

McLaren, Dawn. A Study of Intellectual Property Rights Protection in Developing Countries. (Under the direction of John S. Lapp)

Should developing countries conform to industrialized countries' system of strong intellectual property rights (IPR) protection or should they allow their legal system to evolve with the economic structure of the local economy? Developing countries are being asked to harmonize their legal structure with the United States and Europe, a move that may end up stifling innovation and economic development in the developing world.

There appears to exist a critical turning point in a developing economy where local innovators begin to appear. This paper seeks to substantiate that one can identify this turning point through examination of the types of goods demanded in the developing country's market. With the turning point identified, the argument can be made that the rules regarding IPRs on either side of the turning point should be different. For the pre-turning point developing economies, strong protection of IPRs can be a deterrent to economic growth and improvement of the quality of life. The dangers of protecting IPR prior to the developing country reaching the critical turning point are detailed to provide substantiation of this.

How a country industrializes and the involvement of imitators, innovators and IPR protection is explained. The United States provides a good example of a country that has completed the process and illustrates how this turning point is apparent. The results of the empirical investigation show that the critical turning point in a developing economy can possibly be determined through the matrix of types of goods demanded in the local marketplace. This provides the opportunity to examine the rules on either side of the turning point. Finally, the welfare benefits and costs of protecting IPR before the critical turning point is discussed.

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A STUDY OF INTELLECTUAL PROPERTY RIGHTS PROTECTION
IN DEVELOPING COUNTRIES

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BIOGRAPHY

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Should developing countries conform to industrialized countries' system of strong intellectual property rights (IPR) protection or should they allow their legal system to evolve with the economic structure of the local economy? This is an important question as industrialized countries have been using their economic and political power to pressure developing countries into harmonizing their legal structure with the United States and Europe, a move which may end up stifling innovation and economic development in the developing world.

There appears to exist a critical turning point in a developing economy where local innovators begin to appear. This paper seeks to substantiate that one can identify this turning point through examination of the types of goods demanded in the local (in this paper, local refers to the developing country) market. With the turning point identified, the argument can be made that the rules regarding intellectual property rights on either side of the turning point should be different. For the pre-turning point developing economies, strong protection of intellectual property rights can be a detriment to economic growth and improvement of the quality of life of the inhabitants. The dangers of protecting IPR prior to the developing country reaching the critical turning point are detailed to provide substantiation of this.

First, how a country industrializes and the involvement of imitators, innovators and IPR protection is explained. The United States provides a good example of a country that has completed the process and illustrates how this turning point is apparent. A discussion of how one can determine the turning point with the data available today, including how this may affect

the Cobb-Douglas production function of the developing country follows. This discussion moves into the presentation of the data sources and empirical methods used. The results of the empirical investigation as well as the examination of various economic outcomes show that the critical turning point in a developing economy can possibly be determined by focusing on the matrix of types of goods demanded in the local marketplace. This provides the opportunity to examine the rules on either side of the turning point. Finally, the welfare benefits and costs of protecting IPR before the critical turning point is discussed. From the evidence presented, it is clear that world policy towards developing countries in regard to intellectual property rights should be re-examined and likely changed.

How a country industrializes

The enactment and enforcement of strong IPR protection has drawn a great deal of attention over the last decade. Economists argue that laws protecting intellectual property are put in place because the nature of intellectual property makes it difficult for intellectual property owners to capture all of the gains from invention and innovation. It is a classic free rider problem because intellectual property is non-excludable, but, especially in the case of developing countries, policymakers must carefully consider the balance between the welfare of foreign IPR owners, the domestic companies and consumers worldwide. In most of the literature on the subject, developing countries are encouraged to strengthen their IPR protection with the idea that this will foster an innovative sector in the economy. A correlation between strong IPR and industrialization of a country exists, but the causal relationship is not clear. Developing countries, although adopting the stringent IPR legislation of the industrialized countries,

particularly that of the United States, have remained countries that imitate rather than innovate.

Hal Varian contends that industrialization causes IPR protection when he wrote, “ As countries become richer, their desire for local content increases. However, as they get more local content produced, the necessity of IPR protection becomes increasingly apparent. As enforcement of intellectual property laws increase, both domestic and foreign producers benefit.” It appears that there is a natural process of economic growth, one in which the market determines the appropriate strength and length of protection, through which countries pass from imitation to innovation and therefore towards stronger IPR protection.

Joseph Schumpeter argued that innovators are the agents of economic development. If that is true, then it seems to be in countries’ best interests to protect IPR in order to appropriately reward innovators. H.W. Singer opposes Schumpeter’s theory when it comes to developing countries (Singer, 1964). First, he claims, government is more likely to be the agent of economic development in developing countries and that Schumpeter’s theory is inapplicable in such a case. This point is arguable, but some other points that Singer makes highlight the flaws in the current method of dealing with IPR protection in developing countries. He points out that developing countries tend to be devoid of innovators. This is essentially true because literacy rates are low and infrastructure unstable in developing countries. There may be innovators, but they are small-scale and their inventions only novel to the village. From a sociological point of view, small villages do not need the same structure of law enforcement that large societies do (Diamond, 2000). Because everyone knows each other and possibly are related, reward and punishment are administered without the need for legislative code. It is the anonymity of large societies that creates such a need.

Schumpeter makes another important point about the effect of innovation on economic

development: the introduction of new techniques and technology changes the existing production function, including a movement out indicating the higher production potential of the country. Such expansion can come from the application of innovation from the industrialized nations within the developing nations. Because of this, policymakers assume that it is in the developing countries' best interest to protect and reward the intellectual property that it imports. In this way, however, the developing country remains an imitator dependent upon the whims of the industrialized countries and whose comparative advantage lies only in its cheap labor and land. This leaves it vulnerable to the pressures of industrialized nations and their foreign direct investment strategies.

Does IPR create innovators or do innovators help to create a legal system that encompasses IPR protection? H.W. Singer appears to argue the first, that because the government is the innovator in developing countries, legislation will protect IPR prior to the advent of innovation. The second seems like a more viable hypothesis and is what Varian suggests about a process through which developing countries become innovating nations. In support of this is the fact that common law came into existence long before statutory law. In other words, as problems came up, a judge made decisions and eventually policymakers created a legal code. From a global standpoint, this is similar to what is occurring now. Innovators are asking to receive what they see as part of their reward. They may, however, be out of their jurisdiction when it comes to developing countries and, just as minor children do not automatically appear in adult courts, a different code may be applicable to developing countries.

An empirical study done by Braga and Wilmore (1991) shows that, in closed regimes, the competitive framework of the developing economy may be insufficient to stimulate much innovation. The developing country has a notoriously ill-working competitive framework, so it

may be that there is little incentive to begin the innovative process. Gould and Gruben (1991) find that the cost of innovation falls as human knowledge accumulates. This suggests that the developing country's cost of innovation is too high prior to the point at which the population is sufficiently educated to undertake the task of invention, especially for the global market. The problem facing companies in industrialized countries is that the developing countries are accumulating that human knowledge through what is now defined as piracy, in effect learning through imitation, observation and access to the global knowledge network¹. This has become an earmark of developing countries. Constantly expanding definitions of piracy, which now, for example, include simply copying a software program for one's own use, have brought more developing countries into the realm of the countries in violation of the industrialized countries' wishes.

Todaro (1994) describes some characteristics of developing countries beyond the piracy that is rampant today. First of all, commodity and resource markets are highly imperfect. Enforcement of IPR, which is essentially a government-sanctioned monopoly, may serve to worsen the situation. Second, consumers and producers have limited information. The problem of asymmetric information arises between the developing country and the industrialized nations, with the developing country being at a disadvantage. Third, major structural changes are occurring in the society and the economy. The economy of a developing country is often in a state of disequilibrium, furthering the problems within the competitive framework. Often family and religious considerations take precedence priority over private, self-interested behavior, also intensifying market failures. It is the point during the structural change in the economy at which innovation and respect for IPR begins that needs identification.

¹ Copies of Microsoft Word that allow the sharing of files with the industrialized world is an example of access to the global knowledge network.

The goal of economic development is to raise people's income and consumption levels. Again, the level at which income and consumption begins to cause the demand for local content and the protection of IPR needs identification. It may be possible to determine this point by looking at the structure of consumption through the demand for certain types of goods, , as well as simple income levels. Economic development also serves "to establish social, political and economic systems that promote human dignity and respect" (Todaro, 1994). A market based on private property can be a part of this, where the tragedy of the commons is avoided and IPR is simply an extension.

Yang and Ng (1993) acknowledged several functions of a market based on private property. These functions should also govern intellectual property protection. The efficient allocation of resources is primary and includes a search for the efficient levels of specialization and division of labor. Again, the efficient allocation from a global viewpoint is very different than if taken from the developing countries' standpoint. Developing countries are often looked upon as sources of cheap labor for companies in the industrialized nations, but keeping that particular allocation may stunt the developing country's economic growth. Another function of the private-property market is to discover the efficient market structure and institutional arrangements. Some economists argue that this is best done by the markets themselves and not outside regulatory bodies. The market also seeks to discover the efficient structure for transactions and the monetary regime. A market based upon private property is certainly necessary before respect or enforcement of IPR comes about. This type of market is often lacking in developing countries, where familial ties and traditions determine the structure of the economy.

Most visibly, economic development serves to increase people's choices, whether it is in

terms of goods or personal freedoms. Again, this indicates that the type of goods demanded in the marketplace may identify the point at which innovation begins and appropriate enforcement of IPR protection can begin.

Economists argue that strong intellectual property rights provide an appropriate reward to the innovator. The major innovation of the past decades is computer software. Unlike a cure for cancer which has IPR protection for twenty years, for example, computer software is protected for seventy-five years after the death of the innovator because it is considered as literature. This discrepancy between the cancer cure and literature illustrates an underlying belief that innovations that benefit society as a whole should be made available to the public much more quickly, even though the cost of producing a cure for cancer is many times the cost of writing a book. In order to bring their societies into a realm of competitiveness and into a world of innovation, developing countries need access to innovations such as computer software. In fact, it could be argued that lengthy protection of computer programs has stalled improvements of existing software. So IPR protection can be a good thing in that it gives a reward that compensates the innovator for his costs and trouble. An excessive reward, however, may turn IPR protection into a bad thing for society as a whole. The critical turning point can help to identify when strong IPR protection can be considered a bad rather than a good.

How to determine the “turning point”

Alwyn Young (1995) implies that GDP growth in developing countries comes from perspiration rather than inspiration. In fact, he includes human capital development, an important economic activity in developing countries, in this category. Human capital

development is not, however, all perspiration. Human capital development, which includes improved literacy of the population, forms the basis for the development of inspiration, a source of innovation. For a developing country to produce innovators, it must foster its human capital development. Beyond literacy, this includes mathematics, science and information technology skills. This is the point at which IPR and human capital development come into conflict.

Human capital development begins as imitation and moves on to innovation at a later stage. Fair use has been the way in which IPRs have not interfered with human capital development, but there has been a recent trend towards removing fair use for consumers, especially in the United States. Again, what happens in the United States is important because that model is touted as one that developing countries should follow. It is possible that IPRs stifle creativity by removing an essential building block. By imposing stiff penalties for violation of IPR, some outputs are suppressed while others are encouraged. These penalties likely suppress innovation in the developing country while they encourage an increase in maquiladora-type concerns. One only need look at Mexico and Southeast Asia to see that this is, in fact, the type of industry that has grown rather than research and development of innovative products.

An important key to whether stringent IPR protection is right for the developing country is whether or not the country is ready to produce innovators. Some economists, such as Gould and Gruben (1996), have looked at literacy rates and the like to determine the level of human capital quality in the developing country. While this has provided some hopeful leads, Varian pointed out the importance of the demand sector in the equation. As a country develops, its citizens become more sophisticated in their education, habits and demands. This is why Varian links the development of IPR protection with the demand for local content. From a sociological and psychological point of view, a person must first satisfy his or her basic needs before moving

on to satisfying higher level wants. By applying this to consumer behavior, one would expect to see purchases of convenience and entertainment goods increase as it becomes easier to meet basic necessities. Entertainment is usually demanded in the language and culture of the local area. In other words, one might expect the volume of newspapers, which have a definite local content, demanded per capita to increase as the GDP per capita increases.

Data sources and methods

In setting up the data for use in this paper, many different sources were examined. While one may dispute the sources chosen because of the absolute dollar amounts reported, as a comparison between goods they are still useful. In other words, some key shifts in the pattern of demand become clear with analysis of these data sources.

To reduce piracy, the poor country must first become a richer country. The most common way to measure whether a country is rich or poor is with Gross Domestic Product. In this case, as we are searching for a structural change and not just a simple level of GDP, it is best to use GDP per capita. Because birth rates tend to be high in developing countries, a change the rate of population growth may be an indicator of economic development. Using GDP per capita to identify the more subtle turning point in the economic structure addresses this problem. Another way to pinpoint increased wealth in the country is by looking at the percent of people in poverty. As people rise from poverty, they are more willing to pay for access to the global economic network. Prior to that, access to food and shelter are the primary considerations. One can use GINI coefficients, which measure the distribution of wealth, but the problem there is that a small percentage of the population capturing the country's income can change the manner of

handling IPR enforcement as they could be in the position to innovate. It probably would not take many innovators before changes in legislation occur.

The demand for local content might be reflected in falling imports per capita, but this does not appear to be a reliable way to pinpoint the change. Sometimes imports per capita will show an increase with a more sophisticated economy. The United States, for example, imports many goods requiring cheap, unskilled labor from developing countries. If there were a measure of local authors, artists and inventors, there may be some way to get at local content information. Unfortunately, there is not such a measure available. Instead, it may be useful to look at the number of books demanded, which are likely to be in the local language and appealing to local culture.

To measure piracy rates, the Business Software Alliance's surveys of countries' piracy rates are used. These rates are calculated by taking shipments of hardware and shipments of software to estimate a piracy rate. This ignores the fact that some new hardware may have properly-obtained and registered older software versions installed. Again, this may not be harmful in the analysis of the data because countries with innovators will likely use the new software rather than the old at the point at which they begin innovation. Also, if the BSA piracy rates are inflated due to the exclusion of resale of old software in their calculation, they will then be inflated across the board because the exclusion is across the board, leaving comparisons between the demand variables and piracy rates unaffected. BSA revenue lost to piracy figures are calculated from manufacturers' suggested retail price in the United States rather than from consumers' willingness to pay in the developing country, leading to their gross exaggeration. Revenue figures, therefore, are ignored in this analysis.

Some economists have attempted to measure the rate of piracy from the legislation on the

books in the developing countries. Some countries have strict laws about IPR protection and others not, but this does not tackle the issue of how often and how strictly enforcement is carried out. So looking at a country's level of "on-the-books" legislation about piracy, does not measure the level of effectiveness of its enforcement. A detailed study of enforcement could be done by reviewing cases brought to court for the number of cases and severity of punishment, but such a study is time-consuming and expensive, especially considering the accessibility of court records in developing countries. For the cost of undertaking such a study, the benefit is minimal as the result would exclude the 'hidden' pirates who are never caught, much as discouraged workers are excluded from the measurement of the unemployment rate. Also, such a study of enforcement in the courts is likely impossible in countries such as China because of the political situation. Therefore, the BSA piracy rates make the best proxy for the true piracy rates and IPR violation.

For measuring all other factors, such as GDP, sales of goods such as books, telephones, clothing and spending on leisure and education, Euromonitor data are used. This information is valuable in pinpointing a change in the demand matrix of the developing country's population. Some demand-side factors are taken into account, with the assumption that Varian is correct in that stricter enforcement of IPR occurs when more local content is demanded, something that occurs along with the intellectual development of the population that is spawning new supply-side innovators. The variables chosen identify when the population of the developing country begins to purchase goods such as books, televisions and telephones, which are goods compatible with a higher level of human capital advancement. Although these data are not exactly compatible with IMF or other measures in that the figures differ somewhat between the IMF and Euromonitor, the data are internally consistent. This means that the measures of the number of

computers per household, for example, can be compared to the measurement of GDP per capita without introducing a data incompatibility error. Therefore, Euromonitor measures of GDP are used instead of the more widely accepted IMF data. Euromonitor's methodology is one of extensive surveys conducted within each developing country.

The first data set examined is that of GDP per capita. Since real GDP measures the total income of a country, increasing real GDP shows a poor country becoming a richer country. Because developing countries depend a great deal on higher rates of labor input than industrialized countries, it is important to look at GDP per person, rather than simple GDP level, to accurately measure how the economy is improving.

Because a long time series is not available for piracy rates, a five-year average of all variables is used for this analysis.

Empirical Results

Euromonitor data show a correlation of .91 between the volume of newspapers demanded per capita and the level of GDP per capita. Spending on leisure and education shows an even higher correlation with a five-year average of both GDP per capita and spending on leisure and education per capita marking a correlation of .97. Also showing remarkably high correlations were telephone use, which indicates more use of a network in the society whether it be personal or business. Convenience goods such as ovens and dishwashers also register high correlations when compared to GDP.

A negative correlation exists between GDP per capita and the piracy rate as estimated by the Business Software Alliance. The five-year average rate of piracy and the five-year average

of GDP per capita show a correlation of -0.71. This is strong evidence that as a country develops, the respect for private property such as IPR increases. Whether or not it is because of higher enforcement, it is clear that people violate IPR less when they have more income.

Looking at the sophistication of the society as measured by the type of goods demanded per capita and the rate of piracy, one can clearly see a pattern. Showing highly negative correlations to the rate of piracy are overall retail sales (-0.82), spending on transportation (-0.77), spending on leisure and education (-0.75), number of vehicles in use (-0.74), number of telephones in use (-0.69) and the volume of newspapers sold (-0.60). It is interesting to note that these are items that give one access to a network, whether it is through education or a telephone line. Showing a low negative correlation between piracy rates and the good demanded is the volume of refrigerators sold (-0.42) and spending on health care (-0.46). The calculation of spending on health care may be distorted because of developing countries' tendency to violate pharmaceutical patents and the fact that many international aid agencies provide cheap or free health care in developing countries.

There appears to be a breakpoint when looking at GDP per capita and piracy rates. Chow breakpoint tests confirm this to be the case (see Table 5). The best fit of a regression for these two variables occurs with a log regression, which was a clue to the breakpoint's existence. Various breakpoints were tested based upon the information gathered from the log regression. For all the variables tested (see Tables), the breakpoint occurred at a piracy rate of about 61.8 percent. This suggests that respect for IPR is significantly different above that point when compared to below it, likely because of the difference in the demand structure of the economy. The developed countries tend to have lower rates of piracy while developing countries tend to have the highest piracy rates. It is interesting to note that countries suffering from economic

stagnation, such as South Africa and Slovakia, have lower rates of piracy compared to developing countries where the economy is not stagnating. In this small group of countries, GDP per capita is low and piracy rates are in the medium range. Countries such as China and Thailand have high levels of piracy and low levels of GDP per capita, but the international market definitely feels their presence, especially when it comes to China.

It appears that there is a natural progression towards protecting IPRs as a country grows economically. It is also apparent that the evolution includes a period of high IPR violation as the country diffuses knowledge and technology more widely. This correlates with higher levels of GDP per capita. What needs to be considered now is whether enforcing higher IPR protection before the country manages to reach that point itself will do harm or good.

Welfare benefits and costs of early IPR protection

Mazzoleni and Nelson (1998) outlined four major functions of IPR recognition. First of all, there is the invention motivation. The expectation of reward comes from the monopoly profit that exists for the duration of the patent or copyright protection. The assumption is that one will be willing to risk more in expenditures towards an invention if one can realize economic profit, including implicit as well as explicit costs. Bell telephone patents were instrumental in allowing AT&T to keep its monopoly for a very long time and the same occurred with General Electric and Westinghouse in terms of light bulbs (Mazzoleni and Nelson, 1998).

A second function of IPR protection is to induce commercialization. This seems to have fallen by the wayside of late as many firms, especially when it comes to gene mapping, have sought IPR protection in order to gain profit from the licensing fees and royalties rather than

from the commercial application of the innovation. Such activity may, in fact, discourage commercial application as the royalties and licensing fees add to the explicit expenses of an invention. Developing countries are ill equipped to handle such added costs.

A third reason to protect IPR is that the procedure forces the inventor to disclose his method and materials. The knowledge that imitators will assume liability for damages when caught makes the inventor willing to disclose the details of his invention. Again, this is part of the tension that exists between innovators and developing country imitators. This disclosure is also supposed to prevent the duplication of effort when it comes to innovation. Knowing that someone else has already laid claim to a particular route allows others to make a work-around solution.

The most important reward to innovators comes from monopoly profit. One can accomplish this in one of two ways: by being the first-mover, the first to introduce a product to the marketplace, or through government protection in the form of copyright and patent. The risk when one is the first-mover is higher than when the government grants a monopoly because of the length of time that one can expect the monopoly to continue. In the first-mover example, an innovator has as long as it takes an imitator to enter the market, but the government-granted monopoly allows the innovator to earn monopoly profit until a viable work-around enters the market or until the expiration of the IPR protection. According to economic theory, higher prices and lower quantities for consumers come with a monopolistic economic structure. Consumers in developing countries are not the ones able to pay higher prices for innovative products.

Even if the innovator is unable to bring a product to the marketplace, there is still value in the IPR protection because of royalties and licensing. In this case, the value of the patent or

copyright is higher when the enforcement of protection is greater. This is a motivation for companies to prosecute for every infringement, as it is a show of strength of protection when an imitator loses a case. In fact, Lanjouw (1994) found that the value of a patent is affected both by whether it is infringed upon and by whether the patent or copyright owner chooses to seek prosecution. Schankerman (1998) found that the mean value of a pharmaceutical patent in 1980 dollars is \$4,313 (Schankerman, 1998). The mean value of an electronics patent is \$19,837 in 1980 dollars. If patent licensing fees become the motivation for innovation, commercialization may become blocked and weakened protection will reduce the value of the patents in terms of licensing and increase the value in terms of commercialization.

There are ways to reward innovators other than through copyrights and patents. One way is to provide research contracts through the government. Such a system is in place when it comes to innovation at universities, which lacked a profit motive until recently. Another solution suggested is research tournaments, which might provide a similar rare and big prize to the one afforded by patent and copyright. People enter the lottery with the hope of such a rare and big prize, so a research tournament or research grant might attract inventors as does copyright and patent protection. An idea could attract the dollars to test and develop it. While this method appears to subvert the workings of the free market, it appears that overly strong patent protection, which is also a type of government interference with the free market, is doing the same.

Can product development and artistic expression flourish without intellectual property protection? One of the loudest voices in the fight for strong copyright protection is the record industry, with their fight against Napster and MP3.com being the highlights. They claimed millions of dollars in lost revenue, but a comparison shows that music artists may be better off

without the record companies as they do not see as large a percentage of the revenue as they could otherwise. MP3.com made and marketed CDs as well as allowing individuals to download or listen to songs. These services were for new bands and artists that had not yet signed a recording contract. Through the record companies, the artist could expect to get \$1 per CD, but through MP3.com, the return was \$3.99 per CD (Litman, 2000, pg. 157) This suggests that artists produce for more than just a rare and large reward. As opposed to gamblers, entertainers may seek fame in addition to fortune. For the entertainer, there is an element of gaining power and recognition through fame while a gambler will remain relatively unknown no matter how large his winnings. When it comes to allocation of the reward, rather than adjusting the marketing model of innovation and artistic creation, various interested parties are trying to enforce their reward through the legal system. The problem is that, just like the laws about speed limit, people ignore laws with which they do not agree or do not understand. In fact, most people are not aware of how much they have lost in what was once considered fair use. Piracy has come to mean much more than simply creating a cheap copy of something and selling it as the original. This makes the problem of piracy in the developing countries look like a very severe situation, and one without merit.

In the United States' legal code, now the model for the rest of the world, much fair use has been lost through the Digital Millennium Copyright Act. Among these are use of others' intellectual property in criticism, comment, news reporting, teaching, scholarship and research. In fact, finding data upon which to base the research for this paper was difficult because university libraries are now bound by the same copyright restrictions and pricing schemes as businesses which would gain a profit from their work. One can assume that the problem must be far more severe in poverty-stricken developing countries.

Some tout that fair use is no longer necessary, but such an argument appears to be unfounded. Some economists and policymakers argue that reduced transaction costs eliminate the need for fair use because each instance of use can be negotiated, favoring a system of pay-per-view rather than a doctrine of first sale. This is applicable if the transaction costs of the negotiation are close to zero. Permissions can be granted via the Internet, a supposedly free transaction. In developing countries, however, the free Internet is a myth. In South Africa, for example, one may have a computer at home and a flat monthly fee for Internet access. The phone company, however, charges for every minute of connection to the Internet because even local telephone calls are not free. In fact, landlines may be very hard to come by, which is one reason for the unprecedented popularity of cellular phones in developing countries compared to the industrialized nations. In the case of Princeton University Press versus Michigan Document Services, the judge decided that the creation of coursepacks was not fair use because Princeton had a permissions department, making the transaction cost of obtaining permission very low. Loren (1997) points out that “a permission system only remedies the market failure that occurs because of high transaction costs”. More than just this failure is occurring when it comes to developing countries. Depoorter and Parisi (2002) claim that, “Fair use forsakes the informational function of the price mechanism”. With that, they say, goes Pareto optimality. Without fair use, however, may go the opportunity for developing countries to enhance their knowledge base and therefore their ability to achieve economic development.

The IPR regime is not flawless. Market failure in IPR can occur from several different sources. The granting of protection for IPR creates a market barrier. The monopoly profit is supposed to be the reward, but as mentioned earlier, it also serves to reduce quantity in the marketplace. In addition, externalities can also cause a problem. Anti-dissemination motives

may lie behind the application for a patent. The granting of a patent prevents others from commercializing or distributing the product and its derivatives without the express permission of the right's owner. The owner may simply seek to keep a product off the market. Sometimes the withholding of innovation that is protected will cause distrust of the IPR market and therefore the infringement upon it. Sometimes value-maximizing exchanges may not occur if transaction costs are higher than projected benefit. This could have one of two effects: the advent of piracy or the under-use of the innovation. Piracy is the typical response of developing countries, whose projected total benefit may be small when compared to industrialized countries, but whose marginal benefit may be significant. In addition, a noteworthy factor in developing countries is the fact that individual costs and benefits differ from the social costs and benefits, especially from a regional viewpoint. Sometimes this will also cause a market failure.

The "tragedy of the commons" is a well-taught lesson in economics, but there is also a "tragedy of the anti-commons" (Heller, 1998). This is described as a system in which multiple owners hold the rights of exclusion to a scarce resource, exactly the opposite of the commons in which nobody can be excluded, and is a reasonable description of IPR protection. In this type of scheme, nobody has an enforceable privilege of use rather than everyone having an enforceable privilege of use. The two systems have the opposite results. While the "tragedy of the commons" produces overuse, the "tragedy of the anti-commons" produces underuse. Developing countries find themselves suffering the tragedy of the anti-commons. Underuse today has serious consequences for the future as so many new products are developed from old concepts. Without the wheel, we would not have automobiles. Market failure is prevalent in developing countries without introducing another type of market failure, a government-protected monopoly.

Is there an example of a developing country that has successfully entered the realm of industrialization that one may use as an example? The United States was once a developing economy, but current developing economies are being asked to skip the passage from imitation to innovation by simply adopting the current policies of the United States as a panacea. It was once US policy to imitate and pirate as much as possible. Between 1799 and 1860, the US had similar per capita income of purchasing power, percent of population in agriculture (72.8 percent) (Singer, 1964), percent of national income from agriculture (39.3 percent), and ratio of per capita income in agriculture to the national average (54.1 percent) that is characteristic of developing countries. In the mid-1800s, Charles Dickens faced a problem when “A Christmas Carol”, was typeset in the US without his permission and sold for a mere 2.4 percent of its price in England (Varian, 1998) In fact, IPR violation was the policy of the US government in the late 1700s and early 1800s (Haley, 2000) and Alexander Hamilton’s Report on Manufactures reveals this as true.

As the US had no intellectual property protection at that time, but strong protection now, it appears that innovation preceded strong IPR protection and not vice-versa. Looking at the history of US legislation, it becomes obvious that it is reactive rather than prescriptive.

The first US copyright statute² was limited. It gave copyright owners the “sole right and liberty of printing, reprinting, publishing and vending”. The music industry, one of the most vocal in piracy concerns, was alive and well at that time, albeit in a different form. Music owners did not have exclusive rights to public performance of their works, but if others were to perform the music, they would have to buy the sheet music.

This situation was acceptable until the advent of piano rolls. “Until the enactment of the copyright act of 1909, copyright owners realized no revenues from the sales of piano rolls and

² Act of May 31, 1790, Ch.15, §1, 1 Stat 124)

phonograph records, because they were not deemed to be ‘copies’ of the music. Until Congress established a public performance right for musical works in 1897, composers had no right to receive royalties from their public performances.” (Litman, 2000) Such is the reactive nature of legislation. The invention of piano rolls required a reaction. By 1900 Congress had decided to let the affected industries work out solutions among themselves and, unfortunately, to simply accept the compromise as the new legislation. This left the consumer, whom Congress is supposed to represent, out of the bargain, but this flaw in the evolution of US innovation and IPR protection is beyond the scope of this paper. The copyright act of 1909 was repealed and replaced in 1976 by legislation addressing the advent of new innovations and, in 1992, the Audio Home Recording Act went even further (Litman, 2000). The Digital Millennium Copyright Act goes to extremes and is the model that developing countries are now expected to follow.

The consumers of copyrighted and patented material, which is the position of developing countries that inherently lack an innovative sector of their own, stand to lose in the application of strong IPR. The consumer should be able to cite copyrighted materials; gain access to and reuse ideas and facts; and give, loan or sell copyrighted materials, also known as fair use; make non-commercial copies. This side of the trade between consumers of copyrighted materials and copyright owners has been diminished over the last decade.

Richard Posner, along with many economists, argues that if an innovator cannot reap, he will not sow (Posner, 1998) He claims that one needs monopoly profit to recoup large fixed costs (Posner, 1998, pg. 43). If a good costs a million dollars in fixed costs, but \$50 in marginal costs, the expected market price in a perfectly competitive market is \$50. This does not cover the fixed costs, however, so a monopoly price premium is necessary in order to get the innovator to begin production. In return for the government-sanctioned monopoly, the innovator must

disclose the details of his inventions so that others may “invent around” the patent when the product idea has been revealed. Granting the patent before the invention can be produced commercially supposedly stops “costly duplication of expensive development work” (Posner, 1998). Posner claims that the cost of the patent system and the way it acts as a wedge between price and marginal costs is the same type of economic cost as using a fence to demarcate a property line when it comes to physical property. Of course, as the recording of physical property has improved, those fences have become invisible and the cost of demarcation of property lines has decreased. The same does not appear to be true about the wedge between price and marginal cost created by the granting of patent or copyright. As the length of copyright, for example, has become longer, that wedge has become significantly larger.

Posner also states that un-owned land is more inefficient than un-owned intellectual property. Un-owned land is either left unused or it is overused. Sometimes it is not used in the manner most appropriate. If un-owned intellectual property is overused, it does not create the same “tragedy of the commons” as overused physical property. In fact, it may be that un-owned property is the most efficient, as evidenced by the usefulness of the public domain.

With the notion of intellectual property being like physical property fully ingrained in industrialized economies, the Agreement on Trade-Related Property Rights (TRIPS) comes into play. As developing countries are eager to join the ranks of the industrialized world with all the benefits and complications it offers, they are using TRIPS as a guide on handling intellectual property. It can be argued that enforcing industrial-style IPR protection before developing countries are ready for it is possibly detrimental to development of an innovative sector in those countries rather than fostering such development. Seeking to impose these new rules upon developing countries is liable to keep an innovative sector from emerging at all. Developing

countries will become dependent upon voluntary and limited technology transfer from benevolent companies' foreign direct investment.

Have the developing countries been duped? Maskus and Lahouel (2000) write, "increasingly, developing countries recognize that promoting effective competition in their markets promises substantial net benefits over the long term. This may be seen from the fact that over 40 developing countries unilaterally strengthened their IPR regimes in the 1990s." Maskus and Lahouel credit the so-called obvious benefits of strong IPR protection for the developing countries movement towards it, but it may be that developing countries have felt obligated to follow the lead of the industrialized nations, perhaps in fear of political repercussions. It has already been discussed in this paper that the strengthening of the IPR regimes is a natural process in any economy.

As innovators wish to preserve their first mover profit, they appeal for legislation to protect it. In a country without innovators, such as in the less-developed country, there is no necessity for such legislation. Less-developed countries have chosen to appease the innovators from industrialized countries in order to preserve the benefits they may be receiving from those foreign governments and businesses. Developing countries are dependent on industrial-world medicines, agricultural innovations and manufacturing enterprises. In Africa, AIDS is a major problem to which foreign pharmaceutical firms have an answer. In Central and South America, manufacturing enterprises provide much-needed low-skill jobs, maquiladora-style. In India, genetically modified seeds have increased crop yields and improved the country's export power. The same is true in China.

The World Trade Organization has asked that all countries seek to protect the innovators that have brought us these quality-of-life changing technologies. The WTO established a council

to monitor progress towards a goal of stringent IPR protection. Developed countries were required to comply by 1996, developing countries by 2001 and less-developed countries by 2007. That means that the less-developed countries have a very small window left in which to begin producing their own innovators. Otherwise, they may protect foreign countries' interests and stifle their own domestic innovation. China has made sure that this will not occur there as they require any foreign investments there to include a measure of intellectual property transfer, a technology and knowledge transfer.

One danger in the TRIPS agreement is that copyright protection is defined broadly as the “right to stop other people from making unauthorized copies” (Agreement on Trade-Related Property Rights). This broad scope protects industrialized country innovators to the extent that developing country learners-by-doing will have a difficult time extending their knowledge base in order to kick-start their innovations. IPR protection is, according to the WTO provisions, supposed to enhance the advancement of technological innovation and also the transfer of technology. By giving a broad scope of protection to innovators, one simply gives monopoly control of innovation to one group, which may produce a contradictory result for the transfer of technology. The new provisions are a higher standard than the pre-existing Paris Convention for products and Bern Convention for art, revealing once again that the industrialized world is moving towards more stringent rules for users of innovations. The international community is following the US lead in this very strict IPR protection. Computer programs, for example, are protected as literary works under Bern, giving them beyond-authors-lifetime protection under TRIPS, and authors and music producers have the right to prohibit the commercial rental of their works to the public. It is interesting to note that it is mostly publishers, recording companies and the like that are fighting for enhanced IPR protection, not the authors and musicians. Authors

and musicians tend to benefit less than the publishers and recording companies because, the publishers and recording companies insist, they have less sunk costs in the production of the books and music. The publisher must print, bind and promote the books, which has not been an inexpensive undertaking until the advent of Internet publication. Also, a less-developed country may be acting in a self-defeating manner if it seeks to protect foreign interests with the scant law enforcement resources that it has available.

Foreign Direct Investment (FDI) is important to developing countries, which lack the financial foundation with which to fund industrial progress. Countries that are willing to violate IPR may find themselves with lower levels of FDI, as no business will willingly give up one of its profit centers.

Zhou and Li (2002) provide some reasons as to why lower levels of FDI should not concern a developing country. One point they make is that foreign-invested enterprises often employ expatriates, people who worked in their industry in the industrialized country, and also often pay them many times higher salaries than they pay to local personnel doing similar work. Local firms have to be strong enough and productive enough to compete directly with the FDI-funded enterprise in order to survive. The economic model of competition implies that, for some industries, an FDI-funded company that faces lower costs because of better technology and the like may be able to price local firms out of business. The less-efficient local firms may find themselves pushed out of business, leaving local demand to foreign-owned firms. China has mitigated this by forcing foreign companies into joint ventures or by requiring a certain amount of technology transfer with any FDI. Zhou and Li also point out that the local labor market also faces competition between the local firms and the FDI-funded firms. The foreign firms that already have proven successful in industrialized countries, may draw the best employees

available in the local market, making the locally funded firm more inefficient. In fact, the best employees may hope to enter the industrialized country, where opportunities abound, through a relationship with the foreign firm.

China has proven that the lack of IPR protection does not necessarily scare away FDI. The economic basis for this is that the foreign firm is getting an amount of benefit from lower variable costs such as wages and lower fixed costs such as for property. There are higher costs associated with transportation and, as China would have it, the transfer of knowledge. As long as the knowledge transfer costs leaves a marginal benefit to locating the enterprise in the developing country, that is the outcome. Given this, a threatened loss of FDI for loose IPR protection should not intimidate the developing country.

The Cobb-Douglas Production Function, where $Y = AK^{\alpha}N^{(1-\alpha)}$, is useful for describing how various inputs, particularly labor and capital, affect the development of the country, in this case the pushing outward of the curve. This describes the economic advancement of a country at the most basic level. Alwyn Young's investigation of the East Asian Newly Industrialized Countries claims that most of their development, measured by this outward movement of the curve, was based on increased labor input as the population moved into the urban areas for work and on capital input through FDI. It was an economic disaster waiting to happen because as FDI dried up in the face of a real estate bubble, so did all the advancement that had taken place in the East Asian NICs. Young's work may have been challenged, but searches of EconLit and other social sciences indices revealed nothing. Whether or not Young's figures are exactly accurate, they and the events of the Asian Financial Crisis, as it is now known, illustrate how a developing country must make sure that development comes from within the country, not only external sources. By strictly enforcing foreign IPR in an effort to preserve FDI, developing countries

may be putting themselves into a rather precarious position. They should make sure that, in addition to the perspiration, some of the inspiration is theirs. Paul Krugman describes labor and capital inputs as perspiration and total factor productivity as inspiration (Krugman, 1994).

Looking at the welfare effects of enforcing IPRs, with the foreign country as developed and the domestic country as developing, provides some interesting and important results. There are three entities in each country to consider, the consumer, the producer and the country's leader.

From the perspective of the domestic consumer, the entrance of domestic firms may create alternatives to the foreign goods, expanding the number of choices available, an economic development goal, and perhaps even providing goods more palatable to the local culture and tradition. The granting of an IPR is tantamount to the granting of a monopoly, and a monopoly is encouraged to use its position, which leads to higher prices and lower quantity for the domestic consumer. Maskus and Lahouel (2000) confirm that strengthening of IPR protection is likely to lead to the use of the monopoly power provided. In developing countries, intrabrand competition is already a problem because of its weakness as are other anti-competitive practices. The enforcement of IPR protection may only lead to further the problem. One of the goals of economic development is to increase free and competitive markets and IPR protection flies directly into the face of that, especially from the perspective of the domestic consumer.

The foreign consumer may benefit from weak IPR protection as goods produced in the developing country could eventually be exported. That would increase the variety available in the foreign country as well. It could also lead to a higher level of price competition and subsequently lower prices for the foreign consumer.

The producer's benefit from IPR protection is very visible as the granting of the IPR

creates a monopoly position in the market for the producer, as long as the producer is also the innovator. If the innovator is a separate entity from the producer, the producer faces higher costs from having to pay IPR license and use fees. Unfortunately for developing country producers, they tend to find themselves in such a situation due to their level of human capital development and lack of innovators. According to monopoly theory, producers may limit their quantity of output in order to maximize their profit when they have captured the entire market share. In the case where the market is captured and secured by legislation, individuals and companies may decide to innovate at a slower pace because their place in the market is guaranteed.

Domestic producers in a developing country find themselves in the position of having to negotiate license contracts, which can sometimes involve a high transaction cost. China has been very successful in the offering of joint ventures that include a transfer of technology and knowledge. Production and marketing capabilities are exchanged for access to patents. From there, new products are created from the acquired knowledge, often products tailored to the needs and wants of the consumers within the developing country's culture. Foreign country members of these types of joint ventures report problems of oversight that cause a higher production cost than initially anticipated, but it has not yet been serious enough to deter them from the practice, but the developing country teams both learn the innovative processes and enter the worldwide network of the particular industry. Mazzoleni (1998) makes the point that Japanese, Korean and Taiwanese manufacturing grew at a time when IPR enforcement was not at all strong. He claims that these manufacturing enterprises may never have developed if IPR protection had been strong at the time. From Young's work (1994), which shows how the Asian Tigers' manufacturing processes were producing mostly because of increased capital and labor input rather than because of increased efficiency and productivity per unit of input, this seems

plausible. Patents create a barrier to entry and developing countries are already plagued with barriers to entry. Mazzoleni (1998) also claims that fear of backlash either from a political venue or from an FDI standpoint may deter firms from inventing in the neighborhood of a patent.

Maskus and Lahouel (2000) remark, “Exporting firms in the high-income developed economies argue that the anti-competitive practices of competitors in foreign markets hinder their ability to penetrate those markets.” Should such exporting firms, who talk about an emerging middle class to whom they would like to market their goods, be allowed to penetrate the market as much as they would like or are the anti-competitive practices keeping a greater variety of goods away from the domestic consumers? Should a place that already has obvious anti-competitive practices simply have another one, namely government-granted monopoly in the form of IPR protection, added to the mix, especially when the entity standing to gain from this is the foreign producer? The foreign producers would say yes.

The most outspoken foreign producers when it comes to IPR protection in developing countries are software producers, but Sam Williams (2002) advises, “In developing markets, companies stand to make more money if they view each new user as one more mouthpiece for the software and one less customer for the competition.” When developing country consumers are ill equipped to finance the purchase of software packages, perhaps they should be allowed to have them for free and learn them. Once a particular software package is learned, it is more likely that the consumer will purchase within that brand’s line. Perhaps at the time the domestic consumer can afford to buy the software instead of use it unlicensed, that consumer will buy within the product line already learned. By increasing the network of people using the product, the company’s product becomes more valuable.

It must also be remembered that software company’s claimed dollar losses are less than

they claim because they consider that each pirated copy of the software would have drawn a particular price (Manufacturer's Suggested Retail Price, for example) even though the consumer's willingness to pay and ability to pay might be close to zero. Because of this perception, however, it is possible that companies will reduce their FDI and their joint ventures in a country with weak IPR protection. Empirical evidence in the form of China reveals that this is not necessarily a fear that should weigh heavily on the shoulders of the developing countries' leaders.

According to Gould and Gruben (1996), "The net innovation-consuming country will only be motivated to protect intellectual property as long as the type of innovation it demands is different from the type demanded by the net innovation-producing country. If the consuming country has the same demand as the innovating country, the innovating country will develop the technology regardless of whether there is IPR protection in the consuming country." When developing country leaders are looking at the demand of their constituents, they see people who have very basic demands in regard to food, clothing, shelter and health care. It is in health care that the developing country's leader may choose to protect IPR because that is where the developing country's demand can be substantially different than the developed country in which the innovators are. Basically, developing countries' leaders have very little incentive to enforce strong IPR protection. The TRIPS agreement was signed under a great deal of political pressure and gives quite a few years for developing countries to reach the goal of IPR protection as strong as that of the United States.

When the developing country leader looks at strong IPR protection, he sees that for his country, monopoly profits tend to be far smaller than the social surplus created by innovation. Shavell and van Ypersele (1999) showed this to be true. This could be because of the low

quantity achieved in a monopoly scenario.

Domestic producer benefit comes from the technology spillover from disclosed patent information. The benefit from the patent information lies in the ability of others to work around the patent. This possibility is severely limited in developing countries and they cannot take advantage of it. That is, of course, until they have laid the framework to do so. Again, this is part of a natural process and skipping this stage by requiring IPR protection before a country is ready to take advantage of it might end up hindering the country's economic development.

Another defense for weak IPR protection is the classic Goldilocks defense, which involves necessity as its basis. Posner (1998) details the economic basis for the Goldilocks defense when it comes to stealing goods such as food, clothing and shelter. One can extend this analysis to a developing country's existence within the type of global economy that exists today where information and knowledge are the major drivers rather than amount of labor and land for manufacturing enterprises. Although it is not looked upon favorably, the Goldilocks or necessity defense prevails in situations where the cost of the crime to the victim is much smaller than the gain to the injurer. The cost of a bowl of porridge is small compared to the loss of Goldilocks' life through starvation. One can argue that the loss to a multinational software company from piracy is small compared to the gain made by the people in the developing country, especially when that gain means breaking the chains of what could essentially become a form of slavery where the developing country's citizens find themselves always beholden to foreign innovators and unable to build on the innovation of those who moved ahead generations before. A lot of this defense, however, rests on transaction costs. If the transaction cost is small, such as if the bears had been home for Goldilocks to ask for some porridge, the necessity defense loses its power. Transaction costs for developing countries to negotiate licenses and legitimate IPR use

are likely large. That means that the necessity defense is possibly viable in the case of weak IPR protection. Posner provides an example of four men stranded in a boat. One is killed so that three can live. If they agreed to sacrifice the weakest of them ahead of time, there would be an economic argument for the defense of necessity.

Maskus and Lahouel (2000) add to this that weak patent protection may be seen as a way to promote technical change through imitation and diffusion, furthering the economic argument that the supply surplus in the strong IPR (monopoly) scenario is much smaller than the consumer and social surplus in the weak IPR scenario. Another consideration for the developing country's leader is that enforcement costs are high and would have to be taken from a budget that is already short of revenue and heavy with spending on basic services. That cost further drives a wedge between the cost of the "crime" to the victim and the gain to the injurer.

Not only must the level of IPR protection be considered, but also the fact that it may need to change over time. That is part of what Varian was saying when he stated that IPR protection increases as more local content is demanded. Should policymakers attempt to choose the timing of the IPR protection, such as in the TRIPS agreement, or should developing countries simply evolve into a strong IPR protection regime in their own time? Two different situations can be described: when strong IPR protection is enforced before its economic evolution and when IPR protection is allowed to develop as the local economy develops.

So what about the foreign and domestic consumers? If the industrialized world keeps developing countries in the position of being inexpensive manufacturing locations, consumers in the industrialized nations will benefit from lower costs of their goods. It is unclear as to whether the local market has access to the goods or that they would be able to use them, so a strong argument does not exist such that the consumer benefit is far-reaching. Some sort of reward

regime for intellectual property must exist for innovation to continue in the free market, but it must not be so strong that license fees become the profit motive instead of commercialization

When strong IPR protection is in place before the developing economy is ready, local content suffers. The main suffering is on the part of local pirates and their customers, but because the customers, by adding to their knowledge and skills, are adding to the human capital variable in the economy's production function, this suffering occurs indirectly to everyone in the local economy, both before innovation begins locally and for a short time afterwards. Foreign producers benefit to some degree because they no longer feel the pain of their perceived loss. It is unclear whether strong IPR protection will actually increase the number of sales made in developing countries, but because of the monopoly given, the quantity provided is reduced anyway and profit-maximization makes the price higher. The higher price may make the product unaffordable to the local consumers. Local producers lose because they cannot develop incremental products or customized products based upon the existing expertise in a particular industry. They might be able to build upon very old expertise, but then they will either travel the same path as the developed countries or begin a path that diverges the two and breaks down a global network of compatibility between products, especially in the software industry. If a monopoly price is charged, domestic consumers may be priced out of the market. This holds back the developing country's human capital development.

If the developing country's economy is allowed to evolve to stronger IPR protection, foreign producers still benefit. They benefit because they have had time to develop a relationship with customers in the developing country even though their profit may be less for that period of time. Customers can be loyal to particular brands and the foreign producer might be able to exploit that. The foreign producer is also more likely to face domestic competition,

however. Domestic industry begins and faces competition in the domestic country, which enhances consumers' available choices when it comes to both products and jobs. This is one of the key goals of economic development.

Conclusion and recommendations for further work

Because there appears to be a clearly identifiable point at which IPRs gain respect, the best policy may be to wait until the country reaches that level of economic development before requiring strong IPR protection. All in all, the developing country can become a player in the global economy rather than simply a pawn that industrialized countries use as a source of cheap labor and land. The country's comparative advantage becomes more complex and this enriches the world economy over all.

Further investigation beyond the short time series available for this paper might prove useful in pinpointing a breakpoint in the developing country's economic structure. A time series evaluation may reveal useful detail that could aid in developing policies that benefit developing countries as well as the industrialized ones. This will be useful in re-examining public policy regarding IPR protection in developing countries, which appears to be a necessity at this point rather than a luxury that can be left for another day. The detriment to developing countries, already struggling under heavy burdens has begun and needs to be stopped.

FIGURE 1

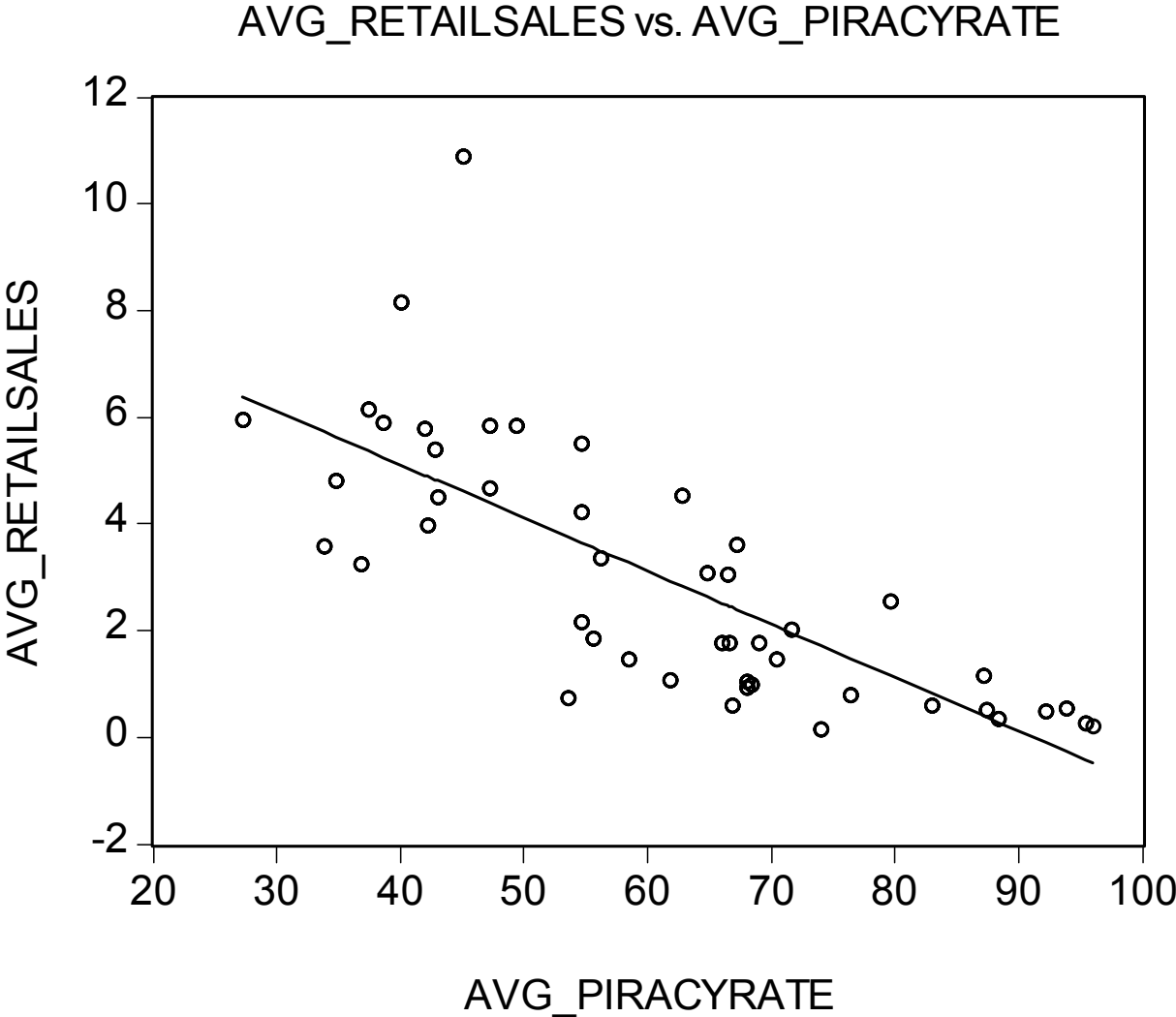


TABLE 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVG_RETAILSALES	-5.755135	0.739567	-7.781764	0.0000
C	78.52896	2.820210	27.84508	0.0000
R-squared	0.573685	Mean dependent var		61.40851
Adjusted R-squared	0.564212	S.D. dependent var		18.32394
S.E. of regression	12.09642	Akaike info criterion		7.865317
Sum squared resid	6584.547	Schwarz criterion		7.944046
Log likelihood	-182.8349	F-statistic		60.55586
Durbin-Watson stat	1.724255	Prob(F-statistic)		0.000000

Chow breakpoint test at piracy level of 61.8 has F-stat of 24.35548 and Log Likelihood ratio of 35.59977.

FIGURE 2

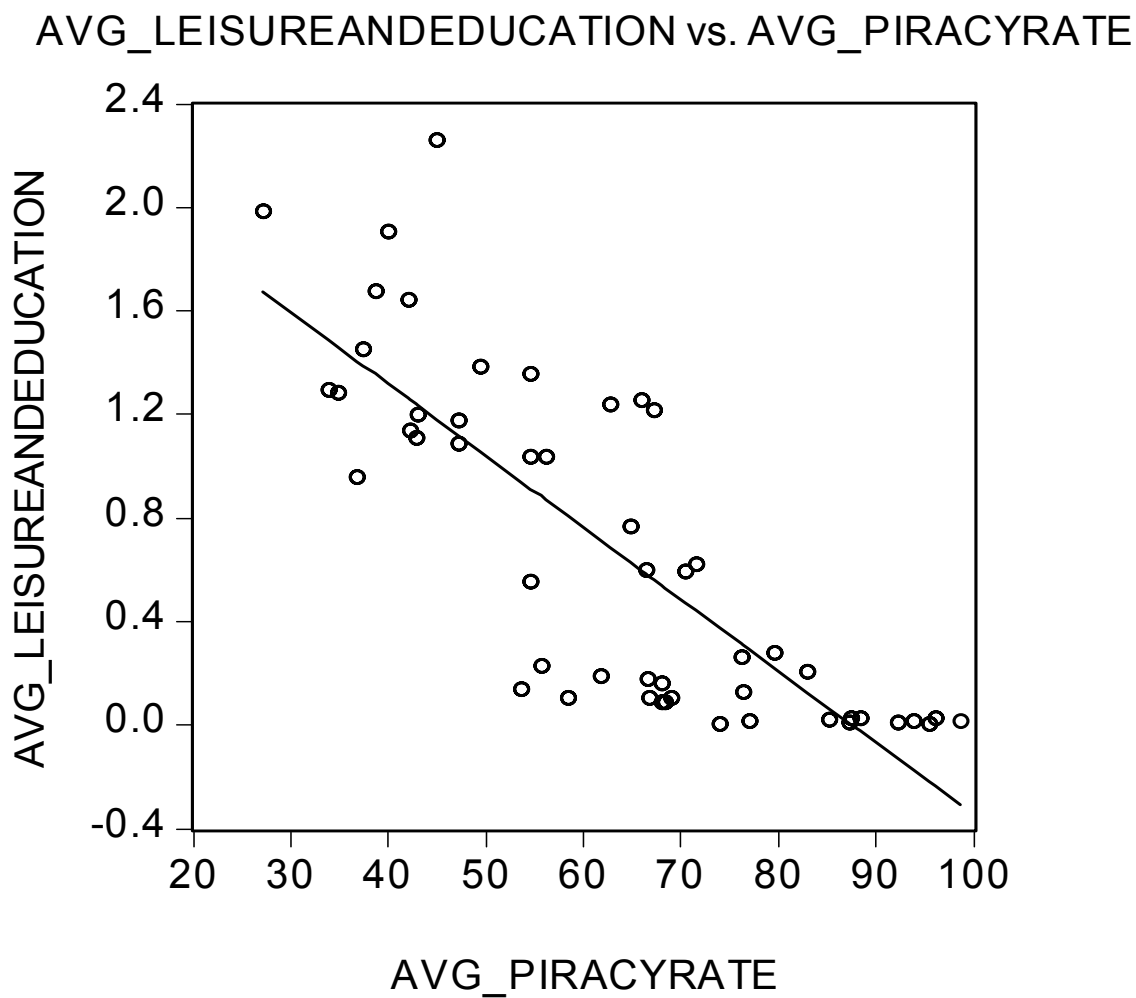


TABLE 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVG_LEISUREANDEDUCATION	-23.41544	2.459238	-9.521422	0.0000
C	78.99599	2.288299	34.52170	0.0000
R-squared	0.649142	Mean dependent var	63.20000	
Adjusted R-squared	0.641981	S.D. dependent var	18.81102	
S.E. of regression	11.25551	Akaike info criterion	7.718019	
Sum squared resid	6207.640	Schwarz criterion	7.793777	
Log likelihood	-194.8095	F-statistic	90.65747	
Durbin-Watson stat	1.821454	Prob(F-statistic)	0.000000	

Chow breakpoint test at piracy level of 61.8 has F-stat of 23.02992 and Log Likelihood ratio of 34.83786.

* Note the cluster of countries with high piracy rates and low spending on leisure and education.

FIGURE 3

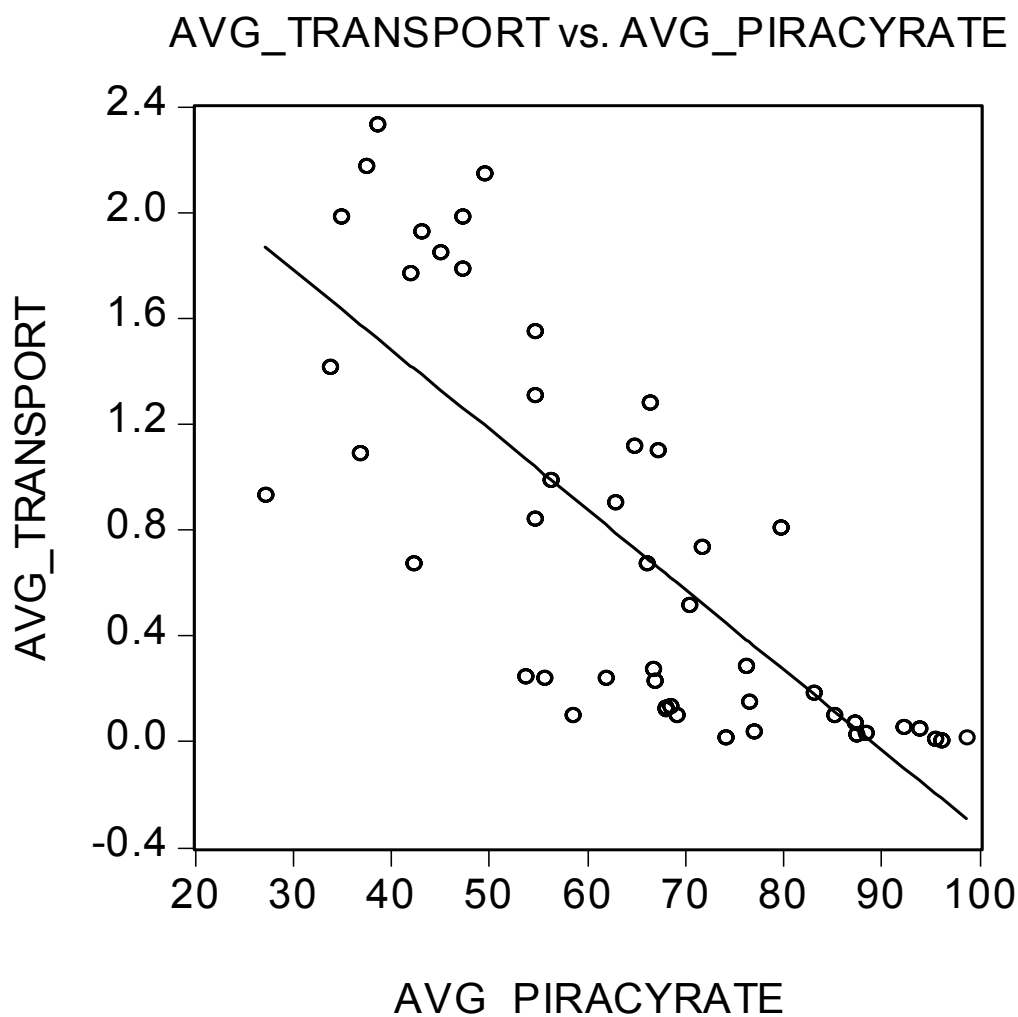


TABLE 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVG_TRANSPORT	-19.27096	2.376367	-8.109421	0.0000
C	78.59950	2.494738	31.50611	0.0000
R-squared	0.583196	Mean dependent var	64.08980	
Adjusted R-squared	0.574327	S.D. dependent var	18.65226	
S.E. of regression	12.16940	Akaike info criterion	7.875687	
Sum squared resid	6960.437	Schwarz criterion	7.952904	
Log likelihood	-190.9543	F-statistic	65.76270	
Durbin-Watson stat	1.927290	Prob(F-statistic)	0.000000	

Chow breakpoint test at piracy level of 61.8 has F-stat of 21.93426 and Log Likelihood ratio of 33.34428.

* Note the same clustering pattern as seen in leisure and education spending.

FIGURE 4

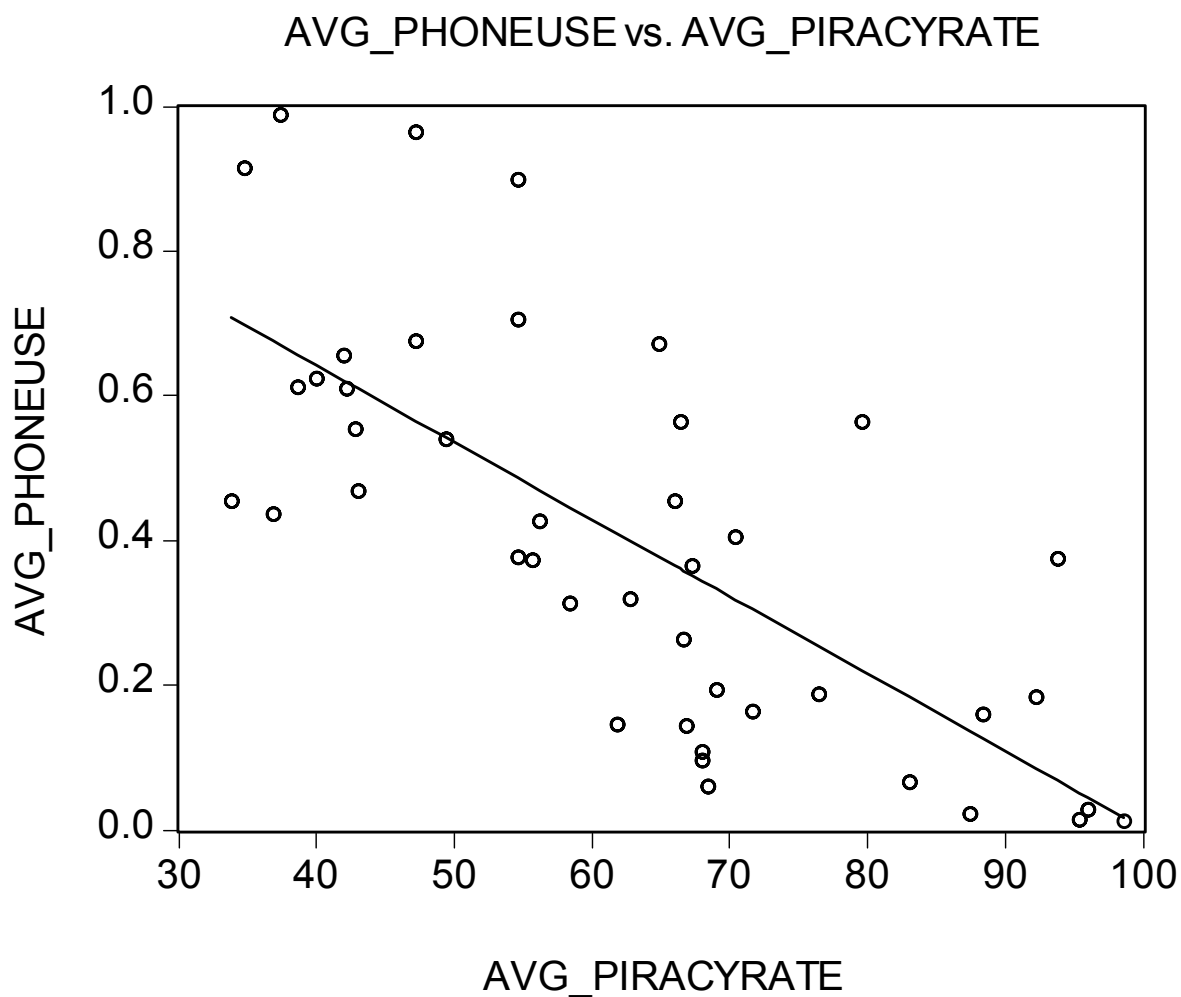


TABLE 4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVG_PHONEUSE	-49.08396	7.312640	-6.712208	0.0000
C	82.35806	3.527321	23.34861	0.0000
R-squared	0.523554	Mean dependent var	62.73953	
Adjusted R-squared	0.511933	S.D. dependent var	18.53447	
S.E. of regression	12.94852	Akaike info criterion	8.005235	
Sum squared resid	6874.228	Schwarz criterion	8.087151	
Log likelihood	-170.1126	F-statistic	45.05374	
Durbin-Watson stat	2.144069	Prob(F-statistic)	0.000000	

Chow breakpoint test at piracy level of 62.8 has F-stat of 17.20404 and Log Likelihood ratio of 27.19632.

FIGURE 5

Log Regression of AVG_GDP vs. AVG_PIRACYRATE

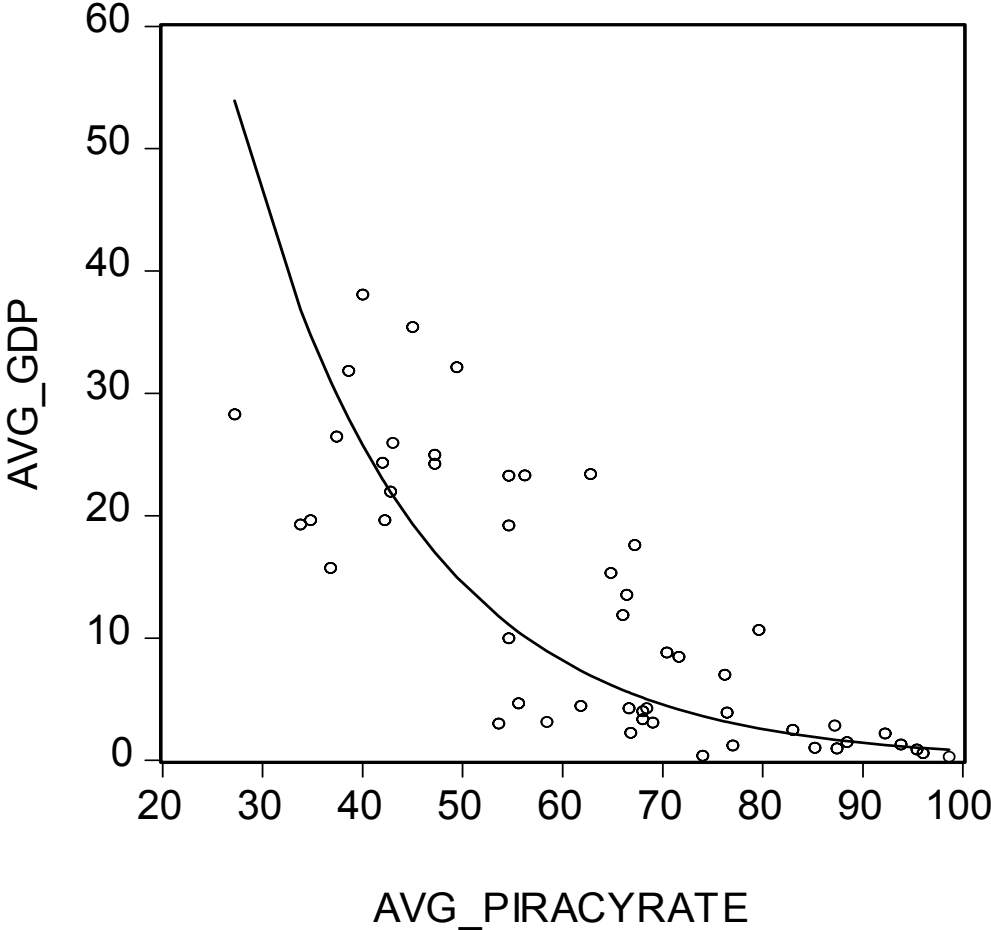


TABLE 5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVG_GDP	-1.354515	0.146960	-9.216882	0.0000
C	80.12007	2.441295	32.81867	0.0000
R-squared	0.634194	Mean dependent var		63.20000
Adjusted R-squared	0.626729	S.D. dependent var		18.81102
S.E. of regression	11.49276	Akaike info criterion		7.759738
Sum squared resid	6472.096	Schwarz criterion		7.835496
Log likelihood	-195.8733	F-statistic		84.95092
Durbin-Watson stat	1.815195	Prob(F-statistic)		0.000000

Chow breakpoint test at piracy level of 61.8 has F-stat of 22.24542 and Log Likelihood ratio of 33.97066.

TABLE SIX

CORRELATIONS OF VARIABLES

	PIRACY RATE
RETAIL SALES (\$)	-0.82
FOOD (\$)	-0.81
CLOTHING (\$)	-0.78
CONSUMER EXPENDITURE (\$)	-0.78
TRANSPORTATION (\$)	-0.77
GDP (\$)	-0.76
HOUSING (\$)	-0.76
LEISURE & EDUCATION (\$)	-0.75
CAR USE (#)	-0.74
COMMUNICATION (\$)	-0.73
VOL. OF DISHWASHERS	-0.71
TELEPHONE USE (#)	-0.69
VOL. OF COMPUTERS	-0.65
VOL. OF MICRO. OVENS	-0.65
VOL. OF NEWSPAPERS	-0.60
HOTEL & RESTAURANT (\$)	-0.52
COMPUTER SALES (\$)	-0.51
VOL. OF T.V.	-0.48
HEALTH (\$)	-0.46
VOL. OF BOOKS	-0.43
VOL. OF FRIDGES	-0.42

BIBLIOGRAPHY

- Besen, Stanley M. and Raskind, Leo J., "An introduction to the law and economics of intellectual property", The Journal of Economic Perspectives, Vol. 5 (1), 1991.
- Braga, H. and L. Wilmore, "Technological imports and technological effort", Journal of Industrial Economics, Vol. 39, 1991.
- Correa, Carlos, Reforming the intellectual property rights system in Latin America, Blackwell, 2000.
- Correa, Carlos, Intellectual Property Rights, the WTO and Developing Countries, Zed Books, 2000.
- Depoorter, Ben and Parisi, Francesco, "Fair use and copyright protection: a price theory explanation", International Review of Law and Economics, Vol. 21, 2002.
- Diamond, Jared, Guns, Germs and Steel, W.W. Norton and Company, New York, 1997.
- Euromonitor database, cd-rom, 2002.
- Gould, David M. and Gruben, William C., "The role of intellectual property rights in economic growth", Journal of Development Economics, Vol. 48, 1996.
- Grossman, Gene M. and Helpman, Elhanan, "Endogenous innovation in the theory of growth", The Journal of Economic Perspectives, Vol. 8(1), 1994.
- Haley, George T., "Intellectual property rights and foreign direct investment in emerging markets", Marketing and Intelligence Planning, 2000.
- Heller, Michael "The Tragedy of the Anticommons", Harvard Law Review, 1998.
- Helpman, Elhanan, "Innovation, imitation and intellectual property rights", Econometrica, Vol. 61, 1993.
- Krugman, Paul, The Myth of Asia's Miracle, 1994.
- Lai, Edwin L, "International intellectual property rights protection and the rate of product innovation", Journal of Development Economics, Vol. 55, 1998.
- Lanjouw, Jean O., 1994, "Economic Consequences of a Changing Litigation Environment: The Case of Patents," National Bureau of Economic Research Working Paper No. 4835, 1994.
- Lanjouw, Jean O., "Patent protection: Of what value and for how long?", NBER Working Paper No. 4475, 1993.

Litman, Jessica, Digital Copyright, Prometheus Books, New York, 2000.

Maskus, Keith E. and Lahouel, Mohamed, Competition policy and intellectual property rights in developing countries, Blackwell, 2000.

Maskus, Keith E. and Penubarti, Mohan, "How trade-related are intellectual property rights", Journal of International Economics, Vol. 39, 1995.

Mazzoleni, Roberto and Nelson, Richard R., "The benefits and costs of strong patent protection: a contribution to the current debate", Research Policy, vol. 27, Elsevier Science, 1998.

Posner, Richard A., Economic Analysis of Law, 5th Edition, Aspen Publishers, 1998.

Qiu, Larry D. and Tao, Zhingang, "Export, foreign direct investment and local content requirement", Journal of Development Economics, Vol. 66, 2001.

Richardson, R. Stephen and Gaisford, James D., "North-South disputes over the protection of intellectual property", The Canadian Journal of Economics, Vol. 29, 1996.

Schankerman, M. "How Valuable Is Patent Protection?" RAND Journal of Economics, Vol. 29, 1998.

Seventh Annual Global Software Piracy Study, Business Software Alliance, 2002.

Shavell, Steven and van Ypersele, Tanguy, "Rewards versus intellectual property rights", NBER Working Paper No. 6956, 1999.

Singer, H.W., International Development: Growth and Change, McGraw-Hill, New York, 1964.

Todaro, Michael P., Economic Development, 5th Edition, Longman, New York, 1994.

Turnbull, Shann, "Should ownership last forever?", Journal of Socio-Economics, Vol. 27, No. 3, 1998.

Varian, Hal. R., Markets for Information Goods, Working Paper, University of California, Berkeley, 1998.

Varsakelis, Nikos C. "The impact of patent protection, economy openness and national culture on R&D investment: a cross-country empirical investigation", Research Policy, Vol. 30, 2001.

Williams, Sam, "Profits from Piracy", Salon.com, September 26, 2002.

Yang, Xiaokai and Yew-Kwang Ng (1993). Specialization and Economic Organization: A New Classical Microeconomic Framework. Amsterdam: North-Holland.

Yang, Guifary and Maskus, Keith E., "Intellectual property rights, licensing and innovation in an endogenous product-cycle model", Journal of International Economics, Elsevier Science, 2001.

Young, Alwyn, "Lessons from the East Asian NICs: A contrarian view", NBER Working Paper No. 4482, 1993.

Young, Alwyn, "The tyranny of numbers: Confronting the statistical realities of the East Asian growth experience", The Quarterly Journal of Economics, 1995.

Zhou, Dongsheng and Li, Shaomin and Tse, David K., "The impact of FDI on the productivity of domestic firms: the case of China", International Business Review, 2002.