to the direct impacts on productivity from greater trade and FDI, foreign competition pushes domestic firms to invest in new technology and higher product quality. Firms in open economies are more likely to absorb the costs of technology transfer when returns to those investments are supported by IPRs. A recent study discovered that the impact of stronger patents was to raise growth rates by 0.66% on average in open economies in comparison with closed economies.³⁵ Thus, combining open markets with stronger IPRs increases growth.

Second, other economic variables help determine the effectiveness of IPRs. One study found a strong and positive impact of patents on physical investment and on R&D spending, which in turn raised growth.³⁶ Another paper showed that FDI raises growth performance in economies with supplies of skilled labor exceeding certain threshold levels.³⁷ These skills are important for promoting local adaptation and learning new technologies.

Thus, IPRs, openness, and investments in physical and human capital operate jointly to raise productivity and economic growth. Unfortunately, these processes have yet to take firm hold in many developing countries. They appear to become more complex and cumulative as countries grow richer. Thus, the role of IPRs in growth is central to the details of complex development processes.

III. CONCLUSION: COUNTRIES NEED AN INTEGRATED POLICY FRAMEWORK

Economists have made substantial progress in understanding the complex trade-offs between intellectual property rights and international economics. The international dimension complicates the analysis because of the great diversity of interests in protection among nations.

35. See David M. Gould & William C. Gruben, *The Role of Intellectual Property Rights in Economic Growth*, 48 J. DEV. ECON. 323, 341 (1996).

36. See Walter G. Park & Juan Carlos Ginarte, *Intellectual Property Rights and Economic Growth*, 15 CONTEMP. ECON. POL'Y, Summer 1997, at 51, 56–59.

37. See E. Borensztein et al., *How Does Foreign Direct Investment Affect Economic Growth?*, 45 J. INT'L ECON. 115, 124–28 (1998).

However, it also opens up new avenues for investigating the economic implications of stronger global IPRs established by TRIPS.

The ambiguities of intellectual property protection support both optimistic and pessimistic claims about how countries will be affected. None of these claims may be decisively rejected by theoretical or empirical analysis. However, the work reviewed here supports one broad view. In brief, the short-run impacts of TRIPS will be to redistribute income between countries, with most gains accruing to the United States and other technology developers. Moreover, intellectual property protection will generate additional market power that could harm information users. Over the longer term, however, there are channels through which technical change and growth in the technology importing countries could be improved.

To achieve these gains, stronger intellectual property rights by themselves will not suffice. Stronger IPRs regimes need to be complemented with appropriate collateral policies and institutions.³⁸ Although the range of such policies is broad, four categories are particularly important.

First, as just noted, IPRs raise growth more effectively in open economies. Thus, market liberalization, promotion of free entry, and the removal of distribution monopolies should encourage dynamic gains from IPRs. Second, because adequate supplies of labor skills promote innovation and technology adoption, it is important to invest widely in primary and secondary education. Third, IPRs are economically useful only where innovations may be brought freely to the marketplace. Thus, countries should reduce impediments to the commercialization of new knowledge within their national innovation systems.

Finally, because consumers and competitors could be harmed by anticompetitive abuse of IPRs, competition authorities need to be capable of investigating complaints and applying appropriate remedies where needed. Competition regulation is a new and complicated issue for most developing countries. Therefore, as IPRs systems are strengthened they should be accompanied by the development of competition regimes aimed at curbing abusive licensing practices, monopoly pricing, and unwarranted market segmentation. This complex area requires considerable thought in its implementation.³⁹

38. See MASKUS, *supra* note 1, at 170.

39. See *id.* at 41, 168–70; Keith E. Maskus & Mohamed Lahouel, *Competition Policy and Intellectual Property Rights in Developing Countries*, 23 *WORLD ECON.* 595, 599–607 (2000). See generally ANDERSON & GALLINI, *supra* note 34, *passim* (various papers exploring competition policy and its implications).

TABLE 1
ESTIMATES OF IMPACTS OF TRIPS PATENT CHANGES ON
INTERNATIONAL FLOWS OF ECONOMIC ACTIVITY FOR SELECTED
COUNTRIES (MILLIONS OF 1995 DOLLARS)

Country	GP1	GP2	Mfg. Im- ports ^a	High- Tech Mfg Im- ports ^a	FDI As- sets ^b	Unaffili- ated Roy- alties & License Fees ^c
U.S.A.	4.86	4.90	308	-3	NA	NA
Canada	3.24	4.30	2713	-42	-7873	227
Germany	3.86	4.60	2823	-64	-3781	322
U.K.	3.57	4.60	3726	-68	-17229	351
Ireland	2.99	4.30	656	-14	-1609	NA
Netherlands	4.24	4.60	109	-2	-1133	24
Switzerland	3.80	4.60	880	-24	-2382	60
Spain	4.04	4.60	2734	422	-413	56
Portugal	2.98	4.00	1973	309	290	NA
Greece	2.32	4.00	2637	365	327	NA
Australia	3.86	4.30	338	-7	-846	44
New Zealand	3.86	4.30	80	-2	-135	7
Japan	3.94	4.50	1610	-37	-4078	1261
Israel	3.57	4.30	971	149	200	19
Mexico	2.52	3.80	7349	1942	4068	174
Brazil	3.05	3.75	1351	271	1391	49
Argentina	3.20	3.75	719	123	414	37
Chile	2.74	3.75	1056	144	510	NA
Panama	3.53	3.75	7	NA	134	NA
Colombia	3.24	3.75	417	68	156	NA
South Africa	3.57	3.75	184	25	27	24
Rep. Of Korea	3.94	4.30	2072	446	188	271
China	2.00	3.25	16020	2693	657	NA
Thailand	2.24	3.25	6384	1390	1017	NA
Indonesia	2.27	3.25	3163	318	861	79
India	1.17	3.25	6552	653	573	260
Bangladesh	1.99	3.00	145	15	NA	NA

Sources: ^aUpdated from Maskus & Penubarti, *supra* note 11; ^bComputed from Maskus, *supra* note 17; ^cComputed from Yang & Maskus, *supra* note 23, at 27–29.

