1

Introduction: The Big Stakes in Selling Knowledge

The world is an astonishingly creative place. African musicians, Peruvian textile designers, Indian movie studios, Australian wineries, and British authors all have creations to delight us and stories to divert us. Chinese biotechnology enterprises, Japanese hybrid automobile developers, US university scientists, and global pharmaceutical concerns offer applied and basic knowledge that pushes the information frontier forward. Society gains immeasurably from these and thousands of additional intellectual pursuits, which need to be nurtured and shared. Or perhaps they should be owned and sold.

Politicians and pundits everywhere agree: We live in a global knowledge economy and the key to "winning the future" is to excel at turning what we discover and learn into marketable new products and technologies. Innovation, adaptation, and the use of these new technologies are the primary drivers of growth within economies and across international borders.[1] Higher-quality technical inputs reduce production costs and spur further innovation. New medicines treat our maladies, and novel technologies offer us alternatives to fossil fuels as energy sources. Software permits interpersonal connections on a scale never before seen. Consumers benefit greatly from new varieties of goods and digital entertainment products. In the 21st century, knowledge truly is the basis on which human life will improve.

How does a society encourage this creation and use of knowledge and then generate income and jobs from it? To be sure, education, creativity, market

1. Economists have taken to referring to dynamic competition among technologically advanced firms as an "innovation arms race," with its connotations of success and defeat, and survival and destruction (Baumol 2002).

dynamics, and the competitive spirit all matter greatly in this process. So does the enormous set of policies—ranging from subsidies to basic science, tax inducements for investments in research and development (R&D), limits on market entry and labor mobility, and regulation of skilled immigration and international trade—that affects incentives to innovate and market new goods and services. Countries and cities are routinely graded on their creative capacities and investment climates, including their support for innovation.

Located centrally in this mix are intellectual property rights (IPRs), the complex stew of patents, copyrights, trademarks, trade secrets, and related tools that, in essence, determine the legal conditions of competition among creators and innovators and the terms of access for users of knowledge. How nations define IPRs is fundamentally important in a global society where knowledge is the basic input underlying the goods we eat and drink, the medicines we ingest, the digital products we watch and read, the cars we drive, and the financial services we use to invest.

Various forms of IPRs have been around for centuries, whether as informal norms among competitors (such as Parisian chefs), royal patent grants in Britain, or intensely legal rules establishing the boundaries of a creator's exclusive and proprietary rights in pharmaceutical products or software. Perhaps what is new is the sheer and visible ubiquity of IPRs in modern life. Today, people almost everywhere lead lives surrounded by the powerful traces of these rights. Consumers buy goods and services sold under names and logos that build brand value. They have expectations about the quality of Volkswagen sedans, Armani suits, Apple iPhones, and McDonald's hamburgers—expectations that are instantly associated with trademarks.

Patients and public health providers pay for Viagra, Lipitor, and Retrovir at prices that at least partially reflect the value of the underlying patents on those products. Patents also affect competition in electronics, airframes, automobile parts, bioengineered seeds, new plant varieties, and virtually every other productive sector, including financial services. Film buffs purchase or rent copyrighted digital video disks at prices that vary widely across market segments and international locations. Software users routinely download computer programs for which they may pay a license fee, but also blindly click on an "I agree" button that makes it illegal to make copies for other uses.

Fortunes rest on the prospect of inventing, selling, and competing with new ideas and creative products. Because IPRs offer their owners the legal ability to exclude others from using their ideas or copying their expressive elements, they can establish breathtaking market power. Only in a world in which people need to create and share documents could Bill Gates amass his wealth by selling platform software to countless users. And only where massive numbers of people and firms wish to interact virtually online could Mark Zuckerberg and other developers of social networking programs become billionaires while barely out of college.

Microsoft and Facebook are extreme cases because they rely on overwhelming network economies associated with some forms of software to

establish their effective, if temporary, monopolies. However, that same market power would be far weaker in the absence of software patents, copyrights, and legally protected digital rights systems that preclude rivals from legally copying both the intellectual content and its marketed expressions. The road to vast riches today increasingly is paved with private control over intellectual content with global reach.

This general reliance on IPRs to support profits and market positions goes far beyond software, of course. All originator firms strive to earn profits by setting prices that more than recapture the costs of investing in product development and producing and selling their goods. Among the many means of doing so, exclusive rights loom large in advanced and emerging-market economies. Whether it is Disney, Siemens, Elsevier, Burberry, Monsanto, AstraZeneca, Sony, Samsung, or Haier, global firms seek such rights behind which to carve out protected market positions and build brand values. University technology spinoffs, biotechnology startups, and application program developers register patents and enforce copyrights to attract financing and grow markets. The commercial world at times seems to run on patents, trademarks, copyrights, and licensing agreements.

Equally, we live in a world where violations of IPRs are endemic and growing. Counterfeit Rolex watches, Shiseido cosmetics, Armani apparel, and Pfizer drugs are commonly found in developing countries, though they also exist readily in developed-world cities and can be purchased online. The Organization for Economic Cooperation and Development (OECD) estimated that in 2007 the remarkable growth of fake products entering international trade channels had reached $250 billion.[2] Patented technologies and confidential trade secrets owned by foreign firms leak rapidly into domestic use in China, despite private and public efforts to discourage it.

In the United States, Europe, and elsewhere, illegal downloading and file sharing of digital music continues to defy the enormous efforts of the recording industry to stop it, while film and television producers and media companies increasingly face the same problem. In the internet age, the scale of this problem is truly massive and global. In China, Russia, Vietnam, and elsewhere, it is possible to purchase pirated DVDs of movies even before they are released by studios for little more than the cost of the blank disk. Many countries are home to internet services such as China's dy558.com, where first-run movies can be streamed instantly.

Given the global ubiquity of IPRs, the explosion of infringement is hardly surprising. To the extent that trademarks permit enterprises to sustain large markups in fashion goods, they will always attract knockoffs. If patent owners choose not to license their technologies, local rivals will seek to copy or reverse engineer them in order to compete. Where copyrights support prices in soft-

2. There is great uncertainty about such estimates. Chapter 4 will consider the economics of counterfeiting and piracy in trade.

ware, books, and digital products that greatly exceed the marginal cost of reproducing them, unauthorized copying will thrive. Indeed, in a world where "if you build it they will copy" is virtually a behavioral norm, there is a constant struggle between firms appropriating economic value from innovation and infringers making money by copying goods and selling them at lower prices to a willing, if sometimes confused, crowd of consumers. The problem is especially acute for producers of medicines, new seed varieties, software, movies, and music—the classic "intellectual property goods" that feature immense upfront investment costs and low marginal distribution expenses, yet are copied at very low cost.

Thus, the battle rages between those who innovate, create, or own exclusive rights and those who would free ride on the gap between the economic value of products distributed under those rights and the low costs of infringing them. This contest is especially intense and controversial at the international level. As a rough but reasonably accurate guide, firms headquartered in richer, postindustrial economies develop over 95 percent of global patents, produce the great majority of popular movies and music, write the most commonly installed platform computer programs, and have the greatest global brand values. These same firms face the largest rates of patent infringement, counterfeiting, and piracy in the developing world.

However, the conflicts do not arise only between developed countries and developing countries, that is "North versus South." Within and across developed countries, IPRs pit music companies against file-sharing college students, and research-based pharmaceutical firms against generic providers and patients buying drugs online. The situation even raises the specter that long-standing informal scientific norms under which university researchers have freely shared results and materials could be threatened as illegal patent and copyright infringement.

The Ever-Elusive Balance

As these comments suggest, controversies over IPRs are about much more than punishing trademark counterfeiters and copyright pirates, as important and difficult as that task is. Rather, the whole concept of what really constitutes intellectual creativity and how it can be owned is controversial. In much of the developed world the definition of intellectual property has expanded inexorably to create what might truly be called the "new ownership society," as described in box 1.1. If everyone should be able to own a home, why shouldn't everyone also own the exclusive rights to whatever inventions, music, books, and commercial names they can come up with? People build and buy homes so they can benefit from them, whether by just living there or renting them out. Creators equally want to enjoy the fruits of their labor by offering their goods or technologies for sale or license under terms they decide.

Box 1.1 The new ownership society

The curriculum vitae of a prominent economic theorist lists 11 US patents that he has received for working out the mathematics of various auction mechanisms. A patent was once granted for a two-piece woman's jumpsuit with a belt that could be removed, permitting the pieces to separate so the wearer can urinate. A Japanese company owns US patent rights to any experimental rabbits (or other nonhuman mammals) that have been treated in a way to engender certain corneal diseases and that may be used in medical experimentation. The European Patent Office seems willing to approve a patent on a variety of broccoli developed by conventional breeding techniques.

In the late 1980s, Los Angeles Lakers coach Pat Riley registered trademarks on the phrase "three-peat" in anticipation of his team winning a third consecutive championship (it did not). He still owns three trademarks and the phrase appears on T-shirts. In February 2010, the National Football League admitted that it did not, in fact, own exclusive trademark rights of the colloquial phrase "Who Dat?", a long-standing rallying cry used by fans of the New Orleans Saints. The Soloflex Company owns US trademark number 380748, which gives it exclusive rights to market exercise equipment and related goods under the phrase "exercise and eat right."

If a shop in the European Union wishes to sell something called Parma Ham it must be sure the meat was packed and sliced in Parma itself. Yorkshire pudding is a commonly made dish throughout the United Kingdom, but manufacturers located specifically in Yorkshire have petitioned the European Commission to restrict usage of the name. Only T-Mobile can use the distinctive shade of pink its advertisements and packaging feature in marketing telecommunications products.

Researchers around the world hoping to publish their findings routinely sign away their copyrights to publishers, who then compile articles, with the free assistance of reviewers and editors, into journals that are sold to the libraries of the very universities employing these highly skilled workers. When the Disney Company's foundational copyrights on Mickey Mouse and related characters were about to expire, the US government passed the Sonny Bono Copyright Term Extension Act in 1998, which will keep those images out of the public domain until 2019. The European Union went one better by restoring copyright protection to works that had already seen their protection expire.

These patents and trademarks are not unusual, nor was it necessarily wrong to grant them, though each has its critics. The copyright extensions mentioned in the previous paragraph may have been questionable in terms of economics—extending the length of protection on existing works could not induce anybody to create them again—but they are hardly out of touch with US and European opinions toward intellectual property rights. These stories really point out that almost anything people create or improve can be owned as intellectual property, and governments are anxious to protect the right to do so.

The analogy to home ownership cannot be taken very far, of course.[3] Homes are *rival* goods and only a finite number of people can live in them. Information is *nonrival* because a song or book or technological process could be enjoyed or used by many people without diminishing its quality or quantity. Thomas Jefferson, for example, compared an idea to the flame of a candle, which could be used to light other candles without diminishing the original light.[4] Real property is also *excludable* in that unauthorized users may be kept out with fences (though legal rules are often necessary). Ideas and information goods are inherently *nonexcludable* without laws and regulations defining rights under which others may be prevented from accessing them.

In a static sense, exclusion is likely to be inefficient and diminish social welfare, since the marginal costs of supplying information goods—whether pills, compact disks, or computer programs—are very low, and access to as many users as possible is beneficial. In a dynamic sense, the very ability to control access, and therefore earn returns on creative efforts, may be critical to ensure the progress of culture and technology. Without at least temporary excludability, inventors and creators would find it difficult or impossible to appropriate sufficient economic returns on their investment efforts, reducing the incentives to invest. This tradeoff between static benefits from reasonably open access and dynamic gains from appropriation through exclusive rights cannot be easily solved, and the task of policymakers is to work out an effective balance.

If defining legal rights is tough, it is equally challenging to determine which activities should be considered illegal infringement where access to information goods is involved. At one level the debate is about defining "free riders" versus "fair followers" (Reichman 1993). At what point does imitation by competing firms shift from acceptable reverse engineering to patent infringement? To what extent should generic drug producers and seed companies be permitted to experiment on protected medicines and plant varieties in order to accelerate entry into the market? Do unauthorized downloading and file sharing constitute theft, as the music companies insist? Or are they means of breaking the hold of entertainment oligopolies on information that should be freely enjoyed by all?

Arguably, the issues get deeper when discussing the role and scope of IPRs in the provision of fundamental public goods. Scientific knowledge, for example, is a public good in two senses. First, it is inherently impossible to exclude others and the nonappropriability of knowledge requires public intervention, typically in the form of government research funding. In principle, it is possible to offset this problem with exclusive IPRs afforded to scientists. However, the second public characteristic of knowledge is that it supports

3. Putnam (2008) offers an extensive and fascinating comparison between natural property and intellectual property.

4. David (1993) discusses Jefferson's notions of knowledge and exclusion.

massive broader benefits as a *positive externality*, including experimentation by other scientists generating more knowledge and practical commercial applications meeting consumer and industrial needs. Even these novel applications may be considered by some observers as public goods to the extent that they help meet such social needs as public health and clean air.

Thus, should universities be encouraged to patent the results of government-funded basic research, potentially limiting access to those who buy licenses? Or should they be required to place these results and materials into the public domain? Should public libraries have wide latitude to copy and distribute educational materials? Should new crop varieties developed from genetic resources be privately owned or deposited into a common global agricultural heritage?

There are no ready answers to questions like these. Across the mature economies there are large differences of opinion about the appropriate balance to strike between the market rights of innovators and the access privileges of users, and about the proper role of IPRs in encouraging creativity and invention. In this context, the "North" is hardly monolithic. There are also major differences between recently industrialized nations, emerging-market economies, and poor countries. Regarding IPRs and their perceived impacts, it makes no sense anymore to refer to a singular "South."

In this complex environment, one would expect research-intensive firms and creative artists in the mature countries to lobby their governments to negotiate relief in the form of stronger global IPRs. Those governments have responded, beginning with enhanced protection via the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO) in 1994, and extending through current bilateral and regional trade agreements.[5] The result has been a dramatic expansion of the ability of firms to register and protect their exclusive rights to produce and sell their new goods and technologies around the world, even if those rights remain poorly enforced.

By itself, this fundamental policy change is globally contentious because it bespeaks a significant increase in the market power of private firms, located mostly in the wealthier economies, to sell their technologies and products around the world under terms they prefer. It also diminishes the ability of follower enterprises anywhere, but especially in emerging-market and developing economies, to copy and reverse engineer those elements. Advocates of these reforms believe they will bolster global technology markets and stimulate a flowering of innovation and technology diffusion that will generate productivity gains and economic growth throughout the world. Opponents envision the further entrenchment of "information oligopolies" that will sharpen the differences between advanced and lagging economies and facilitate rent seeking. Which of these outcomes is more likely is a difficult question

5. This history and its implications are the subject of chapter 3.

to answer.[6] As always in the IPR arena, the tradeoffs between producers and users and innovators and followers are complex and context specific.

However, the new global system of rights is far more controversial than even these matters would suggest. The reason is that the framers of TRIPS and other more recent agreements placed primary priority on improving the value exploitation rights of private firms, and paid considerably less attention to the implications for basic issues of global public policy. There are domestic and global public goods that must be provided, and strict IPRs affect the ability of governments and institutions to do so. To be sure, some of these effects are positive, such as the enhanced ability of public-private partnerships to work out use rights and licensing terms when a new vaccine or AIDS drug is developed. Similarly, new bioengineered seed varieties offer the best possibilities for poor countries to expand agricultural productivity, a critical need in a world with growing demand for food. However, some effects are negative, such as the higher costs that educational institutions and libraries must pay for copyrighted scientific materials.

Put differently, expanded private rights designed to capture the private values inherent in new ideas and knowledge may not account sufficiently for the public valuations that countries and the global community place on access to those same factors. This sweeping statement needs careful qualification, because TRIPS requires minimum—not maximum—standards of protection and does permit countries to limit the scope of IPRs in various ways (see chapters 3 and 5). Still, as we enter the second decade of the new century, fundamental international controversies abound in the IPR context. Should we limit the reach of copyrights to ensure that researchers, students, and libraries in developing countries have greater access to new knowledge? Is it true that patents on new drugs increase the burden on patients and public health budgets in poor countries, and what could be done about it? Are IPRs a barrier to effective transfer of new technologies that could reduce greenhouse gas emissions in the developing world?

Such issues have a major impact on international relations. They have surely sharpened the rhetorical divide between the innovators and owners of rights in developed countries and the followers and users in emerging-market and poor countries, to a degree not seen since the days of what was called the new international economic order in the late 1970s. They have energized civil society groups and nongovernmental organizations (NGOs), many of which are extremely critical of the new global regime and call for major reforms. Indeed, many outspoken NGOs, such as the Access to Medicines Campaign of Médecins Sans Frontières, Knowledge Ecology International, and the Elec-

6. An attempt is made in chapter 2. To preview it here, the poorest countries are not likely to be helped much, and could be disadvantaged, without investing in complementary development policies and receiving assistance from abroad. However, the system should help larger developing countries and rapidly emerging economies move up the global technology ladder.

tronic Frontier Foundation, were founded to oppose the extension of private rights into control over ostensibly public goods.

These debates, often waged as fiercely within countries as across borders, remind us that the private rights to exclude others from using novel inventions, new cultural creations, and improved processes quickly bump up against the ambiguous bounds set by the dictates of public policy. Those bounds are necessarily ambiguous because different countries assign different weights to the primacy of private property and the demands of providing public goods. The challenge of global governance is to balance these distinctive interests in a way that satisfies the fulfillment of public goods needs without significantly diminishing the incentives that firms have to invent, create, innovate, and sell new goods and technologies. It is a difficult task even within a country and becomes enormously complex when taking into account the sharply different opinions across countries.

The Policy Landscape

The complexity of the intellectual property arena makes it impossible in a single volume to comprehensively describe, much less analyze, the full range of critical international issues. To make the task manageable and the reading accessible, this book is organized into broad policy themes that are discussed primarily as problems in international economics. This framework offers valuable insights about policy tradeoffs and economic effects. These questions are of course also treated by scholars in law, international relations, science and technology, and ethics, plus civil society and popular media. But in a world awash in discussions of a constantly evolving commercial and policy arena, the hope is that this relatively narrow analytical snapshot will be enlightening. This section briefly previews the policy questions to come.

How Well Is the System Working in Economic Terms?

As noted above, the basic global policy structure for IPRs is the TRIPS Agreement, which binds WTO member governments to meet and attempt to enforce certain minimum standards of protection. This agreement, along with rules negotiated in preferential trade agreements and unilateral reforms in many countries, has facilitated a remarkable expansion of legal rights around the globe. The primary economic question is whether these expanded rights are supporting additional and more efficient economic activity. This is a difficult question to answer satisfactorily because of the complex factors involved. However, available evidence suggests that the system facilitates more foreign trade and international technology transfer, expanding local learning and indirectly supporting innovation. There is evidence that newer standards support manufacturing export growth in both developed and emerging-market countries. In short, behind the scenes the reformed global regime is working to improve channels of developing and trading technical information—one of its key purposes.

At the same time, stronger legal rights, if poorly enforced, do not slow the loss of technological information through patent infringement and other problems, an issue of particular importance to Western firms operating in China. Chinese policy seems especially attuned to extracting maximum benefits from foreign technologies under a regime of weak enforcement. There is also tentative evidence that stronger global patent rights sometimes support markedly higher prices for medicines in certain developing countries. However, this effect is countered by the enhanced ability of pharmaceutical companies to offer steep discounts in humanitarian situations. These issues suggest that IPR reforms always need to be accompanied by appropriate complementary policies, such as fiscal supports for R&D, incentives to diffuse technologies, and regulation of competition.

Should TRIPS Be under the World Trade Organization?

Underlying these controversies is the important prior question of whether TRIPS even belongs in the WTO architecture. From a strict trade policy standpoint, the answer may well be no, an opinion expressed forcefully during negotiation of the Uruguay Round by advocates of multilateral trade rules, including T. N. Srinivasan (1999, 1053), who called its inclusion a "colossal mistake," and Arvind Panagariya (1999). The first objection was that there was already an international body, the World Intellectual Property Organization (WIPO), with recognized expertise in IPRs so it made little sense to burden the WTO with this management task. A second was that strengthened global intellectual property rules would not be in the interests of developing countries and would diminish their interest in the trading system. Put differently, international IPR reforms would not necessarily improve the welfare of all participants, whereas mutually beneficial impacts may be expected from strict trade liberalization (see chapter 2).

A third problem was that inclusion in the multilateral system of trade rules of IPRs, which are a fundamental area of "behind the border" regulation, would inevitably open the door to provisions governing environmental protection and labor standards. These elements indeed would be problematic for the system to deal with sensibly (Maskus 2002). In this view, the system of the WTO and the General Agreement on Tariffs and Trade (GATT) is optimally restricted to disciplines covering border measures that affect international market access, such as tariffs, foreign direct investment (FDI) regulations, and barriers to service providers. Finally, this expansion of the multilateral trade rules into a complex and controversial area of regulation probably would reduce the likelihood of successful future trade negotiations.

In Maskus (2002) I summarize the counterarguments that were made. First, among regulatory areas IPRs are uniquely trade-related, both theoretically and empirically. Patents and trade secrets are important in principle for inducing more trade and FDI in technologically advanced products, while trademarks and copyrights help enterprises earn higher global returns

on product development and creative goods. International diffusion of new goods and technologies is enhanced by transparent and enforceable IPRs. Put differently, both excessively weak and excessively strong protection can serve as nontariff barriers to trade. Thus, their inclusion in the trading system should facilitate more trade flows. This same relationship to trade does not apply as closely to environmental regulation and labor rights.

Second, while harmonization of IPRs at the highly protective levels of the United States and the European Union surely would not benefit many developing countries, TRIPS actually calls for minimum standards and permits countries to erect significant limitations on the scope of IPRs. Thus, it is possible that the gains from enhanced technology transfer would outweigh the costs of greater foreign monopoly rights in medicines, plant varieties, and the like for many developing and emerging-market economies. In combination with other market access gains associated with the Uruguay Round, even poor countries might see net benefits from joining TRIPS.

More than 15 years have passed since the WTO and TRIPS were launched. What can be said about whether conjoining these two major trade regimes was a good idea or an uneasy marriage? Of course, this question cannot be answered satisfactorily because it asks an impossible counterfactual: How would the world have evolved without a TRIPS Agreement in the WTO and would the world trade situation be better than what we have now? There is no doubt that pushing global IPR reform would have been high on the trade policy agendas of the United States, European Union, Switzerland, and Japan in this period, even in the absence of TRIPS. Thus, the many effects of TRIPS on trade and trade policy cannot be fully identified, much less erased, from the historical record.

It is possible, though, to offer a few observations that matter for a qualitative assessment of TRIPS. First, the evidence provided in chapter 2 should convince disinterested readers that patent reforms do facilitate more international trade, FDI, and technology transfer, including to middle-income and emerging-market economies. In that sense, IPRs are clearly trade-related and TRIPS seems to be achieving at least one of its basic aims. Second, the inclusion of TRIPS does not seem to be taxing the resources for dispute settlement in the WTO. Indeed, the dispute resolution process is building a useful body of judicial interpretation of the precise relationships between IPRs and trade policy, as argued in chapter 3. Moreover, dispute settlement has become an important means for developing countries to explore their policy space and even to use the removal of IPR commitments as a means of enforcing decisions in their favor.

Third, there likely would have been no ability to establish the WTO itself in the absence of an intellectual property accord, given the importance attached to it by major countries. Rather, a plurilateral approach among developed and emerging-market nations to protect intellectual property would have emerged, leaving poorer countries to the side of the trading system itself. Further, it is highly probable that, in the absence of TRIPS, the *demandeurs* would have

pushed for stronger if more fragmented efforts to expand the international scope of IPRs through free trade agreements. Using this "TRIPS-Plus" approach, trade authorities in the United States and the European Union have secured intellectual property standards in some countries that are questionable on development grounds. However, the minimal and more flexible rules in TRIPS offer others a basis from which to discourage such adventurism. Indeed, governments in numerous developing countries have shifted over time in their opinion of the TRIPS Agreement from resigned acceptance of a flawed document to active assertion of a reasonably flexible baseline, to the point where few would now favor removing it from the WTO.

Countering these positive factors is the possibility that disagreements over further multilateral reforms of IPRs contribute materially to the clear difficulties in concluding another round of WTO negotiations. The Doha Round launched in 2001 has not reached fruition more than 10 years later. There are numerous reasons for this failure, including concerns about reducing tariffs in agriculture in key countries and an inability to negotiate meaningful market access in services. However, the issues raised in the IPR area are equally thorny. In particular, the European Union demands considerably expanded protection for geographical indications, while many developing countries ask that patent approvals require inventors to reveal the sources of origin of genetic resources used to develop new medicines and biotechnologies. The United States and numerous other countries strongly oppose these demands and see no reason to link them to the broader market access negotiations.

In truth, it is likely that the Doha Round negotiations would struggle whether or not TRIPS reforms were on the table, given the diminished enthusiasm today for multilateralism in the United States and other major countries. At a minimum, however, the inclusion of IPR issues has not facilitated cross-issue bargaining toward progress, which is a solid first strike against TRIPS as a component of the WTO.

A second strike is that, however much the gains in trade and technology transfer may be, they are not widely distributed across the developing world. Specifically, there is scarce evidence that stronger IPRs encourage more access by the poorest and smallest countries to global technologies. There are many reasons for this problem, related essentially to the need for IPRs to be surrounded by welcoming investment climates, transparent governance, investments in human capital, and other factors in order to be effective (Hoekman, Maskus, and Saggi 2005). In this sense, the inclusion of TRIPS can do little by itself to foster technology transfer to such countries. At the same time, the required changes in patent and copyright rules raise the prospects of higher costs or diminished access for medicines, plant varieties, and educational materials, while offering little in terms of foreign market access. Poor countries can argue that TRIPS has been "all pain and no gain" to this point.

A potential third—and perhaps fatal—strike is the widely voiced claim in civil society that globalized IPRs pose serious roadblocks to the unilateral and international provision at low cost of medicines, green technologies, textbooks,

and other goods that resolve public goods problems. Chapter 5 provides a thorough analysis of this claim. The view here is that the concern is misplaced: Having TRIPS in the WTO does not necessarily interfere with finding such solutions, because of both the flexibilities in its provisions and the fact that effective approaches generally require coordinated actions outside the trading regime.

Reasonable people can contemplate these and perhaps other pros and cons of having the TRIPS Agreement in the WTO and come to quite different opinions. The answer here is a qualified pro: The balance of economic evidence and the opportunities for deploying reforms within the TRIPS framework tilt the balance in favor of its inclusion. Still, there are important steps to take to improve the system and integrate it better with broader public goods concerns on the global stage.

How Is the Global Governance Structure Evolving?

For a variety of reasons, the current global IPR regime, with its foundation in TRIPS, is viewed by many as inadequate, incomplete, or already out of date, leading to pressures for further changes. These pressures are the subject of chapter 3. Advocates of strong patents in pharmaceuticals and biotechnology, for example, think TRIPS offers too much freedom to limit patent scope, and they are pushing for greater rigor in countries negotiating preferential trade agreements with the United States and the European Union. These so-called TRIPS-Plus requirements are highly controversial.

In contrast, many developing and emerging-market countries believe that the system as negotiated is one-sided in favoring the exclusive private rights of inventors and creators, who are found mostly in the industrialized world. These governments argue for rebalancing the system, whether by modifying TRIPS or establishing a pro-development focus at the WIPO. One example of how this is playing out is the ongoing discussions about establishing recognized limitations and exceptions on the scope of copyrights, along with principles of "fair use," under which countries would be permitted to designate as legal certain unauthorized uses of protected material.

Echoes of this debate are found also in attempts by the United States and European Union to procure a global patent treaty at the WIPO that would harmonize substantive patent rules around the world. This rather quixotic attempt is resisted by many countries, rich and poor, that see value in sustaining flexible rules and national sovereignty.

Certain interests on both sides of this basic debate also find the system incomplete and want it to be extended. The European Union, for example, in partnership with several developing economies, is pushing to expand protection in TRIPS of geographical indications, or names that identify quality or other characteristics of consumer goods from particular locations. Many developing countries also wish to introduce into TRIPS intellectual property standards for recognizing and protecting rights to traditional knowledge, such

as folklore and artisanal designs, as well as products developed from genetic resources. This preference is noteworthy for it points out that IPRs are seen by many, even in poor nations, as an affirmative approach to organizing global markets for communal knowledge and resources. To date, however, attempts to expand TRIPS to accommodate these interests have met unyielding opposition.

What Are the Systemic Stresses?

Opinions that the global IPR governance system is inadequate and outdated also stem from basic structural pressures that threaten to overwhelm it in critical dimensions, as laid out in chapter 4. To put it briefly, a system designed for 20th century technologies, procedures, and resources sometimes fails in critical ways to meet the needs of 21st century clients, both rights holders and users.

One problem is an explosion (prior to the Global Recession) of patent applications in the major markets, including the United States, European Union, Japan, South Korea, and China, in addition to registrations of multicountry patents at the WIPO. This situation reflects a variety of factors, including expanding innovation and technology transfer, increasing needs for enterprises to accumulate global patent portfolios, and structural characteristics that encourage large-scale filing. There are at least two key consequences. First, national authorities are increasingly swamped and firms face rapidly rising patent backlogs and delays. Many of these authorities now seek means of international cooperation to reduce costs. Second, the mushrooming of patent applications and grants is increasingly creating complex claims and counterclaims about ownership of particular technologies or families of technologies across borders. This problem makes it costly for others to penetrate this complex and opaque system to determine claims on ownership.

A second factor is that major IPR holders are frustrated with the lack of strong mechanisms to enforce their rights against counterfeiting and piracy, especially in cross-border trade. It is technically difficult to exclude infringing goods from countries even with rigorous intellectual property protection. However, unauthorized copies and illegitimate merchandise are readily traded across borders where there is little reach of customs authorities. Trade in counterfeit medicines and food products may be especially problematic for public health reasons. To combat this problem, the governments of several major economies recently negotiated an Anti-Counterfeiting Trade Agreement (ACTA) with the aim of establishing standards for enforcing IPRs, including internet piracy. This agreement, with voluntary membership, would exist outside the WIPO and WTO, raising a number of difficult questions about process and governance.

A third major stress is that the rapid advance of software, the internet, and digital communication technologies makes it virtually impossible to protect and enforce copyrights as they are traditionally understood. This is because the very acts of controlling distribution of digital copies and preventing their

use in compilations and user-provided music and videos are extremely difficult in an era of costless downloading and file sharing. Attempts to do so via digital rights solutions are met quickly with countermeasures to sustain copying, while the heavy-handed approach of suing users in court seems ultimately self-defeating for content providers. And, as always, the reach of such enforcement is greatly limited when users and servers reside abroad.

At the same time, traditional copyright models are increasingly hard to sustain in a world where digital goods have a greater international reach, meaning that their rights are subject to greater fragmentation and legal uncertainty in numerous jurisdictions. These models also do not necessarily optimize the opportunities of artists and musicians in poor countries to access global media markets. Thus, a more sustainable and international approach is to explore cross-border business models and low-cost, licensing-oriented solutions in which users have ready access to digital content, while ensuring that artists, authors, and content providers receive sufficient returns for their work.

How Do Intellectual Property Rights Interact with Global Public Goods?

A primary point of this book is that while there are significant economic efficiency gains from a globalized IPR regime, the system's inherent focus on defining and enforcing private rights sometimes ignores, and may even encroach upon, the needs and abilities of authorities to cooperate in providing important public goods. For example, concerns continue to be raised about whether restraints on compulsory licensing can block attempts to increase access to medicines. Similarly, many argue that patents in critical green technologies may impede much-needed technology transfer and local adaptation, while copyrights may block access of students in developing countries to published educational materials.

It must be stressed that such problematic outcomes are not always true, precisely because IPRs can improve market processes even as they define private rights. For example, patents can support the establishment of contract terms in public-private partnerships that aim to develop and distribute essential medicines. These contracts assign rights and obligations, determine licensing royalties and access terms, and support dissemination. Similarly, patent pools can be effective means of combining rights needed to produce and license a suite of complementary environmental technologies. And observers should not lose sight of the basic fact that reliance on IPRs is central for supporting R&D investments in pharmaceuticals and biotechnology, industries that provide key inputs for public health and agriculture.

Nevertheless, significant concerns arise in a number of areas, some of which will be addressed in chapter 5. In general, economists ask two basic questions. First, does the global IPR system raise a sufficient number of roadblocks to providing and accessing public goods to justify changes in norms or procedures? Second, is reliance on private exclusive rights enough to meet

needs for investment in development and dissemination of new technologies, or are significant complementary initiatives required?

Within that framework, five broad and essential issues are analyzed. First, what is the scope of policy space for developing countries seeking to benefit from reformed IPR systems? For many countries, transparent and effectively enforced regimes should generate real development gains in the medium term. Nevertheless, countries may deploy important limitations and exceptions to exclusive rights for both development and social policy reasons. The discussion considers how effective such policies as compulsory licenses and regulation of competition may be and under what circumstances.

Second, what is the role of IPRs in the development and distribution of medicines and how do they affect public health policies, especially in developing countries? The section is largely a progress report on initiatives to date, but notes the need for further approaches.

Third, are patents an impediment or a boost to the transfer of environmental technologies and how might they be supplemented by additional global and local policies? There are a number of similarities between the problems with medicines and green technologies, but also enough differences to merit separate treatments.

Fourth, how can IPRs be deployed to spur agricultural innovation and productivity improvements in developing nations? Are IPRs inimical to the protection of traditional knowledge or can they be used to generate income for such creative work?

Finally, perhaps the ultimate public good is knowledge itself. Policymakers in at least the United States and European Union increasingly resort to IPRs as a means of bringing to the market the commercial manifestations of scientific knowledge. Yet if we conceive of knowledge as a basic public good that should be widely available, there is a clear tension between exclusive rights and free access. This raises the thorny question of whether, or to what degree, the useful results of basic scientific work should be placed in some form of information "semi-commons" for widespread access.

Encapsulated in the analysis of these issues is the obvious problem that public health, environmental protection, and knowledge acquisition all involve significant externalities and market failures that IPRs may resolve or exacerbate. Economics can shed light on these questions and that is the essential task of chapter 5. However, even the economic issues and solutions can be highlighted only in general terms in a short treatment, which will essentially ignore equally complex questions in law, science, and international relations.

Four Ideas to Improve the Global System Today

A central message of this book is that well-defined and transparent intellectual property rights are an indispensable building block of the global economy. At the basic level they play an important, if complicated, role in supporting economic development and growth. They resolve certain market shortcom-

ings in the cross-border trade in information and facilitate the emergence of modern international technology markets. IPRs are the foundation of the licensing arrangements needed to build production facilities and transmit know-how among private partners. They also are critical for defining the terms of technology transfer and technology sharing agreements among universities, foundations, pharmaceutical companies, NGOs, and members of public-private partnerships that may develop and distribute essential medicines. The legal assurances of copyrights support contracts in complex, multiple-agent creative activities and facilitate global distribution of entertainment goods and digital media. IPRs offer scope for transmitting new seed varieties, on the one hand, and protecting the rights of those with traditional knowledge, on the other.

Thus, IPRs can be powerful agents for development and transformation and it is a mistake to dismiss them as rent-generating barriers to trade and competition. Still, optimism about potential gains does not preclude worries that the existing global structure is suboptimal in a number of important ways, particularly looking toward the future. At least four general concerns may be raised. First, in some ways the current system underperforms its potential, both because rights may be poorly defined and ambiguously enforced and because users have inadequate information about how to maneuver in this environment. Second, traditional IPRs, based on concepts of discrete invention, linear technical progress, and exclusive distribution control seem increasingly out of touch with modern innovation, networking, and learning. The system remains rather rigidly wedded to these notions, some of which need to be reconsidered. No less an authority than Francis Gurry, the general director of the WIPO, argues that the copyright system must "adapt or perish" in light of pressures from the internet.[7]

Third, despite the many residual policy flexibilities in the TRIPS Agreement, the global regime still has a certain one-size-fits-all logic, with a tendency toward upward harmonization of standards. Developing countries may not want to uncritically adopt these long-standing norms and practices. Rather, some may prefer to experiment with modified innovation tools that make these rights more affirmative for their growth needs.

Finally, despite their critical role in markets, IPRs cannot always be relied upon as the major bridge to finding means of providing important global public goods. In this task, IPRs are sometimes complementary building blocks and sometimes difficult stumbling blocks. They need to be fit into a broader approach to investments, diffusion, and adaptation.

Comments are made throughout the book about specific aspects of these critical issues. To preview, consider the following "top four list" of ideas for short- to medium-term policy changes that would help reestablish the affirming complementary role of IPRs in the greater objectives of supporting

7. "Copyright System Must 'Adapt or Perish,' WIPO Director Says," *Intellectual Property Watch*, March 15, 2011.

innovation, diffusing information, encouraging cultural growth, promoting development, and addressing global public needs. Deeper background analysis will be found in other parts of the book. The recommendations stem largely from a mix of economic analysis and empirical evidence. However, in cases where economics cannot provide a clear answer and evidence is lacking, the ideas rest also on a measure of common sense and global fairness. Each of these suggestions promises significant net global benefits over time and all are feasible, given sufficient political will.

Idea 1: Designate the World Intellectual Property Organization as a Global Information Repository

Establish the WIPO as a global information repository with a mission and resources to develop comprehensive searchable databases on patents and the cultural repertoire.

The global patent system greatly needs more transparency and efficiency, as discussed in chapter 4. International enterprises can be caught unaware of existing patent rights in various markets, while inventors and researchers need access to a fully articulated and comprehensive database of patent claims. Thus, a highly desirable policy initiative would be for the developed and major emerging-market and developing economies to invest in an online, fully searchable database of all patent claims in force at any time, at least within those countries. The natural location for this facility is the WIPO, which has already begun developing searchable patent databases in limited technology areas.

A comprehensive database would lower search costs for examination offices and inventors. A more diffuse and highly desirable benefit would be that published patent applications and grants, with information about duration of protection, could be readily linked to scientific literature and other forms of prior art. This kind of information would be invaluable for the development of "patent landscapes" that characterize the range and geographical scope of patents in key technologies. The utility of an online patent database could be further enhanced through a centralized patent-licensing registry, in which firms could voluntarily list their licensee partners for specific technologies. The WIPO could offer a similar searchable database of trademark registrations, geographical indications, and plant variety rights.

Note that the WIPO's responsibility need not be limited to industrial property. Even more ambitious would be a concerted effort to catalog to the extent possible the creative works of authors, musicians, and artisans around the world. One direct benefit is that such a registry could assist music publishers and other content providers to license their works internationally. Perhaps more importantly, developing a repertoire of music and catalogs of designs and even elements of traditional knowledge in the developing world would offer an important resource linking creative people in poor countries with global commercialization streams.

Idea 2: Facilitate Global Digital Licensing

Clarify through a multilateral agreement that digital content providers have global transmission rights and facilitate greater international competition among national rights collection societies.

It is time to recognize that copyrights in their traditional form are increasingly at odds with rapidly evolving digital and information technologies that favor free availability, global distribution at near-zero marginal cost, and creative uses of digital content (see chapter 4). Continued reliance on nationally defined rights, technological controls, and litigation cannot defeat these trends for long. The current strategy also contradicts the essential public purpose of copyrights, which is to make information and cultural goods available as widely as possible while ensuring returns to artists and writers sufficient to ensure that new goods are continually developed.

A more fruitful approach would meet certain principles: a neutral framework that supports innovation in business models, makes paying for content as easy as downloading it, and recognizes the global reach of the digital world. However, voluntary global licensing faces three essential problems: Transmission rights are not necessarily global, there are high transactions costs associated with different national laws and regulations among rights collection societies, and national copyright laws often excessively restrict usage rights. In principle, these difficulties could be overcome by defining a licensable global digital transmission right that would apply only to online content distribution. Copyright holders could offer licenses to music, video, and news service providers, who would be able to upload and transmit files in the catalog in return for paying a subscription fee. Individual users could also pay a fee to permit noncommercial file sharing and the use of music in videos, celebrations, and the like. Properly structured, such license fees could well attract more users and expand payments to the content industries.

This system can work well only with the close cooperation of rights collection societies, which are often insular, nationalistic, and costly, especially in developing countries. The digital industries are global, but because copyrights are defined nationally, and each country has its own collection societies, distribution is highly fragmented. Remarkably, this balkanized system pertains also to organizing local rights to internet transmissions, which are inherently a worldwide phenomenon. Internet service providers must reach separate licensing agreements with rights holders or performance rights organizations and collection societies in each country.

This situation limits the global reach of such providers and makes it quite difficult for individual users to license international content. Thus, it is important to encourage competition among collection societies in order to maximize choices for music fans and give rights owners more flexibility in selling their content. Particularly in developing economies, opening up music collection societies to entry, including by such societies located abroad, would enhance the ability of local musicians to gain access to licensing revenues.

Idea 3: Establish Revenue Streams to Enhance the Infrastructure of Intellectual Property Rights

Encourage national IPR offices to implement small levies on industrial property registrations, grants, and renewals to establish funds for improving the administrative and judicial systems for IPRs, including especially enforcement. These levies could be supplemented by lump-sum taxes on firms offering copyrighted content.

There are three certainties about international enforcement against trademark counterfeiting and copyright piracy (see chapter 4). First, domestic copying and illicit trade are highly profitable activities that cannot easily be controlled. Second, the firms selling legitimate versions, overwhelmingly from the developed world, want strong crackdowns on rapidly growing misappropriation of their rights. Third, many developing countries are not willing to pay the costs of enforcing IPRs, both because their administrative and financial resources are heavily constrained and because the owners of the rights are mostly foreign.

The political economy of this situation could not be clearer, and it explains why the major intellectual-property-exporting countries have negotiated ACTA. Their evident hope is that its provisions will come to be seen as best practices that must be adopted by developing nations if they wish to sustain open market access abroad. This seems a vain hope unless active investments are made in registering, administering, and enforcing IPRs in poor countries.

There are sound public interest reasons for supporting these investments. They are unlikely to be made, however, without additional revenue sources to pay the costs. Some of this might come in the form of public subsidies from developed-country governments to pay for more training and administrative resources. A more sensible approach is to recognize that the major beneficiaries of greater enforcement will be intellectual property owners. Thus, additional burdens should be placed on producers of legitimate goods, thereby making them shoulder a portion of the costs. One concrete suggestion would be for governments to place a small special levy on patents, geographical indicators, plant variety rights, and, especially, trademark applications and renewals. The levy could be tied to market sales or some other measure of local presence in order to avoid an excessive burden on small companies and startups. Safeguards may be needed to prevent diversion of these user fees into other unrelated areas. One possibility would be to have these small fees, designated clearly for building administration and enforcement capacity, collected and managed by the WIPO. A complementary or alternative idea would add small fees to patent applications under the Patent Cooperation Treaty and international trademark registrations under the Madrid Protocol to help pay for technical assistance and enforcement.

Finding dedicated resource streams could help raise the willingness and ability of smaller economies to address counterfeiting and piracy. However, their ability to deal with massive problems in China, Russia, India, and other large markets is doubtful. Here the problem is less a lack of resources and more

an unwillingness to deal with structural sources of infringement. In such cases, there seems little alternative except continued engagement and sustained pressure on those governments to take these problems seriously, while convincing them that cleaning up these problems is in the interests of innovators and creators in their own economies.

There are many other IPR-related conflicts with China, of course, such as the contours of its indigenous innovation and standards policies, both of which affect patent rights (see chapter 4). Dealing successfully with these problems likely will require considerably more cooperative bilateral and plurilateral engagement to increase mutual understanding and find confidence-building measures.

Idea 4: Make an Affirmative Declaration on Technology Transfer

Announce that technology transfer for development and public needs is a clear global priority.

Probably the most frequently heard complaint about TRIPS from developing nations and NGOs is the perceived lack of technology transfer flows in the wake of its implementation. Despite some indirect econometric evidence of positive effects, the perception is real and deeply felt, particularly in the poor and least developed economies. In turn, there is great frustration on two grounds. First, probably the major selling point of TRIPS to poor countries was the potential it would create for more technology transfer. Without clear evidence of such growth, countries have lost confidence in the economic benefits of TRIPS and the global IPR system in general. Second, TRIPS itself, in Article 66.2, committed the developed countries to positively encourage outward technology transfer at least to the least developed countries. Any reading of the periodic reports to the TRIPS Council reveals that such efforts have been minimal and poorly targeted.

This frustration is important in light of the clear importance of technology transfer, both as a direct contribution to economic development and as the most feasible means of accessing critically needed technical solutions to problems in public health, environmental protection, and agriculture (see chapters 3 and 5). Available evidence suggests that patents are not often a major impediment to such access. Indeed, they play an important supporting role in many cases. Overall, however, the existing IPR system has yet to marshal much success in expanding the volumes of technology development aimed at problems in poor countries and ensuring their international diffusion.

In this context, probably the greatest confidence-building measure developed countries could achieve in the IPR arena is to make a meaningful commitment to investing in these needs. Such a commitment might be termed an Affirmative Declaration on Technology Transfer, which could powerfully complement the conclusion of the Doha Round but should go forward even if the round ultimately fails. The provisions of such a declaration might incorpo-

rate a wide variety of positive inducements that, if focused on meeting future public needs, would make a substantive contribution to both economic development and global welfare.

Among the suggestions supported by economic analysis would be those listed below, as outlined in chapters 5 and 6.

First, announce a program to explore the potential for using differentiated patent terms and buyouts to encourage technology transfer in specific technologies supporting public goods and development needs. Second, commit public funding to support local use and adaptation of protected technologies under specific circumstances. This approach could also facilitate collaborative mechanisms that build sustainable technical and information-sharing relationships among global enterprises and local firms and institutions. Third, find means to encourage universities, research laboratories, and enterprises to license on terms differentiated to the needs of local markets. Fourth, announce a commitment to join meaningfully in discussions at the WIPO over terms of an agreement on permissible use of copyrighted materials for education and science.

Moving further afield, such a declaration could signal a willingness to incorporate into public research grants provisions for researchers to network with scientists in developing countries, both to focus efforts on projects of demonstrated importance and to transmit knowledge. It could also give a sympathetic nod to proposals to increase the flow of temporary migration of scientific and technical personnel. Ultimately, such steps could serve as a building block for an eventual agreement on international access to basic science and technology.

Finally, many key elements to facilitate needed technology transfer involve public and foundation funding for R&D programs, dissemination of new information, and adaptation of technologies to local uses in poor countries. Greater enthusiasm for such funding by taxpayers in economically stressed high-income countries is unlikely to emerge for some time. In this context, a significant commitment of resources from China, the oil kingdoms in the Middle East, and other countries with large monetary reserves could be a decisive signal of their intention to contribute meaningfully to meeting global public needs.

Organization of the Book

With this foundation, the remainder of the book delves deeply into the international economics of IPRs. Chapter 2 begins by analyzing the impact of IPR policy reforms on various forms of innovation and technology transfer. While there is certainly room for more research, the evidence convincingly supports the view that IPRs, measured primarily by patent rights, have positive effects on international information dissemination through market channels of new technologies. However, that optimistic conclusion requires qualification in a number of dimensions, most importantly that such evidence to date is

absent as regards technology transfer to the poorest economies. The evidence of impact on innovation is more ambiguous and anecdotal, reflecting the complexities of this issue.

The policy stage is set in chapter 3 by reviewing major changes in the global system since the introduction of TRIPS. While this chapter is largely descriptive, it highlights a number of controversies that have been addressed—or deepened—by these successive regime changes. Chapter 4 turns to an analysis of a number of current international pressures and strategic issues regarding the commercial use of IPRs. These cover such problems as patent overload, patents and technical standards, geographical indications, parallel trade, internet copyrights, and dealing with counterfeiting and piracy. Chapter 5 continues in that vein but with an emphasis on global social needs, particularly in developing countries. The chapter reviews questions regarding IPRs and public health, patents and environmental technologies, and the complex subject of private rights in both traditional knowledge and fundamental scientific results.

Based on the analysis in the text, chapter 6 offers general conclusions for a policy agenda. While these recommendations are based as much as possible on the economic evidence and logic, inevitably they are about finding a forward-looking balance and cannot meet the preferences of all stakeholders. They will appeal to some readers and dismay others; to yet others they will appear naïve. It is unlikely that anyone will agree with all of them. But if readers feel better informed and challenged to think through these issues more fully, the book will have done its job.