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Liz Dunshee
University of Northern Iowa

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Legal and Economic Strategies for International Intellectual Property Protection: The Case of Software

Liz Dunshee

ABSTRACT. Intellectual property is an important asset for business and society. In 1998, the worldwide software market was estimated at \$135 billion. Piracy, however, is reducing profits, innovation, investment, and tax revenues. In order to curb piracy, international intellectual property protection must be improved. This paper analyzes the Trade Related Intellectual Property Rights Agreement and the World Intellectual Property Organization. It also examines other methods of intellectual property protection, including arbitration, Digital Rights Management Systems, and price discrimination. Evidence suggests that optimal protection includes a mixture of international laws, pricing strategies, and governmental intervention.

I. The Importance of Intellectual Property Rights

Intellectual property is an increasingly important asset for businesses and society as a whole. It is a key element in the globalization and growth of the world economy. Software is a key component of this growth. In 1998, the worldwide software market was estimated at \$135 billion. The United States captured seventy percent of global software sales [Gopal and Sanders, 2000, para. 1].

Piracy, however, is an increasing problem for the software industry. Not only is piracy wrong from a moral standpoint, but it also diminishes revenues and reduces incentives for investment in research and development. Software piracy is responsible for lost jobs, wages, and tax revenues. It also creates a potential barrier to success for software start-ups around the globe. According to the Software Publishers Association, piracy losses for the worldwide software industry topped \$12.2 billion in 1999, for a cumulative total of \$59.2 billion lost over the preceding five years. Losses were greatest in the United States and Canada, where they exceeded \$3.6 billion [Software Protection Agency Report, 2000, para. 1].

Intellectual property protection will not only curb the software industry's monetary losses, but it will also help society in the long run by enabling growth. Incentives for innovation will rise as innovators are rewarded for their creativity. Investors in research and development will

also experience decreased risk as private property rights are enforced. Strict intellectual property protection will thus prompt innovators and investors to put additional time and money towards innovation, whereas weak protection will decrease incentives for innovation. Macroeconomic theory states that sustained growth in production is only possible when technology improves. Hence incentives to encourage technological innovation are essential for production gains in the long run.

Strict enforcement of intellectual property rights will also yield current benefits. Legitimate software sales generate tax revenue that may be used for social programs or additional research and development. Intellectual property protection also aids developing countries because it attracts foreign capital to developing markets. Countries that enforce private property rights offer lower investment risk than those that don't. Foreign capital will be attracted to the less risky markets. Developing countries with strict intellectual property rights and low piracy rates will thus receive more direct foreign investment than similar countries with high piracy rates.

There are various ways to deal with piracy. Policymakers must be aware of the costs and benefits of different alternatives. The optimal amount of protection will promote innovation and increase software availability in the long run. The protection must also be efficiently enforced. This paper argues that optimal protection includes a mixture of international laws, pricing strategies, and government intervention.

II. Arguments against Intellectual Property Protection

Although most people acknowledge that intellectual property protection is necessary, there are also critics of excessive regulation. The critics accuse software publishers of using copyrights to stifle innovation and protest that the fair use of information has been suppressed. Lawrence Lessig, a well-known opponent of excessive intellectual property regulation, argues that innovation is enabled by the freedom to share. He contends that copyright owners dominate and constrain the marketplace of ideas. According to Lessig, if free software is available, it can be used by anyone to build new or enhanced software. Individuals will be more creative than companies, who tend to merely upgrade existing products in incremental steps. Hence making software freely available will let users develop new technologies, which enables society to continue to advance at a rapid pace [Zilner, 2002, para. 4, 6].

Lessig suggests that government should encourage the development of open code by using it for all government computers, and should share the code with anyone who is interested [Zilner, 2002, para. 17]. He also proposes changes to the copyright and patent system. Currently, a copyright for software extends to seventy years beyond the death of the author. Usually, the software is obsolete long before the copyright has expired. Lessig advocates a five-year term of protection for copyrighted material, renewable for another five years. He also suggests that the author must include a complete source code, which would be held by the Copyright Office. When the copyright expires, the code would be released to the public.

In the case of patents, Lessig urges that the patent office study whether the patenting of software is more likely to aid innovation than to harm it [Zilner, 2002, para. 19]. Zilner also refers to James Buchanan, a Nobel Laureate in economics [2002, para. 12]. Buchanan suggests that innovators are reluctant to work in an area in which patent holders could exert a claim on parts of the innovator's work. Thus, according to Buchanan and Lessig, the excessive issuance of patents may stifle innovation.

Lessig's arguments give important background information to the intellectual property debate. They are persuasive, but his suggestions may have drawbacks. Basic economic theory argues that incentives are necessary for continuous innovation. As mentioned, investment and tax revenue also increase when intellectual property rights are strictly enforced. Lessig's views should be considered, but it is generally accepted that some amount of intellectual property protection is needed.

Many of Lessig's criticisms emphasize problems with the legal system rather than the degree of intellectual property protection. His arguments indicate that there are problems with current intellectual property laws, and that the legal environment may need to change to encourage innovation. International intellectual property organizations and copyrights must be examined because they are an important component of this environment.

III. International Agreements: TRIPS and WIPO

Experts continue to argue about the necessary amounts and methods of protection, and the debate stretches beyond national boundaries. The Internet has contributed to faster globalization, and sharing information

has become quicker and easier. Countries must cooperate to protect intellectual property, but norms and enforcement tactics differ.

Several international agreements have attempted to facilitate cooperation. One prominent treaty is the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement. The treaty is a component of the World Trade Organization and was put into effect in 1995. The TRIPS agreement establishes standards of protection, rules of enforcement, and the application of the WTO dispute settlement mechanism to resolve intellectual property disputes between member states. The agreement was formed because global standards for the protection of intellectual property rights were inadequate. In addition, international enforcement was ineffective. These weaknesses were harming legitimate commercial interests. Although there were two prior conventions governing intellectual property, they did not establish binding, universal minimum standards. The 1883 Paris Convention for the Protection of Industrial Property and the 1886 Berne Convention for the Protection of Literary and Artistic Works remain important standards, and the TRIPS agreement builds upon their foundations. The agreement also creates international minimum standards for the protection of various forms of intellectual property, including copyrights, trademarks, and patents. Software may be covered under each of these three categories, but this paper will mainly focus on copyright protection.

The TRIPS agreement clarifies existing obligations under the Berne Convention and adds some specific points. Under the Berne Convention, once a literary work is protected under copyright in one country, it is protected in all. Article 10 of the TRIPS agreement provides that “computer programs, whether in source [human readable] or object [machine readable] code, shall be protected as literary works under the Berne Convention (1971)” [Harvard Law Review, 2003, para. 8]. The Article also states that “compilations of data or other material, . . . which by reason of the selection or arrangement of their contents constitute intellectual creations shall be protected as such.” In addition, such protection “shall not extend to the data or . . . [the] material itself.” Article 9 also specifies that only expressions and not “ideas, procedures, methods of operation or mathematical concepts as such” are protected under general copyright law [Harvard Law Review, 2003, para. 8].

The TRIPS agreement uses a dispute resolution method to enforce its statutes. The method is intended to promote consistency and predictability. When disputes arise, a panel of three to five independent

members with experience in international trade law or policy convenes. The panel receives written and oral evidence from every party involved and makes an objective decision. The countries involved may not block the adoption of the panel's decision, but they may appeal to another quasi-judicial group, the Appellate Body. The Appellate Body may "uphold, modify or reverse the legal findings and conclusions of the panel," and its final reports must be "unconditionally accepted by the parties to the dispute" [Harvard Law Review, 2003, para. 11].

The TRIPS Agreement has improved global intellectual property protection, but it is not the only source of international law in this area. The World Intellectual Property Organization (WIPO) has also played a key role in the establishment of global intellectual property protection standards since 1970. The musicians at Woodstock may not have worried about Napster, but WIPO has kept up with changing technologies and increasing globalization. Like the TRIPS agreement, WIPO was also based on the Paris and Berne Conventions.

Recently, WIPO realized the need for a global strategy of intellectual property development. In 1998 the organization began a deep transformation process to move towards this goal. Since then, WIPO has focused on the effects of information technology on intellectual property. The organization has also worked with the WTO to enforce intellectual property rights. On January 1, 1996, WIPO and the WTO agreed to cooperate to implement the TRIPS agreement. In 1998, the organizations established a joint initiative to help developing countries meet their TRIPS obligations by the year 2000 [General Information about WIPO, 2003, para. 67-8]. Assistance has continued from both organizations. WIPO has also set several important goals of its own.

The World Intellectual Property Organization primarily works to coordinate international intellectual property legislation and procedures. It created a Digital Agenda to help harmonize intellectual property procedures and increase cooperation between member states. Under the Digital Agenda, the organization formulates appropriate responses that will encourage the use and creation of intellectual property. The Digital Agenda also realizes the need for adjustments of intellectual property law in the Internet environment and aims to familiarize developing countries with new technology. Dispute resolution is also a key element of the Agenda. It proposes the eventual use of an online resolution system, which will allow for swift and efficient decisions.

The online resolution system may be possible through WIPOnet, an

essential component of the Digital Agenda. WIPOnet is a “global intellectual property information network” that promotes international cooperation by linking the intellectual property offices of its member-states [General Information about WIPO, 2003, para. 56]. The link will facilitate the digital exchange of intellectual property. The exchange will “enhance the worldwide use of strategic information for more effective protection and enforcement of intellectual property rights” [General Information about WIPO, 2003, para. 57].

WIPO’s goal for harmonization is important, but stability and the perception of equality by members are also key elements for success. Cooperation among members leads to a stronger organization. WIPO currently has 179 members, and more are apt to join as its policies become recognized as the norm [General Information about WIPO, 2003, para. 2]. As membership increases, so will the organization’s strength. This will aid international intellectual property protection. WIPO has developed “Nationally-Focused Action Plans” to modernize the intellectual property law of less developed countries and to encourage their involvement in the organization. These tailor-made assistance plans cover a one to three-year time period for targeted countries. In 2001, 56 Nationally-Focused Action Plans were executed by WIPO [About WIPO, 2003, para. 71]. Obviously, WIPO works to include and empower a variety of countries. According to their website,

All parties interested to a smaller or larger extent in intellectual property or having major stakes are included in the international dialogue conducted by WIPO. Those which have limited or no means of participating or of taking advantage of the intellectual property system are provided or empowered with the requisite training, information, equipment or appropriate support by WIPO [General Information about WIPO, 2003, para. 92].

The World Intellectual Property Organization administers twenty-three international treaties, with six pertaining to copyrights [General Information about WIPO, 2003, para. 6]. The WIPO Copyright Treaty was adopted in 1996. The scope of material covered under copyright protection is identical to that of the Trade-Related Intellectual Property Rights agreement. It “extends to expressions and not to ideas, procedures, methods of operation or mathematical concepts as such” [Article 2 of the WIPO Copyright Treaty, 1996, para. 1]. Protection of software on the

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Internet is vague under the guidelines of this treaty. Article 8 does specify that

Authors of literary and artistic works shall enjoy the exclusive right of authorizing any communication to the public of their works, by wire or wireless means, including the making available to the public of their works in such a way that members of the public may access these works from a place and at a time individually chosen by them,

But it does not explicitly state if software is included in this protection [Article 8 of the WIPO Copyright Treaty, 1996, para. 1].

IV. Problems with TRIPS and WIPO

TRIPS and WIPO have established important standards for international intellectual property protection. The treaties, however, still have areas that need improvement. International relations theory, through its branches of realism, institutionalism, and liberalism, addresses their problems. They are also addressed by recently created alternative proposals, which rely on the values of uniformity, certainty, and pluralism.

The realist branch of international relations theory argues that countries act selfishly when they establish international agreements. Loopholes in procedural standards will enable powerful countries to selfishly interpret treaties. Realism implies that countries that advocate strong intellectual property protection may have incentives to incorporate their own enforcement techniques into policies. For example, ambiguous standards in the TRIPS Agreement have allowed the United States to establish a policy commonly referred to as “Special 301.” The policy requires the United States Trade Representative to annually review the intellectual property practices of U.S. trading partners and to sanction countries whose intellectual property protection regimes are deemed unfair to U.S. interests. “The punitive measures embodied in rules such as Special 301 allow powerful, resolute states like the United States to impose punishments, or withhold benefits, sufficient to induce a potential reneger to comply” [Harvard Law Review, 2003, para. 17].

Rules like Special 301 are not part of an efficient long-term solution to the intellectual property problem. Relations with countries who

perceive such a policy as imperialistic may be undermined. There is also a widely held view, even among developed states, that “unilateral action, such as that which can be taken under Special 301, is contrary to the letter and spirit of GATT” [Harvard Law Review, 2003, para. 18].

Developed countries have strong interests in intellectual property protection, but an effective policy must also cater to the needs of less-developed countries in order to gain their compliance. Advanced countries will benefit from this compliance because it will strengthen international agreements. Compliance will also help the less-developed countries by fostering outside investment and domestic innovation. As mentioned earlier, the lower investment risk that results from the existence of private property protection will attract foreign capital. Innovators within the country will also receive rewards for their creativity when intellectual property is protected. This incentive will lead to more innovation within the country. Countries around the globe will benefit as innovation is stimulated within developing countries. As Jack Handey said, “I hope if dogs ever take over the world, and they chose a king, they don't just go by size, because I bet there are some Chihuahuas with some good ideas,” [Deep Thoughts Archive, 2001, para. 1]. In the same sense, less-developed countries will make contributions to our global economy if they are given the chance. A good international policy should be effective without the use of Special 301 or similar legislation.

The effectiveness of international agreements depends upon the level of cooperation among countries. Fostering compliance, as mentioned, will benefit both advanced and less-developed countries. Cooperation is also important for international treaties because nonmembers have the power to thwart member goals. In an electronic environment, non-signatories may be able to evade the goals of international agreements, even though they are not powerful in the traditional sense. This, in turn, may discourage other countries from cooperating with the treaties. A form of prisoner's dilemma exists because countries only benefit from the treaties if a large number of other countries are involved. In addition, a few uncooperative non-signatories may become data havens, due to non-existent or poorly enforced foreign copyright laws. Content owners fear data havens because they “facilitate the widespread duplication and distribution of copyrighted content” [Franklin and Morris, 2002, para. 40]. If the havens are not completely self-sufficient, members of an international convention may be able to use coordinated electronic blockades or standard trade sanctions against them. Establishing a

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cooperative atmosphere at the outset of an international agreement, however, may be a more efficient solution. A cooperative environment will increase membership and support for international treaties. This, in turn, will decrease the likelihood of data havens.

This cooperation may be harmed by selfish actions, such as by the use of Special 301. Policies must be continuously reviewed to prevent the establishment of such rules. Continuous review will help ensure fairness and uniformity. The method and probability of enforcement must be consistent across all participating countries. If asymmetric enforcement exists, companies may relocate to non-enforcing countries where the risk of litigation is lower. This type of nationality shopping will harm the economies of enforcing countries and help those of the non-enforcers, which will decrease support for intellectual property protection in the long run.

WIPO and TRIPS must also provide a degree of certainty to foster cooperation. An ambiguous agreement or unpredictable enforcement will harm society by deterring actors from exchanging information on the Internet. International agreements should thus ensure that people are able to make informed decisions about various courses of action. Unpredictable rules force potential defendants to constantly keep up with changes. Only the biggest multinational corporations will be capable of this. Society's well being will decrease as smaller innovators are forced out of business, and risk and uncertainty will discourage investment in multinational intellectual property initiatives. If procedural standards are ambiguous, powerful countries will also have a greater temptation to manipulate rules. Valuing certainty will help protect the interests of smaller countries by decreasing the likelihood of selfish legislation. The TRIPS Agreement, as mentioned, fosters certainty through its dispute resolution method. Reliable methods such as this will encourage countries to support WIPO and TRIPS.

Uniform, predictable international standards are important to a certain extent, but Franklin and Morris argue that "there is little demand in the world as yet for a totally homogenized legal culture" [2002, para. 68]. Uniformity and predictability must be balanced with the value of pluralism to achieve the optimal amount of cooperation. The legal standards of international agreements must have a certain degree of flexibility. The agreements will gain support if they attempt to respect a variety of legal cultures. In addition, nations provide laboratories for social experiments. The success and failure of various legal systems and

substantive laws can be easily observed. International standards that honor pluralism can be altered as the benefits and drawbacks of various legal systems become apparent. This decreases the risk of implementing a faulty universal policy.

WIPO and TRIPS must be able to conform to cultural standards of various countries without compromising their basic goal of intellectual property protection. A flexible approach to implementation will foster compliance and enhance the value of pluralism. As mentioned, continuous review of both policies and implementation methods is also necessary. Review will not only ensure fairness and uniformity, but it will also facilitate assistance, education, and capacity-building tools for developing countries.

The TRIPS Agreement will rely on the WTO's Trade Policy Review Mechanism to monitor implementation standards and encourage flexible judgments. WIPO, as mentioned, has already proposed an online resolution system as a part of the Digital Agenda. This system will allow for swift and flexible decisions. WIPO's Nationally Focused Action Plans will also encourage cooperation by empowering and educating less-developed countries. Excessive legislation and the use of rules like Special 301 have created an imperialistic environment for intellectual property protection and discouraged cooperation. WIPO's Nationally Focused Action Plans introduce methods of intellectual property protection to developing countries in a non-threatening way. Education has helped the governments of less-developed countries understand the importance of international intellectual property protection.

Many times, this education has been made possible through the help of Non-Governmental Organizations (NGOs). For instance, the International Intellectual Property Alliance and the Business Software Alliance have been very involved with software anti-piracy programs. They are dedicated to promoting international intellectual property protection, and have experience reporting and testifying to governments. These organizations are also in a good position to promote education in developing countries. They can assist in the broadcast of legal norms and the benefits of intellectual property protection.

Liberalism stresses the importance of NGOs in international cooperation. The World Intellectual Property Organization has enlisted the help of many non-governmental organizations. There are currently 170 NGOs with observer status [General Information about WIPO, 2003, para. 7]. A major criticism of the TRIPS Agreement is that it has not

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created a role for NGOs. These organizations help WIPO with enforcement and education. Liberalism not only suggests that NGOs may be involved with education, but also that they may help establish the rules themselves. One proposal entails bargaining between governments and private firms, using the TRIPS agreement as a basic set of default rules.

V. Common Law, Digital Rights Management, and Economic Approaches to Intellectual Property Protection

The practice of private bargaining has increased. Constantly changing technology may increase reliance on dispute resolution and private bargaining methods. These methods are more flexible than traditional legislation and may also enable faster resolutions. Some experts suggest that greater reliance on private bargaining, along with other trends, may eventually decrease reliance on international legislation in general.

The usefulness of international agreements, especially in a business setting, could lessen as alternative dispute resolution becomes more prevalent. International laws would not be needed if alternative dispute resolution clauses were incorporated into the majority of contracts. Alternative dispute resolution has its benefits, but may not offer the predictability of civil law. It also may create unfair advantages for the party drafting a contract, as they are the ones to specify the type of dispute resolution.

A common law approach to dispute resolution may offer some of the same benefits of alternative dispute resolution, while also providing a stable procedural background to ensure fairness. This approach provides an efficient combination of flexibility and legislation. Statutes provide an important legal framework, but cannot stand alone. They may not be able to keep up with the changing technological environment. A flexible, common law approach to international property protection may be more useful than complete reliance on international statutes.

Mark Twain once said “Reader, suppose you were an idiot. And suppose you were a member of Congress. But I repeat myself” [Mark Twain Quotes, 2003, para. 1]. Although not expressed so bluntly, this view prevails among many in the field of intellectual property. In an article for the *Vanderbilt Law Review*, Suzanna Sherry suggests a solution to intellectual property disputes is better found through common law

methods.

Congress often enacts legislation because of a perceived crisis when applicable judicial interpretations already exist. A problem arises because “legislation designed to address questions raised by a rapidly changing technology is likely to become obsolete equally quickly” [Sherry, 2002, para. 6]. Congress is unlikely to revisit the issue for some time, which may create confusing and unintended consequences. Judicial decisions, on the other hand, do not have the global reach of legislation. Reliance on judicial decisions enables observation and gradual adaptation of common law. A common law approach to intellectual property protection may also enable Congress to address more important matters. Sherry states that “if the federal legislature continually reacts to the crisis of the moment, it may neglect more long-term problems” [2002, para. 12].

How do these domestic issues apply to international intellectual property issues? International organizations such as the World Intellectual Property Organization are generally less hasty than Congress when enacting regulations, although they still must contend with a rapidly changing environment. The issues more directly apply when we consider that international harmonization is often used as a justification for domestic laws. The goal of harmonization puts additional pressure on Congress. Reliance on legislation may be inefficient in other countries as well as ours, which means that an obsession with international legislation is not beneficial. If a common law approach is used internationally, individual nations will benefit. International agreements will also be inherently stronger because they will not contain useless or outdated statutes. A common law approach offers extra time and the knowledge of successive experiences for establishing standards, and may be more efficient than established statutes when unforeseen changes arise.

Complete dependence on common law may also create problems. As with alternative dispute resolution methods, the values of uniformity and predictability may be compromised. In addition, congestion may become a problem in courts that are specifically created for intellectual property cases. Existing international organizations have been working to address these issues. As mentioned, there has been a trend towards alternative dispute resolution methods. Arbitration has already been incorporated into some international treaties. Arbitration and common-law approaches are not identical, but both approach international problems without complete reliance on specific legal statutes. The technique is cost-effective for businesses and helps free up the judicial system, but may

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compromise uniformity and predictability. The benefits of arbitration and common-law must be weighed against these costs.

Technology may also play a role in the relative usefulness of international agreements. Although greater use of technology may create a need for international copyright protection, technology itself could also prevent unlawful use of certain materials. Digital Rights Management Systems are the preventative measures that copyright owners may take. For instance, a compact disc may be playable but not copyable, or playable only a limited number of times. For a few years, Microsoft took this approach with its software, allowing users to install material exactly two times from a compact disc. These technological restraints may offer a combination of low cost and high likelihood of enforceability. In addition, the legal battles between content owners and users are minimized. Technology restraints protect property without legal aid.

The effects of technological restraints may be viewed as either benefits or costs. The use of the restraints may benefit society by decreasing congestion in legal courts. They may also create higher incentives for innovation because of the high degree of enforcement. However, fewer users would have access to software, decreasing society's benefit from the innovation in the short run. Because technology is constantly changing, content owners may also spend more time and money working to protect existing property than creating new programs. In addition, some competitors may offer material lock-free, creating an uneven marketplace.

Digital Rights Management Systems and common law approaches can help prevent piracy. These methods offer advantages over international treaties, but they also have drawbacks of their own. Some experts argue that economic actions may be the most efficient way to protect intellectual property. In the article "Pirated for Profit," Slive and Bernhardt [1998, 886-91] suggest that software publishers use a subtle form of price discrimination to increase profits. Their strategy is to differentiate between business and home consumers, essentially charging a price of zero to the home consumers. These consumers are less willing to pay and more difficult to prosecute for intellectual property violations. The potential costs of piracy are higher for businesses, so they will be more willing to pay for legitimate software. Businesses also incur positive network externalities when their employees gain familiarity with software outside the business setting. If network externalities for specific programs are high enough, businesses will have incentives to purchase

them. Thus software companies can profit from limited piracy by home consumers. The authors support their claim by stating that anti-piracy efforts are mainly directed at businesses [Slive and Bernhardt, 1998, 895-6].

Slive and Bernhardt make some important points. Their study, which was conducted in 1998, demonstrates a relationship among externalities, legal prices, and the piracy rate. However, the software environment in 2003 is dramatically different from what it was in 1998. Network externalities have become less pronounced because the general public has gained proficiency with many types of software. The claim is also weakened by the fact that individuals have recently been targeted for intellectual property violations. According to the *New York Times*, the record industry recently filed lawsuits against four college students [Harmon, 2003, A1]. The industry is charging them with copyright infringement and seeking billions of dollars in damages.

The general idea of price discrimination, however, has merits. A more direct form of price discrimination may help tackle the international piracy problem. A high incidence of piracy is often associated with certain market factors. Within a country, both ability and willingness to pay affect the frequency of intellectual property violations. Piracy generally occurs in developing countries where authentic software is unavailable or perceived to be unfairly priced. Citizens of most countries cannot afford software when it is sold at the same price as in the United States. The relatively high price provides justification for both the violators and their respective governments to allow or at least tolerate piracy. Empirical evidence supports this theory, as countries with low per capita gross national product show the highest piracy rates. The relationship is most pronounced for countries with per-capita gross national products less than \$6000 [Gopal and Sanders, 2000, para. 14]. Governments in these countries are not unaware of the benefits of intellectual property protection. They know that piracy impedes the growth of the domestic software industry and lowers tax revenues. Yet it is inefficient for governments to discourage piracy because software use will be severely restricted if strict copyright laws are enforced.

Although a focus on international property rights may have marginal success in deterring piracy, the pricing strategies of software companies must also be addressed. Software companies may use a global price discrimination policy to deter piracy. Such a strategy could substantially alter the piracy incentives for governments and their citizens. Critics

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argue that price discrimination is difficult because it requires effective measurement of customer preferences and a mechanism for preventing arbitrage. The software publishing industry, however, has already been using this technique in several different ways. In addition to the indirect means mentioned earlier, companies also grant site licenses and practice customer segmentation. Arbitrage is controlled through the distribution channel. Companies may also provide different versions of their product for different groups of users.

A price discrimination policy based on national criteria could just as easily be implemented. Gopal and Sanders suggest that national income levels broadly capture the willingness-to-pay function [2000, para. 24]. Thus, the per-capita gross national product would be a simple index for price. Although some amount of arbitrage may occur, the danger of software flowing from poor to rich countries is relatively slim when the strict enforcement of copyright laws and entrenched cultural values of developed countries are considered. In theory, once the legal price of software corresponds with citizens' ability to pay, the government's incentives to enforce intellectual property rights increase substantially. The governments would work to protect intellectual property in order to accelerate the growth of the domestic software industry and to increase the tax revenues from software sales. Consumers would also benefit from the support provided with legitimate software. A positive environment for intellectual property protection would be established as the trend of legitimate purchasing gained momentum.

Price discrimination seems like a simple solution to a complicated piracy problem, but it hasn't been widely adopted. This may be because United States publishers do not view citizens of developing countries as part of their customer base. They may also be relying on the government to subsidize research and development. Although subsidies may increase incentives for innovation, they tend to be less efficient than market incentives. It may be difficult for the government to determine an appropriate level for subsidies, and the tax revenue may be better used somewhere else.

VI. Conclusion

It seems that each of the possible solutions for piracy have drawbacks. Is there a way for society to maximize innovation and utility? A mixture of international laws, pricing strategies, and governmental intervention may

best solve the piracy problem. Price discrimination may be a viable strategy for simultaneously increasing profits and benefiting consumers, but it must be backed with strong international copyright laws to deter arbitrage. Because intellectual property is a public good, some amount of government subsidization may also be necessary. The best strategy will be one that provides flexible laws and an environment that stimulates innovation. The values of uniformity, predictability, and pluralism should be upheld. Regulations should be sufficient to create incentives for innovation, but should not be excessive.

Users and software companies must also help protect intellectual property. Users have a moral obligation to respect intellectual property. They must also be educated that they will benefit from its protection in the long run. Software companies must realize that, regardless of these benefits, users will continue to find ways around technological and legal barriers if they perceive them as unfair. As suggested earlier, this philosophy is demonstrated by the high rates of piracy in poor countries. It can also be observed in the popularity of peer-to-peer music sharing. The outrageous pricing strategies of record companies were revealed after Napster facilitated cheap and easy copying. Software companies may face the same fate if they do not adapt to changing customer bases. International organizations, such as the World Intellectual Property Organization, have helped decrease piracy through international laws and education for less-developed countries. The laws may protect intellectual property to some extent, but enforcement and adaptability are questionable. The education may also be useless if the price of legitimate software is significantly higher than the expected costs of piracy. Hence, the burden of intellectual property protection falls not only on these international organizations but also on software companies and users. Society is a victim of the loss of innovation. Pricing strategies, laws, and users all play a part in stimulating innovation for the future.

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