

ASSESSING COHERENCE OF THE INTELLECTUAL PROPERTY RIGHTS REGIME IN CHINA

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In this article I discuss China's recent and ongoing legislative reforms in intellectual property rights (IPRs). These reforms combine to achieve a legal framework for protecting intellectual property that is comparable to that in most developed nations. However, there are structural impediments to the effective use of IPRs arising from weaknesses in China's administration and enforcement policies. At present these difficulties raise significant costs for both foreign and domestic enterprises, largely offsetting any stimulus from legal reforms. I also consider the coherence of China's emerging IPRs regime, in conjunction with other development policies, for promoting both innovation and key social objectives.

1. INTRODUCTION

Infringement of intellectual property rights (IPRs) in China remains a major irritant for developed countries that export new technologies and goods.¹ For example, at the World Trade Organization (WTO) the United States, Japan, and Switzerland recently requested detailed information from China regarding its IPRs enforcement activities from 2001 to 2004.² Many observers describe this action as a precursor to a WTO dispute resolution panel in which China would be accused of failing to meet its enforcement obligations under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

As this article describes, recent legislative changes in China have achieved a legal framework for registering and protecting IPRs that is comparable to many advanced economies and is consistent with requirements under TRIPS. However, despite some improvements in administrative and judicial systems, the enforcement system suffers from a number of structural difficulties. Trademark counterfeiting, piracy of software and digital electronic goods, and infringement of patents and trade secrecy continue at high levels. Coping with such activities is costly for both international and domestic enterprises operating in China.

In this context, China is at a crossroads. On the one hand, the profits from infringement of IPRs are great, while the likelihood of incurring significant penalties for doing so is small. There are gains for Chinese consumers and firms from such activities, at least in the short run. On the other hand, many domestic Chinese enterprises are making increasing use of advanced production technologies, while consumer demand

within the growing middle class is shifting toward higher-quality goods and services. Thus, there is a growing emphasis on developing brand-name recognition and engaging in product innovation.

These issues are complex and evolving, making any full assessment based on a current snapshot difficult and questionable. Based on interviews and observations in China, I believe that problems with infringement are growing worse and raising increasing roadblocks to domestic innovation and product development. At some point this situation could become debilitating for Chinese enterprises (Maskus, et al 2004).

The government therefore has a difficult balancing act to pursue. Continued laxity in enforcement will achieve consumer gains while further irritating major trade and investment partners. Over time, however, it will limit incentives for domestic innovation. The Chinese central government recognizes the need for a workable IPRs system that will promote dynamic structural change. Support is also growing among innovative Chinese enterprises, which suffer losses from trademark and copyright infringement and also understand that their access to foreign technologies depends partially on IPRs.

To date, the government's response to this challenge has been to undertake significant reforms of its intellectual property legislation, even as it permits enforcement problems to fester. Since 1990 the government has updated its laws covering copyrights, trademarks, patents, and trade secrets (or "anti-unfair competition") and has adopted protection for new plant varieties and integrated circuits. Beijing has joined nearly all major international IPRs conventions and is a member of international agreements on classification of patents and trademarks and the deposit of microorganisms. China made further revisions in conformity with the requirements of TRIPS in its accession to the WTO (Maskus, 2004). With full implementation of these reforms the country will have a modern IPRs structure comparable with those of most developed economies.

Like most developing countries, China relies on a mix of administrative and judicial mechanisms for enforcing IPRs. The administrative system comprises a number of central government and provincial agencies. These range from police and customs authorities at the operational end, through the copyright administration and patent and trademark office and related registration services, to high-level administrative commissions at the policymaking end. These various agencies are responsible both for implementing regulations set by legislative action and for undertaking enforcement actions, which may be done either on behalf of complainants or self-initiated. The judicial regime includes municipal, provincial, and national courts that hear civil and criminal cases that cannot be dealt with strictly through administrative procedures. The courts increasingly are used for litigation among parties. These systems are described more fully in the following section.

Despite education and training programs to raise awareness and upgrades of its administrative and legal systems, significant structural problems remain, including weak penalties, delays in administrative and court procedures, and "local protectionism" that make enforcement difficult in certain provinces and cities. As I argue below, these problems raise significant barriers to business development and innovation on the part of both foreign and domestic enterprises. Reducing these structural barriers to rights

exploitation, arising from weak enforcement, is the primary remaining challenge with respect to the IPRs regime itself.

Finally, to be fully effective the system must be recognized as a component of broader development strategies. The ultimate objectives of IPRs are to increase dynamic competition through technology acquisition and innovation and to encourage firms to place their products on the domestic and export markets. Strengthening IPRs improves such incentives, but the system needs to be developed within a broader set of policies, including development of the financial system, expansion of educational opportunities, and means for encouraging active competition. Also important is improving the national innovation system, which is the nexus of policies and incentives linking research outcomes from universities and laboratories to opportunities for commercialization (Dahlman and Aubert, 2001).

In the next section I describe China's recent reform efforts in legislation and the administrative and judicial systems for enforcement. In Section Three the discussion turns to the economic development potential of IPRs, noting the need for policy coherence. In Section Four I provide concluding remarks about the importance of systemic changes to help establish a robust set of incentives for encouraging the development and commercialization of technologies and products while sustaining a focus on broader development needs.

2. RECENT LEGISLATIVE AND ENFORCEMENT REFORMS

Since the mid-1980s China has implemented numerous laws and administrative regulations covering IPRs (Maskus, et al 2004; OECD 2004). Many of these changes were made as a result of three Memorandums of Understanding with the United States. The first of these was the "People's Republic of China Intellectual Property Rights Memorandum of Understanding" signed in 1992. It committed China to markedly strengthen its patent regime, while requiring the country to join the Berne Convention and Geneva Convention covering copyright practices, and to come into legal compliance with those conventions. China also pledged to upgrade its trade secrets protection and to establish border measures for enforcing intellectual property rights. The second was the U.S.-China Intellectual Property Rights Enforcement Agreement, signed in 1995. In it, China agreed to reduce copyright piracy markedly, improve its border enforcement measures, and open its market to U.S. movies, software, and sound recordings. It also established the basic administrative structure of IPR management in China. The third was a 1996 document titled "China Implementation of the 1995 Intellectual Property Rights Agreement," which set out additional expectations.³

The process culminated with several changes in the legal regime in connection with joining the WTO in late 2001 and in achieving compliance with TRIPS obligations. For example, a major second revision of the Patent Law came into effect in July 2001, with a further revision in August 2003. These changes established TRIPS compliance in patent regulations and improved certain administrative and judicial procedures, including the use of preliminary injunctions. In June 2003 the government announced procedures for issuing compulsory licenses of patented inventions, consistent with TRIPS Article 31 (WTO, 2003).

Similarly, in 1997 the government promulgated regulations for exclusive rights in new plant varieties, establishing *sui generis*, TRIPS-consistent protection along the lines of 1978 UPOV.⁴ A new set of regulations for protecting layout designs of integrated circuits came into force in October 2001.

Just prior to China's accession to the WTO in 2001, there remained some differences with required TRIPS standards. Most of these discrepancies were in trademarks and copyright protection. Therefore, in October 2001 the government enacted a substantial revision to its trademark and copyright laws to make both consistent with TRIPS.⁵

As this author noted in an earlier paper (Maskus, 2004), the trademark law established the right of individual Chinese persons to register marks, clarified the definition of collective marks and joint ownership, and protected collective and certificate marks for the first time. It also broadened the range of symbols that may be used as marks, extended protection of well-known trademarks to their unauthorized use on unrelated products, and set out criteria for determining well-known marks. The last regulations were further updated by the National Industrial and Commercial Administration in June 2003 (WTO, 2003). The trademark law also set out regulations protecting geographical indications in accordance with TRIPS. The copyright law set out a communication right over the internet, under which the original content provider or its licensees have exclusive privileges to place and distribute protected materials online. Thus, websites that permit unauthorized downloading of digital products are illegal.⁶ It also defined fair-use limitations for electronic content, clarified broadcast and rental rights, and asserted that databases may be copyrighted. Further changes were made in August 2002 to improve rental rights, performance rights, rights of communication and broadcast, and database protection. These legislative reforms, which are still ongoing, soon should make China's IPRs legal regime fully consistent with TRIPS.⁷

In addition to changes in the laws, Chinese authorities have strengthened their administrative and enforcement procedures in IPRs. For example, the trademark and copyright laws clarify the amounts of compensation available to victims of infringement. Foreign firms are now permitted to take their copyright cases to local enforcement bureaus in addition to the National Copyright Administration, eliminating what had been a discriminatory arrangement. Several further clarifications regarding enforcement, administration, and penalties regarding counterfeiting and piracy were made in 2002 and 2003 (WTO, 2003).

China is attempting to improve its enforcement through administrative, civil, criminal, and customs measures (OECD, 2004). A national office was created to help coordinate enforcement of IPRs protection across the country and involves 21 government ministries and national agencies. Criminal sanctions are now available for cases of willful infringement, while the maximum permissible fines were increased. Preliminary injunctions and seizure orders may be issued to afford timely relief for IPRs owners. Courts may also order compensatory damages, though arguably the regulation is weaker than what might be required to deter infringement. Finally, enhanced access to judicial review is provided along with other means of streamlining access for plaintiffs in IPRs cases to the national courts.

A week-long campaign in April 2004 was undertaken to raise awareness of IPRs issues among the Chinese population, while other campaigns have occurred since that time (OECD, 2004). Arguably these efforts are achieving results, with substantial increases registered in 2004 of investigations and prosecutions of trademark counterfeiting, patent infringement, and copyright piracy.

Despite these changes, complaints about infringement and weak enforcement are increasing among foreign firms operating in China. Such firms have little recourse against the misappropriation of trade secrets because to date the courts have not upheld foreign claims under acts governing unfair competition (Mertha, 2005). Moreover, patent litigation is difficult to win in China for a number of reasons, such as limits on evidential discovery from allegedly infringing domestic enterprises and the unwillingness of courts to issue sufficient damages to deter infringement. These problems are listed as critical by managers of foreign enterprises (Maskus, et al 2004). Such frustrations of international enterprises with the difficulty of protecting their proprietary technical information from leakage due to illegal imitation, technology stealing, or use of trade secrets are a growing irritation in U.S.-China economic relations.

Further, despite the increase in enforcement activities, it appears that the volume of copyright piracy in software and recorded entertainment products is rising rapidly. For example, the International Intellectual Property Alliance claimed in its 2005 report on China that “Piracy levels have not been significantly reduced — they still are around 90 percent in all sectors.”⁸ This report also called for the United States Trade Representative to place China on its priority watch list for the country’s failure to reduce piracy and meet its enforcement obligations. There are also concerns about the evident discrimination in enforcement activities. For example, recently the Chinese government has rigorously protected trademarks in the Olympic logo in order to avoid embarrassing amounts of counterfeiting during the 2008 summer games. Foreign enterprises wonder why such rigor cannot be applied to their trademarks.

In part, this situation reflects remaining structural impediments to effective enforcement of IPRs. While there are many such problems, the primary ones may be described as follows. First, there can be long delays in enforcement actions and court rulings and there remains little likelihood of criminal prosecution of willful violations (OECD, 2004). Interviews by this author of Chinese and foreign enterprise managers suggested that several consider the recent regulatory changes to be insufficient to deter infringement (Maskus, 2004). Second, enforcement actions can be arbitrary and non-transparent, though the central government and certain regional and municipal governments are taking steps to mitigate these problems. Third, “regional protectionism” in IPRs, whereby certain provinces or cities fail to take effective enforcement actions, may be the most difficult to confront by enterprises suffering infringement. There is insufficient coordination among regional bureaus of the Administration for Industry and Commerce (AIC). Further, the regional AICs have weak administrative powers and actions of municipal governments may offset them in any case. Municipal government officials may prefer to allocate resources to objectives other than IPRs enforcement (OECD, 2004).

Additional problems underlie limited progress in achieving comprehensive enforcement. For example, enterprises engaged in infringement are often significant

employers and revenue sources for local governments. Low salaries for public officials reduce their effectiveness as enforcement authorities, while provincial administrative agencies are generally poorly funded. Finally, legal, technical, and judicial expertise remains limited despite the establishment of special training programs.

Such difficulties restrain the scope of enforcement, while the market basis for the vast scope of infringing activity is evident. Gaining access to modern technologies through patent infringement and abuse of trade secrecy can be a low-cost means of establishing domestic competitors and products. Trademark counterfeiting and illegal copying are highly profitable, meaning that these activities will continue at large volumes for some time to come. There is relatively little opposition from the general public to infringement, especially in the rural and inland areas. Chinese consumers benefit from low-cost software, electronic products, and consumer goods, at least in the short run.

Given these evident gains, an important question is whether China has a strong development interest in reducing infringement. Interviews undertaken by this author and his colleagues Andrew Mertha and Sean Dougherty in China over a three-year period suggest that domestic economic interests in enforcement are growing. Managers of Chinese enterprises claimed that weak enforcement of IPRs resulted in endemic trademark violations targeting products of innovative local firms, thereby deterring business development. Examples were Chinese-brand producers of such consumer goods as medicines, soft drinks, processed foods, tobacco products, clothing, and especially electronics products (Maskus, et al, 2004). Successful domestic enterprises often found their trademarks applied to unauthorized products of lower quality, damaging the original firm's reputation. In some cases, Chinese enterprises either gave up on their trademarks and became licensees of better-known institutions or engaged in expensive enforcement actions (Mertha, 2005).

Weak enforcement also can impede efficient use of patents and trade secrets. According to interviewees, patent infringement was most frequent in utility models, which are easy to copy but overwhelmingly owned by Chinese enterprises.⁹ Several foreign firms also claimed to have lost patented technologies through unfair means, such as former employees selling technical manuals and designs. According to one industry association, such cases are becoming more common and increasingly targeted on sophisticated domestic and international technologies.

As Maskus (2004) documented, the variation across provinces and municipalities in per-capita incomes and the use of IPRs is striking. Thus, the bulk of China's patent and trademark registrations come in Shanghai, Beijing, and a few other large municipalities. In those two cities in particular, educational attainment and innovation processes are far advanced over the remainder of the country. Overall, China remains a country with relatively low per-capita income and technological development has not spread widely through the economy.¹⁰ For these reasons, it is likely that significant problems in enforcing IPRs will remain for some time on a national scale. In turn, China may become one focus of dispute resolution cases at the WTO as intellectual property interests from developed countries demand stronger enforcement and protection.

3. THE DEVELOPMENT POTENTIAL OF INTELLECTUAL PROPERTY RIGHTS

Relationships between IPRs and economic development are complex and available evidence is difficult to interpret, particularly as regards causality.¹¹ However, the Chinese central government seems committed to deploying an IPRs regime for purposes of encouraging innovation and growth. In this context it is useful to consider the development prospects of strengthening intellectual property protection.

(a) IPRs and the Stimulation of Innovation and Development

A well designed system of IPRs can encourage economic development and growth in a number of ways. First, an economy in which infringement is rife and rights are poorly defined can stifle innovation even at low levels of economic development (Evenson and Westphal, 1997; Maskus 2000a). Most inventions are developed for local market circumstances and can benefit from patent or utility model protection. The bulk of innovation involves minor adaptations of existing technologies, management systems, and quality control mechanisms. Such investments generate high economic and social returns by raising productivity toward international levels. For example, econometric evidence suggests that Japan's system of utility models contributed positively and significantly to its postwar rise in productivity (Maskus and McDaniel, 1999).

Next, trademarks provide essential incentives for entry of new firms and introduction of new products, even in poor nations. Firms find it easier to innovate cumulatively as they grow larger and their trademarks are better recognized. This process stimulates entry of small and medium-sized enterprises into specific markets. It also encourages more successful enterprises to take advantage of scale economies through interregional production and marketing. Some Chinese enterprises may even become significant exporters as they invest in quality and brand recognition. Similarly, firms that depend on copyrights, such as those in publishing, recorded entertainment, and software, could experience limited entry by local firms under weak protection and systemic copying. Initial creation of entertainment services and digital products is expensive and little worth the investment by local entrepreneurs if their products will be copied.

Moreover, innovation also involves establishing marketing and distribution networks, which is difficult in an environment of weak IPRs. Intellectual property protection improves the certainty of contracts, permitting better monitoring and enforcement of rights throughout the supply network. Finally, IPRs are supposed to disseminate knowledge. Patent claims are published and competitors may use the disclosed technical knowledge to develop further inventions. This cumulative process of invention can be an important source of technical change (Scotchmer, 1991). Moreover, patents, trademarks, and trade secrets provide a central legal basis for licensing technologies (Arora, et al 2001).

Considerable evidence shows that international flows of advanced technologies depend positively on the strength of IPRs, among many other factors.¹² For example, international trade in manufactures is positively affected by the strength of patent regimes in large developing countries. This trade often embodies technical knowledge that may be adapted to local technological capabilities. Foreign direct investment, joint ventures, and technology-licensing contracts also transfer knowledge. Evidence suggests

that the strength of IPRs affects choices by multinational enterprises as to where to invest and whether to transfer advanced technologies. In particular, the level of technology transferred often depends on the ability to maintain control over the technology through assertion of IPRs. Licensing also tends to rise with stronger IPRs because of reduced contracting costs.

(b) Development Costs of Strengthened IPRs

Tightened IPRs also impose economic costs. For China the costs of administering and enforcing a modern system likely will exceed 10 million U.S. dollars annually (Maskus, et al, 2004). Many of these costs may be covered by patent and trademark application fees, the revenues from which have risen rapidly with the number of such applications in China.

The most visible aspects of IPRs infringement in China are illegal copying of recorded entertainment and software and selling products bearing counterfeit trademarks. Undoubtedly there are significant amounts of labor employed in copying and retailing illegitimate products. An important short-run cost of stronger IPRs, therefore, is employment displacement. The associated adjustment costs are limited in economies with flexible labor markets and rapid growth. China has mixed prospects on this score and it is conceivable that aggressive copyright and trademark enforcement would contribute to unemployment problems associated with economic reform.

Patents raise the costs of imitating products and technologies, and therefore learning technical information in this fashion could become more expensive in China. There is considerable anecdotal evidence that firms operating in China continue to lose technologies to local rivals through defection of technical personnel, misappropriation by input suppliers, and copying of blueprints (Maskus, et al, 2004; Mertha, 2005). While under some circumstances this may be a low-cost route to technical transformation, some important practical problems should be recognized. Foreign firms tend to transfer older technologies, engage in less technical training, hide key aspects of know-how from sub-contractors and suppliers, and are less likely to establish advanced R&D facilities.

Next, strong IPRs create market power, which at times permits firms to raise prices to monopolistic levels. This concern is particularly relevant in developing countries because patent applications come overwhelmingly from foreign firms and because market competition may be weak, supporting monopolization. Note that while broader economic reforms in China have improved competitive processes, the economy remains far from a situation of free entry and strong competition in technology and product markets. Indeed, Chinese authorities are especially concerned about the implications of patents for prices of key medicines and software. However, the extent of these price increases will depend on the competitive aspects of markets post-reform, again pointing to the need for vigilance in ensuring the maintenance of competition.

(c) Need for Coherence

As has often been noted, IPRs are not an end in themselves but a means to achieving certain economic objectives, including innovation, technical change, product commercialization, dynamic competition, and ultimately more rapid growth (Maskus,

2000; Commission on Intellectual Property Rights, 2002). At the same time, the exercise of exclusive rights can raise prices of key commodities, increase the costs of imitation, and limit access of users to new technologies. In this context, countries must recognize the importance of embedding IPRs into a broader approach to development policy. A large number of interrelated elements arise in devising such an approach, but I focus here on the most significant problems.

First, it is critical for China to establish coordination among agencies and ministries responsible for enforcing IPRs and related regulations. A coherent regime recognizes primarily that IPRs are relevant for many important policy concerns within any economy, including science and technology, education, health care, agriculture, the environment, and trade and industrial policy. In many countries IPRs are left to trade and industry ministries, without sufficient scope for the health and agriculture ministers to assert their concerns and achieve a package of policies that meet the needs of the bulk of stakeholders.

One critical example is the specification of price controls and issuance of compulsory licensing of essential medicines. These tasks are generally the responsibility of the public health ministry, but agreements struck by the trade minister may significantly restrict their scope. Another is the means by which new agricultural technologies are diffused into the farming sector, in which a role for government may arise in poor agricultural areas. Yet another is that educational policy may wish to establish liberal fair use exceptions from copyright laws.

Second, there is a critical relationship between IPRs and competition or antitrust policy. These two regimes, if properly structured, can be complements in encouraging dynamic competition and innovation. That is, patents and related IPRs should provide certainty about the boundaries of exclusive rights in order to encourage investments in R&D and establish access to foreign technologies. However, their scope should not be so broad as to close off opportunities for legitimate follow-on innovation that helps generate cumulative growth. In turn, competition rules should focus on licensing abuses, product tie-ins, price collusion, and related anticompetitive uses of IPRs. Thus, the Chinese government, which has recently begun to issue detailed guidelines on competition regulation and expects to adopt a comprehensive anti-monopoly law in 2006, needs to deepen its definitions and procedures regarding the interactions between IPRs and anti-competitive firm behavior.¹³

Note that a particularly effective component of competition policy is increasing openness to international trade and investment. Through its WTO obligations, China will soon be among the most open economies in the developing world as regards investment in manufacturing and services.¹⁴ For example, its commitments to liberalize services are among the most far-reaching in the developing world. It will be equally important to sustain progress on reducing barriers to imports of goods, particularly as regards technological inputs and capital equipment. Such goods can accelerate the economy's shift toward production and exports of higher-technology products over time in collaboration with greater domestic innovation.

Third, IPRs are, in effect, a particular component of what might be called each country's national innovation system (Dahlman and Aubert, 2001). They set out

incentives for investment in R&D and the commercialization of resulting products. However, they may have little net impact on technical change if they are not supplemented by other effective policy regimes, including human capital formation through education and training, the removal of impediments to firm entry and product innovation, subsidies or tax advantages for R&D, the development of financial markets for allocating capital to inventive activity, and incentives for commercialization of new technologies (OECD, 2004; Maskus, 2000).

Chinese central government authorities are aware of these coordination questions and are taking steps to implement an overall approach to technology policy within the realm of social policy. For example, China retains access to compulsory licensing and significant price regulation in medicines (Maskus, et al 2004). It is also working on systemic issues of innovation, including mechanisms for commercializing the research results found in public laboratories and universities (Dahlman and Aubert, 2001).

(d) A Brief Assessment of China's IPRs Regime

It is informative to assess briefly China's legal reforms in terms of how they might affect prospects for technical change and social protection (Maskus, 2004). China may be thought of as a dynamic middle-income nation, with a growing base of human capital and sophisticated capabilities in science and technology. However, it also suffers from substantial rural and urban poverty and many of its enterprises use technologies that lag behind those in the modern sectors.

China provides TRIPS-standard terms of copyright protection, such as a once-renewable 25-year term for software copyrights (50-year maximum period). China's Copyright Law embraces the concept of fair use in education and scientific research, permitting uncompensated use of copyrighted material in journals, periodicals, and broadcast media for purposes of disseminating news. It also allows a free right to translate works from Han into minority languages. In software, users are permitted a limited right of reverse engineering to develop new programs, which should help the industry remain fairly open to competition. However, the government is considering providing patents for computer programs, a standard that would exceed TRIPS requirements and is found only in the United States, Japan, and Australia.¹⁵ For a sector that remains young and subject to considerable cross-fertilization through learning, such a choice seems questionable over the short run.

To date China protects databases solely with copyrights, as mandated by TRIPS. This minimum standard is sensible for a country with a strong interest in access to information databases. Finally, ratification of the WIPO Copyright Treaty and the Treaty on Performances and Phonograms could be beneficial in sorting out copyright protection for internet transmissions, so long as appropriate fair-use limitations are provided.

Protection of confidential test data from disclosure provides applicants for patents in pharmaceuticals and agricultural chemicals a period of exclusivity in the use of results from clinical trials. It seems advisable for China, a country with domestic research capabilities in medicines and biotechnology, to provide such exclusivity for some period. Perhaps surprisingly, China has opted to protect test data in medicines for six years from application date, in comparison to the U.S. standard of five years. China's law may

thus be overly protective from the standpoint of the encouragement of domestic generic competition, though presumably it met with approval from the local pharmaceutical industry.

In its 2001 patent law, China retains sensible exemptions from coverage for discoveries of nature, mental methods of arriving at results (such as computer algorithms and mathematical formulas), diagnostic and surgical treatments, and plant and animal varieties (Maskus, 2004). Thus, China does not patent higher-order life forms or biological research tools. These limitations are appropriate for developing countries with emerging biotechnology sectors in order to avoid locking up critical technologies that support additional research. China's patent law does not permit experimental use, however, which may be overly strong in the context of its development strategies. The country's standards covering government use, compulsory licenses, and utility models and designs are appropriate for its level of development.

Finally, China's plant variety law also seems appropriate for its needs. Plant varieties may not be patented and China's regulation permits farmers' the privilege to use propagating materials for re-planting, while also permitting experimental use for science and rival breeders.

Taken as a whole, China's laws regarding IPRs are largely consistent with both TRIPS and what seems appropriate for a middle-income economy with emerging technological capabilities. As noted above, the authorities also recognize the importance of complementary and coordinated development policies, though progress in some areas remains slow. Overall, China's central government seems to have a strong grasp on appropriate policies for supporting the effective use of IPRs. The essential difficulty remains the extensive volumes of infringement, especially in terms of trademark counterfeiting and copyright piracy. To make these elements effective, China will need to invest more heavily in expertise, capacity, enforcement, and awareness. Such efforts will face considerable opposition, however, in light of the profits made from infringement over the medium term.

4. CONCLUDING REMARKS

This article has overviewed recent legislative and administrative changes in China's IPRs regime. Put briefly, the legal reforms are compliant with TRIPS requirements and largely appropriate for a country at China's level of development and technological promise. Indeed, in one or two areas, such as patentability of software and protection of confidential test data, the regulations may be overly protective from that standpoint. The primary remaining obstacle to progress is the weakness of China's administrative and judicial mechanisms for enforcing IPRs. In the area of copyright piracy and trademark counterfeiting, there has been little progress in reducing rates of infringement, while volumes have increased despite somewhat greater efforts at enforcement. Patent and trade secret violations are a growing irritant for governments in the United States and other developed economies. It is in the enforcement area that China needs to concentrate its efforts over the next several years.

In doing so, however, the authorities should not lose sight of the need for complementary and coordinated policies across the range of pro-development

interventions. In an earlier section I discussed broadly the elements of such a coordinated approach. Important aspects include increasing the access of people to education and other forms of human capital formation, deepening and improving the flexibility of capital and labor markets, maintaining open trade and distribution systems, and building capacity in competition policy.

Ultimately, IPRs are a component of China's national innovation strategy. It is fair to say that the government's legislative reforms in IPRs are further along than its efforts to provide direct incentives for R&D in domestic enterprises and to encourage commercialization of research results discovered in China's universities and public laboratories. In this regard, the authorities are considering the advisability of implementing policies that mimic the U.S. Bayh-Dole Act of 1980 or related systems in Japan (OECD 2004). In particular, it is becoming increasingly common for individual university scientists in biotechnology, electronics, and other areas to share in licensing receipts and to establish local enterprises (Maskus, et al 2004). Currently, however, the amount of intellectual property registered by universities and public research organizations is small for an economy of China's size and development level. It is likely to take some time before such activities become a sufficiently vibrant segment of the economy to account for major sources of growth.

Chinese authorities also recognize in general terms the importance of embedding IPRs into a broader view of social policies, including public health, agriculture, and education. Here the challenge will be to retain balance among these complex objectives as domestic economic interests in stronger technology protection through private rights emerge over time. Meeting this challenge will require consistently working to build capacity in all of the relevant ministries in addition to raising awareness among the developers and users of intellectual property.

NOTES

1. This article draws on the analysis in Maskus (2004) and Maskus, et al (2004).
2. See "US, Switzerland, Japan Launch New WTO Probe on China's IP Enforcement," *Intellectual Property Watch*, October 26, 2005.
3. On this history see Yu (2002) and Mertha (2005).
4. UPOV is the International Union for the Protection of New Varieties of Plants.
5. For policies taken before 2003, the description in these paragraphs relies on information from an interview by the author in April of that year with Luo Dong Chuan, Deputy Chief Judge, Third Civil Tribunal of the Supreme People's Court, Beijing, and on Lehman, Lee and Xu, *China Intellectual Property Newsletter: Special Issue*, 2001.
6. This right is defined in the WIPO Copyright Treaty, Article 8. Despite this reform, such websites continue to exist in China. Maskus (2004) offers a detailed analysis of the changes and remaining work to be done.
8. <http://www.iipa.com/rbc/2005/2005SPEC301PRCrev.pdf>.
9. A utility model, or petty patent, is a patent of short duration and limited scope on a minor modification of an existing product or technology. It is designed to protect small-scale, incremental innovation, such as a change in a hand tool or an adaptation of a machine to a local environment.
10. According to the World Bank (2005), China's per capita gross national income in 2003 was \$4,990 in purchasing-power parity terms or \$1,100 measured at market exchange rates. Even though there are over 100 million registered internet users in China, this represents less than 10 percent

of the population and penetration of the remoter areas of the economy by electronic media is in its infancy (Dahlman and Aubert, 2001).

11. For extensive reviews see Evenson and Westphal (1997), Maskus (2000a), and Primo Braga, et al (1998).
12. Maskus (2000) reviews this evidence.
13. See the discussion in Bush (2005).
14. Several chapters in Bhattasali, et al. (2004) attest to this dramatic opening. On services, see especially the contribution by Mattoo in that volume.
15. The European Union has moved recently toward the provision of patent protection.

REFERENCES

- Arora, Ashish, Andrea Fosfuri, and Alfonso Gambardella (2001), *Markets for Technology: the Economics of Innovation and Corporate Strategy* (Cambridge: MIT Press).
- Bhattasali, Deepak, Shantong Li, and William J. Martin, ed. (2004), *China and the WTO: Accession, Policy Reform, and Poverty Reduction Strategies* (Oxford: Oxford University Press).
- Bush, Nathan (2005), "Chinese Competition Policy: It Takes More than a Law," *The China Business Review*, May (available at www.chinabusinessreview.com/public/0505/bush.html).
- Commission on Intellectual Property Rights (2002), *Integrating Intellectual Property Rights and Development Policy* (London: Commission on Intellectual Property Rights).
- Dahlman, Carl J. and Jean-Eric Aubert (2001), "China and the Knowledge Economy: Seizing the 21st Century," World Bank.
- Evenson, Robert E. and Larry E. Westphal (1997), "Technological Change and Technology Strategy," *Handbook of Development Economics: Volume 3*, (Amsterdam: North-Holland).
- Maskus, Keith E. (2000), *Intellectual Property Rights in the Global Economy* (Washington DC: Institute for International Economics).
- Maskus, Keith E. (2004), "Intellectual Property Rights and the WTO Accession Package: Assessing China's Reforms," in Deepak Bhattasali, Shantong Li, and William J. Martin, ed., *China and the WTO: Accession, Policy Reform, and Poverty Reduction Strategies* (Oxford: Oxford University Press), 49-68.
- Maskus, Keith E., Sean M. Dougherty, and Andrew C. Mertha (2004), "Intellectual Property Rights and Economic Development in China," in Carsten Fink and Keith E. Maskus, editors, *Intellectual Property and Development: Lessons from Recent Economic Research* (Oxford: Oxford University Press and Washington DC: World Bank), 295-331.
- Maskus, Keith E. and Christine McDaniel (1999), "The Impacts of the Japanese Patent System on Post-War Productivity Growth," *Japan and the World Economy* 11: 557-74.
- Mertha, Andrew C. (2005), *The Politics of Piracy: Intellectual Property in Contemporary China* (Ithaca, NY: Cornell University Press).
- Organization for Economic Cooperation and Development (2004), "Promoting IPR Policy and Enforcement in China," manuscript.
- Scotchmer, Suzanne (1991), "Standing on the Shoulders of Giants: Cumulative Research and the Patent Law," *Journal of Economic Perspectives*, v. 5, Winter, pp. 29-42.
- United Nations Conference on Trade and Development (1996), *The TRIPS Agreement and Developing Countries* (Geneva: UNCTAD).
- World Bank (2005), *World Development Report: A Better Investment Climate for Everyone* (Washington DC: The World Bank).
- World Trade Organization (2003), "Transitional Review Mechanism of China: Communication to the Council for Trade-Related Aspects of Intellectual Property Rights," IP/C/W/415.
- Yu, Peter K. (2002), "An Action Plan to Reinvent U.S.-China Intellectual Property Policy," manuscript.