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The effects of trade related aspects of intellectual property rights on developing countries

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The Effects of Trade Related Aspects of Intellectual Property Rights on Developing Countries

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ABSTRACT

An important hallmark of the 1994 Uruguay round of trade talks was the inclusion of the protection of the of intellectual property rights across international borders by the WTO. This piece of legislation has helped put pressure on countries to reduce piracy in goods such as computer software. Yet it has had unintended adverse effect on developing countries especially the least developed countries. This paper uses price discrimination among countries as a way of solving lack of access to essential patented goods such as pharmaceuticals. One of the goals of World Trade organization (WTO) is to accelerate economic development in developing countries through International Trade. Drawing on this background, this paper explores avenues through which TRIPS would be less detrimental to developing countries.

Chapter 1

Introduction

A notable feature of the 1995 Uruguay Round of multilateral trade negotiations was the protection of Trade Related Aspects of Intellectual Property Rights (TRIPS). Hitherto, enhancement in trade in goods and services, through tariff reduction among its members, was the main focus of the various trade negotiations under General Agreement on Trade and Tariffs (GATT). The 1995 agreement gave the World Trade Organization (WTO) a legal framework to enforce rules governing intellectual property.

Intellectual Property Rights (IPR) refers to ownership of non-physical assets such as trademarks, patents, copyrights, and trade secrets. Patents are issued by a government to an individual or entity for the possession of the sole right to prevent others from commercial exploitation of an invention. Copyright refers to the right of writers, photographers, filmmakers, and other owners of artistic works to exclude unauthorized people to reproduce their works for commercial purpose. A trademark is a symbol, a sign, a word, or a combination of these. The holder of a trademark is the only authorized person to use it for commercial purpose. A firm in possession of a trade secret uses a kind of technique, a device or a method of production to gain advantage over other firms in the industry.

The basic underlying idea of IPR is that the innovator must enjoy the fruit of his labor. Tangible goods are not difficult to produce but due to the costs that go into research and development (R and D) to produce a tangible good, the innovator must be given the right to recoup the cost of invention.

The concept of IPR has been in existence for centuries in Europe and North America. But it is a relatively new concept in Asia and Africa. Asia and Africa have community ownership of property whereas the western world encourages individualism. The ill-defined property rights in Asian and African countries meant that the push for TRIPS would come from the West. Prior to the adoption of the TRIPS by the World Trade Organization (WTO) in 1994, The United States had its own laws that were aimed at curbing imitation and piracy that were on the rise in countries in the former Soviet Union and China. The United States Congress passed a law that became known as Section 301. This law authorized the United States to impose trade sanctions on any country suspected of patent or copyright violation. In December 1994 the government of the United States and China nearly started a trade war due to continual copyright violation by Chinese consumers in spite of repeated warnings from the American government. Thus the 1995 TRIPS agreement enabled countries like China, India, Brazil and Pakistan to avoid unilateral imposition of sanction by the United States. These countries have more leverage under TRIPS because under TRIPS can defend their case in front of an independent panel. If a country violates a TRIPS regulation, the due process of Dispute Settlement Understanding (DSU) of the WTO is followed.

TRIPS was a result of unyielding efforts by a coalition of business leaders in the United States to protect their profits against evolving competition from countries such as, China, India, Brazil, and countries of the former Soviet Union. In particular, China's accession to the WTO was delayed because of its perceived lack of willingness to confront the menace of piracy. China's request to enter the WTO as a developing country was rejected because that would have conferred on the country the privileges that developing countries enjoy at the WTO. For example, upon acceding to the WTO, developing countries are not

required to bring their tariff rate to conform to the standards of the WTO. Rather they are giving between 15 to 20 years to gradually reduce their tariff rate.

This paper examines the impact of TRIPS on economic development in developing countries, in particular it examines whether provisions in the TRIPS agreement violate the spirit of WTO stated declaration of accelerating economic development in developing countries through flexible trade policy. The WTO has some provisions aimed at bolstering economic development of impoverished countries. Unlike advanced countries, article XVIII of the General Agreement on Trade and Tariffs (GATT) regulation gives developing countries the right to control goods entering their ports. The purpose of this privilege is to protect developing countries against balance of payment deficit and to shield infant industries from competition abroad.

When the TRIPS agreement was established in 1995, no specific provisions were made to accommodate the special needs of developing countries. It was only after six years of TRIPS that WTO members begun to realize the adverse effects of the policy on economies of developing countries. In particular TRIPS has adversely affected the economies of developing countries through lack of access to essential drugs and agricultural processes.

Effects of TRIPS on developing countries were one of the major focuses of the WTO ministerial meeting in Doha in 2001. Declarations 17, 18, and 19 were devoted to TRIPS. Among other things, the declarations stated that TRIPS should be used "in a manner supportive of public health, by promoting both access to existing medicine and research and development into medicines". In a separate declaration, the WTO not only granted compulsory license to member countries to manufacture life saving drugs, it also recognized that countries that do not have the modern technology to produce these essential drugs under

compulsory license should be assisted. Though the type of assistance that should be given was not made clear. This vague assurance has not materialized because developing countries in dire need of essential drugs are still not allowed under WTO rule to import generic drugs from other developing countries.

This paper analyzes the economic impact of TRIPS on developing countries, especially the least developed countries. The paper examines whether TRIPS hinders economic development in the most impoverished countries. Any trace of under development in the least developed countries that could be attributed to TRIPS is unintended because those countries were not the target of TRIPS, since the basic motivation of TRIPS was to reduce trade in counterfeit goods produced by some specific countries, most importantly China. Today, the major concern of most governments of LDCs on TRIPS is not so much about their inability to control copyright infringement but much about having access to drugs for its ailing citizens. Pharmaceutical companies in the United States and other developed countries hold the patents for drugs that are used to treat tropical diseases such malaria and tuberculosis, and Acquired Immune Deficiency Syndrome (AIDS). When The TRIPS agreement was signed in 1995 there was no indication that it would be a source of contention between developed and developing countries. In an apparent show of goodwill towards poor countries, the members of the WTO came to an agreement in 2001 to enable the poor countries to manufacture patented drugs under certain emergency conditions for its citizens. The flaw in this provision is that it was assumed that all developing countries are capable of producing these sophisticated drugs by themselves. Few developing countries, like Brazil, India, and Argentina have the capability to produce these drugs. The export of these drugs to other developing countries is not allowed by the WTO due to a strong opposition from the

pharmaceutical companies in the developed countries. Pharmaceutical companies object to authorizing the export of drugs manufactured under compulsory license because by allowing other countries to import drugs from other developing countries under the emergency rule, these drugs may end up in the developed countries, thereby curtailing the sales and profits of the pharmaceutical companies. Most of the countries that cannot utilize the compulsory license rule frequently experience macroeconomic instability such as inflation and high rate of unemployment. Since TRIPS is mostly driven by commercial interests of individual producers in advanced countries, a careful evaluation is needed. In this paper, we determine a country's willingness to pay for a patent product based on its per capita GDP. It follows that countries with the highest per capita GDP are expected to pay more for a patented product than a middle-income country. Middle-income countries are expected to exhibit greater willingness to pay than least developed countries. It is recognized that TRIPS has ethical consequences: whether it is acceptable for the world to allow human tragedy that has engulfed countries in Southern Africa and other parts of the world to perpetuate when the marginal cost of reducing the suffering is small. This ethical issue could be debated in other disciplines. This paper shows that by employing price discrimination among countries, patent holders are going to be better off than the current situation where developing countries are made to invoke the compulsory license rule to violate patent right.

IPR enhances R and D which bring about innovation. Investors in R and D will continue to invest in so far as they make profit to cover the huge cost. It has been shown that the bulk of the sales of pharmaceutical products come from the advanced countries. IPR for music, electronic gadgets, trade secrets, trademarks need no modification because the compulsory license rule of the WTO may never apply. On the other hand applying the strict

rules of TRIPS to pharmaceuticals and biotechnology defeats the very concessions that WTO members have given to least LDCs. The argument that without IPR every innovation becomes a common property is untenable in the case of pharmaceutical drugs for poor countries. Their consumption of pharmaceutical drugs with patent is close to zero. Global welfare will be improved if TRIPS rules are relaxed for the countries of the South.

Chapter 2

Literature Review

The debate over IPR dates back to nineteen century. In his book, *The Principle of Political Economy*, the nineteenth century British economist John Stuart Mills (1900) argued that the criticism against the monopolist should not be extended to include the patent holder. His reason was that a patent conferred some privileges on the inventor whose innovation increases the welfare of the consumer. In his opinion, patent should not be equated to monopoly because the latter reduces the welfare of the consumer whereas patent increases the welfare of consumers because a patent motivates producers to come out with an entirely new product that benefits consumers.

The 1995 agreement on TRIPS under WTO was not the first international agreement on IPR. A precursor of TRIPS was the 1883 Paris convention for the protection of Industrial Property. Copyright has been protected since the Berne convention in 1886. In 1967, a conference was held in Stockholm, Sweden that that obliged countries to confer on citizens of other countries the patent rights of its own citizens. Other IPR protection treaties were Patent Cooperation Treaty which was signed in 1979 to enable inventors to file for the patent rights for the same invention in different countries

2.1 Market Failure Argument in Favor of TRIPS

The concept of IPR contradicts the fundamental economic concept of perfect competition. Under ideal circumstances, perfect competition is preferable to any form of imperfect market structure, be it monopoly, monopolistic competition, duopoly or oligopoly. Critics of IPR contend that there is always welfare loss under imperfect competition. Proponents of strong IPR, however, argue along the line of public good. A public good has two main characteristics. It is non-rivalry, which means that one person's consumption of it would not prevent another person from consuming the same good. It is non excludable, that is consumers who want to consume the good cannot be denied access. The public good represents a classic case of market failure because a public good is associated with a social cost that would not be borne by participants in a free market transaction (Coase, 1960). An individual will not readily pay for a public good. Patent is regarded as a public good because once the discovery of the processes of making a product is made, it would be impossible to prevent others from using that knowledge without paying for it. This is known as free riding. The problem of free riding leads to under production of any good that can be classified as public good. It has been suggested that pharmaceutical companies should be given the protection of IPR. In a study published by Tuft Center for the Study of Drug Development and published in 2001, it was estimated that on average, the cost of developing a new drug is $802 million over a 12 year period (Berndt, 2002). This figure is two times more than the $350 million that was estimated a decade ago. The implication is that the cost of discovering a new drug is increasing very fast. A worldwide extension of patent as granted by TRIPS would be the right move to help innovators to recoup their large investment.

Using R and D on pharmaceuticals as an example, Kremer (2002) concurred with the need to motivate innovators by stating that R and D on new pharmaceuticals is in short supply because the competitive markets do not provide enough incentives for R and D expenditures. The traditional solution of governments stepping in to provide the social public good is not applicable because governments in various countries face the free rider problem of supplying this public good.

However, Deardoff (1992) devised a model where limiting the jurisdiction of a patent geographically does not discourage investment in R and D. In Deardorff's view, absence of international legislation that will protect a patent across international borders will not stifle innovation as other researchers have claimed. A foreign country merely serves as a market for an innovated product. In high technology sectors innovation is regarded as a cumulative process that depends on previous work (Gallini, 2002). Current research always dwells on previous research, therefore strict IPR protection would prevent future researchers improving upon past innovations (O'Dongue et al, 1998). Falvey et al (2005) consider a simple case where R and D has brought about discovery of a new product. Economic theory suggests that for a socially optimal output to be produced, the product should be sold at a price equal to its marginal cost. Under this setting, society will derive the highest social surplus possible. Assuming no fixed cost, the innovator does get zero economic profit. Since it cost millions of dollars to come out with a new product, firms will not have the incentive to invest in R and D when they can only make zero profit. A solution to this zero profit problem is to grant patent rights to innovators. A patent gives the patent holder a temporary right to make economic profit. Once the patent expires product enters the competitive market.

The argument that a stronger protection for intellectual property rights across international borders impedes economic growth in the developing countries received mixed reviews from Easterly (2001). Isolating the factors that enhance economic growth in the developing countries is a daunting task. Past policies aimed at accelerating economic growth have failed. Generous aid from the advanced countries to the developing countries is not a solution. Therefore, in the opinion of Easterly, one cannot argue that IPR protection works against the economic interest of developing countries.

2.2 The Divergent Interests of Developed Countries and Developing Countries on TRIPS

Developing countries view TRIPS as an instrument designed to limit their use of modern technology and life saving drugs. It has also been found out that TRIPS increases prices of commodities because it increases the domestic monopoly power since the foreign patent holder must give license to a producer or ship the goods to a sole distributor abroad. Among other things, developing countries seek to undermine IPR treaties in order to have access to advanced technologies without paying the required royalty fees (Sell, 1995).

Before the current debate over the effect of TRIPS on the economy of the less affluent countries, Chichilnisky (1994), pointed out that there is a vast difference between property rights in the South and the North. The South has weak property rights, whereas the North has well defined property rights. This difference has lead to pressure on environmental resources in the South. Due to strong property rights there is less pressure on environmental resources (Chichilnisky, 1994).

Yet the single most important factor in the fast rise of the IPR protection across international borders stems from the use of threat of retaliation . The United States in put significant pressure on both developed and developing countries to conform to international treaties on IPR. At various forums in the 1960's and 1970s, (this includes the World Intellectual Property Organization and UNCTAD) United States trade representatives bilaterally consulted its counterparts from Singapore, Hungary, Taiwan, and South Korea, over intellectual property rights violations. United States was not totally successful in persuading these countries to stringently protect intellectual property rights. The United States government learned that the use of mild force was more effective than exhortation. An amendment to the Trade and Tariff Act of 1984 in 1988 gave the United States government the power to retaliate against any country that is perceived to violate intellectual property protection. (Sell, 1995)

Developing countries, especially African countries have protested against the patenting of life forms and biological processes. TRIPS is vague on agricultural innovation. The TRIPS agreement does not offer specific IPR protection for plants and animal innovations. In United States, however, the landmark decision in 1980 of *diamond v. Chakrabarty* allowed patents in agricultural processes. The United States Supreme Court ruled that patent could be obtained for any biological processes or invention due to human intervention. The Supreme Court ruled again in *J.E.M. Ag Supply Inc v. Pioneer Hi-Bred International Inc.*, that plants and plant seeds, whether natural or artificial can be patented under United States law. (Janis and Kesan, 2002). Developing countries are, however, dissatisfied with these rulings. Farmers in Argentina, for instance can save patented seeds for replanting the next season whereas it is illegal in the United States because of the Supreme

Court ruling (Moschini, 2004). The United States Trade representatives are of the view that the Supreme Court ruling is in line with TRIPS provisions. On the other hand, developing countries have doubts. Their unease stems from the fact that patents of biotechnological innovations will be the next agenda that will be discussed at the WTO when TRIPS is analyzed for reforms and suggestions. Recall that it was the amendment of Section 301 of United States Trade and Tariff Act of 1994 that made it hard for foreign countries to fail to comply with intellectual property protection of United States patents in the respective countries. By 1994 Section 301 has been incorporated into WTO regulation in the form of TRIPS. To developing countries granting patents to plants and animals is not to their advantage. The belief is that substances and processes that occur in nature are a discoveries and not inventions that should be patented. Famine due to poor harvest is major problem in developing countries. Most biotechnological seeds are drought resistance and high yield.

Developing countries also tend to complain that they have not benefited much from TRIPS because the other party (developed countries) have not held their end of the bargain. This is because during the Uruguay round of trade negotiations, developing countries were made to believe that acceptance and compliance with TRIPS would open the door for freer trade in agricultural goods and textiles. Yet, years after implementation of TRIPS, developed countries and developing countries at still at loggerheads on international trade in textile and agricultural products. Brazil has threatened to send United States to WTO over subsidy on cotton.

These differences in interests between the developing and the developed world not withstanding, some researchers on protection of intellectual property right argue that patents are beneficial to both the North and the South (Richardson and Gaisford, 1996). In a two

country model comprising of North and South where the North has a firm capable of inventing a new product, and a South firm that has limited R and D capabilities, they pointed out that the length of patent in the North would be different from the length of patent in the South. The North and the South play a game in patent in which the patent in the South is conditional on the patent length in the North. A successful R and D will bring little immediate consumer surplus in the North as well as in the South. But both the North and the South gain considerable consumer surplus when the patent expires.

In spite of the adverse effects of TRIPS on the economies of developing countries, some developing countries are relieved because they regarded the hitherto unilateral use of Section 301 by United States as unfair. TRIPS to a greater degree works in favor of developed countries. Developing countries however are confident in the rule oriented policy of the Dispute Settlement Unit (DSU) of WTO because the DSU process allows developing countries to argue the merit of their case before an independent panel whereas prior to TRIPS, United States can impose a unilateral trade sanction under the pretext of patent violation. (Okediji, 2005)

It has also been noted that developing countries are not keen on enforcing TRIPS in their respective countries out of their own volition. In fact, lack of domestic legislation to enforce TRIPS in developing countries has been identified as one of the main problems since the agreement was signed in 1995. The problem has partly arisen because the TRIPS agreement does not require countries to establish a special judicial and administrative set up to cover patent violation (Okediji, 2005).

2.3 Solving Piracy across International Borders

TRIPS came into being directly as a result of piracy in certain goods. It was the international counterfeiting in products such as video games, computers (Apple and IBM), unauthorized recording of music and films, copying of computer software programs, reverse engineering of chips, and counterfeiting designer jeans that sparked the heated debate in the 1980s on how to protect intellectual property across international borders (Russell,1983). Patents violation can occur between two developing countries. In May of 2005 Pakistan's Federal Investigation agency raided and recovered more than 100, 000 DVDs of Indian movies in Karachi. Raids such as these would not be frequent since the illegal production of copy right materials benefits the economy of the pirate country.

Globerman (1988) argues that strictly speaking, piracy does not have an adverse effect on the economy of the domestic country. This view suggests that piracy need not be controlled. Globerman argues that piracy is beneficial to foreign economy but poses no threat to the domestic economy where a patent originates. If there is a piracy of patented American products abroad, the only group that loses is the subsidiaries of American companies located overseas. Local firms take away profits from American subsidiaries. Globerman states that that counterfeiting of foreign goods protected by patents adversely affects the economies of the pirated countries because piracy stifles inflow of foreign direct investment. The argument is that the existing market situation does more harm to countries with lax piracy rules.

Choi (2005) argues that there is a distinction between authentic goods and counterfeit ones since counterfeit goods are traded in the black markets whereas the original brands are

sold in legal markets. There are also differences in price between a genuine product and a counterfeit one. In addition, few consumers will pay the same price for a counterfeit good as they would pay for the original. In other words, consumers are not easily deceived into buying a counterfeit product. Assuming a counterfeit good has a positive marginal utility, consumers will purchase a counterfeit, good although it might be inferior in terms of quality to the original. An increase in production of a counterfeit good will invariably result in the decrease in demand of the original good and vice versa since counterfeit good and authentic good are close substitutes.

In a two-country model where there is a domestic firm that produces a genuine brand, and a foreign firm that produces a counterfeit brand, assuming copyright is held by the domestic firm, counterfeit products flood the foreign market due to differences in enforcement of intellectual property protection. According to Choi:

The foreign government does not rigorously enforce copyrights and trademarks within its territory. Law enforcement is costly and the foreign government has no incentive to crack down on counterfeiters contributing economies. Accordingly not all counterfeiters are caught and prosecuted (Choi, 2005 pp 432).

To solve the counterfeiting problem in countries with lax rules, Choi suggests a novel approach since counterfeiting cannot be completely eradicated. Counterfeiters can pay fees. Patent holders may be willing to accept the tolerance fee since it increases their overall profit and counterfeiters will readily accept this deal since it enables them to avoid prosecution and possible jail sentence and large fines.

This suggestion is practical, for all intents and purposes, considering the very recent deal that Microsoft Corporation has reached with the Indonesian government. After months of intensive negotiations, Microsoft Corporation in the first week of June 2005 reached a deal with the Indonesian government over piracy of Windows software. Under the deal, the Indonesian government will pay a token amount of $1 for every pirated window software on a government computer. In exchange for this agreement, the Indonesian government will buy the original software from Microsoft whenever it wants a new Microsoft program. The deal involved over 50, 000 government owned computers. The Indonesian Information minister was quoted as saying that Microsoft was being realistic since the Indonesian government lacked revenue to purchase authentic Microsoft product.

Piracy is a growing problem in international trade in spite of the existence of TRIPS. The following table shows countries with leading piracy rate on computer software and other trademarks.

Table 1. Countries with Highest Piracy Rates

Country	Rate (%)
Vietnam	92
Ukraine	91
China	90
Zimbabwe	90
Indonesia	87

Source: Business Software Alliance (BSA)

Developing countries cannot be forced to use patented software at all times, they may try to evade detection. Microsoft's deal with Indonesia will enable the country to limit its use of pirated software. The same amnesty could be granted to other countries on the list with exception of China. A trade dispute between a United States based firm and the Chinese government is not going to be solved between the firm and the government as Microsoft has done. Rather the issue would be resolved through governmental negotiation or through the DSU of WTO because of the strategic position of China to the United States. China is the United States largest trading partner after Japan. Due to the growing United States' trade deficit with China, China's accession to the WTO was delayed because The European Union and the United States refused China's request to be admitted to the WTO as a developing country. Accession as a developing country would have given China ample years to comply with WTO tariff structures. United States scathingly criticized China repeatedly from 1994 to 1996 over non-compliance with IPR protection (Eglin, 1997) The United States is very particular about China because the United States' trade deficit with China is huge. The value of United States' export to China rose from $5.8 billion in 1989 to $26.1 billion in 2003. During the same period the value of United States' import from China increased from 11.9 billion to $157.1 billion. United States' trade deficit thus grew from a moderate 20.3 billion in 1989 to $119.5 billion in 2003 (Scot, 2005)

China's population size and trade volume would make it eligible for accession only on commercial basis. The extension of amnesty covering piracy is an ambiguous move because it has been observed that weak patent protection in foreign countries can reduce United States exports (Smith, 2002). On the other hand a strong foreign IPR protection increases United States exports to countries with high rate of piracy. The result also showed

that United States exports diminish when there is a stronger IPR in countries that are less likely to violate patent right. The Microsoft decision is a step in the right direction, though the *Economist* (2003) has projected that with counterfeiting and piracy on the increase in China and in other emerging economies of the former Soviet Union, there is no end in sight for piracy and that the problem is going to become a global business. It is however ironic that the products that have been generating heated debate over TRIPS are not the ones that the most impoverished countries on earth care about. TRIPS to some extent has been useful in combating piracy because of the threat those countries that violate IPR will be sent to WTO.

Chapter 3.

Ethical Problems Associated with TRIPS

The debate over TRIPS and its negative impact on economies of developing and least developing countries borders on ethics as well as economics. On the ethical side of the debate, it is often asked whether millions of impoverished people in the South should die from treatable diseases such as tuberculosis, malaria, and AIDS when the marginal cost of keeping them healthy and productive is so small. New drugs that are more effective in treating Tuberculoses and malaria are patented. Should agricultural research and processes that could save millions of people from starvation and death be patented? With regard to pharmaceutical companies and health crises in the developing countries, critics have stated that ethically minded pharmaceutical companies in the developed countries should adopt the Rawlsian theory of distributive justice. That is life saving drugs should be made available to people who need them because those drugs are a primary social good. UNAIDS, the United Nations agency responsible for monitoring AIDS issues has reported that there are about 36 million people currently suffering from the disease. 22 million people have already died of the disease. It is estimated that 10 percent of the adult population in sub Saharan Africa has the disease. In countries such as South Africa, Botswana, and Zimbabwe more than 25 percent of the adult population carry the disease. AIDS sufferers are not usually accorded the compassion and empathy of victims of other diseases and natural disasters. They are not even considered victims because of the mode of transmission of the disease. AIDS is transmitted mainly through unprotected sex with a carrier of the disease or through intravenous drug use. Sufferers are therefore seen as victims of their own reckless actions.

The United Nations Human Development Index (HDI) clearly shows that there is a positive correlation between economic growth and life expectancy. Life expectancy could be used as a proxy for the health status of citizens of a country. It follows logically that since AIDS reduces the life expectancy of countries that are severely affected, the disease will definitely slow down economic growth. However some critics see the picture differently in spite of the terrible human tragedy. Young (2004) did an analysis and concluded that the AIDS epidemic in Southern Africa will adversely affect the human capital accumulation of orphaned children in the short run. But in the long run, Young claimed that the long term effect of the epidemic is positive because labor becomes scarce, fertility rate is lowered due to shortage of women through death, and reluctance to have unprotected sex, thereby leading to high per capita accumulation in the future. This analysis, however, is flawed because it assumed the problem will go away with time. In reality there is not much evidence to support the notion that the AIDS crisis in Southern Africa would in the long run be beneficial when there is no end in sight of a cure. He could have used biological model of a progression of a disease before a cure is found. Small pox among Native Americans is a good example.

Activists' resolve to campaign to make life saving drugs accessible to the impoverished make ethical sense but has no economic appeal. The pharmaceutical companies are not going to be persuaded by emotional appeal to reduce the price of drugs for developing countries. Biotechnological companies in the advanced countries will not freely provide patented seeds to poor countries on the verge of famine. The next chapter analyzes economic theory to find solutions to the adverse effect of TRIPS on developing countries. The ethical issues could be debated in other discipline such as philosophy or bioethics. In the next chapter we use economic theory in an attempt to offer suggestions.

Chapter 4.

Economic Analysis

This section analyzes two main ways in which TRIPS works against the economic interests of developing countries and why some developing countries are able to use threats to force a change in behavior of patent holders. Other developing countries that are categorized among the most impoverished countries are incapable of forcing any concession from patent holders because they do not pose any credible threat. Granting patents to agribusiness firms in the developed countries have a negative impact on the economies of developing countries. Price discrimination is used as a model to resolve the two pressing issues of access to pharmaceutical drugs and agricultural processes.

Price discrimination is a topic well studied in microeconomics literature. Assume arbitrage is illegal and therefore impossible, we show that patent holders can maximize profit by practicing price discrimination in the international market. Rather than allowing pharmaceutical firms in the developing countries to invoke compulsory license rule to violate patent, patent holders in the advanced countries can practice price discrimination.

Under imperfect competition where market participants can influence price and quantity, economic theory assumes that market participants recognize the need of their interdependence, resulting in a price that is equitable to all parties. However, this assumption is not applicable to TRIPS negotiation. For example a third world farmer who wants to utilize a patented a bio-engineered seed cannot negotiate directly with the patent owner in the United States. The negotiation is done through governmental representatives at the WTO.

4.1 Political Economy Issues

Hayami (1998) has demonstrated that politicians in developed countries pay special attention to the demands of special interest groups like industrial capitalists and farmers. The political survival of politicians depends on the electoral success, which in turn depends on political support from the interest groups. In developed countries like United States, Britain, and Germany where democracy is practiced, politicians' marginal revenue of pursuing a trade policy is measured by expected increase in electoral votes of those who will benefit from the policy. The number of votes that the politicians lose from those who oppose a policy measures the marginal cost. Marginal benefit to the politicians for implementing a policy, therefore, is the net expected increase in electoral votes. Marginal loss is the expected decrease in votes. Often, politicians in developed countries weigh trade policy based on expectation of political support.

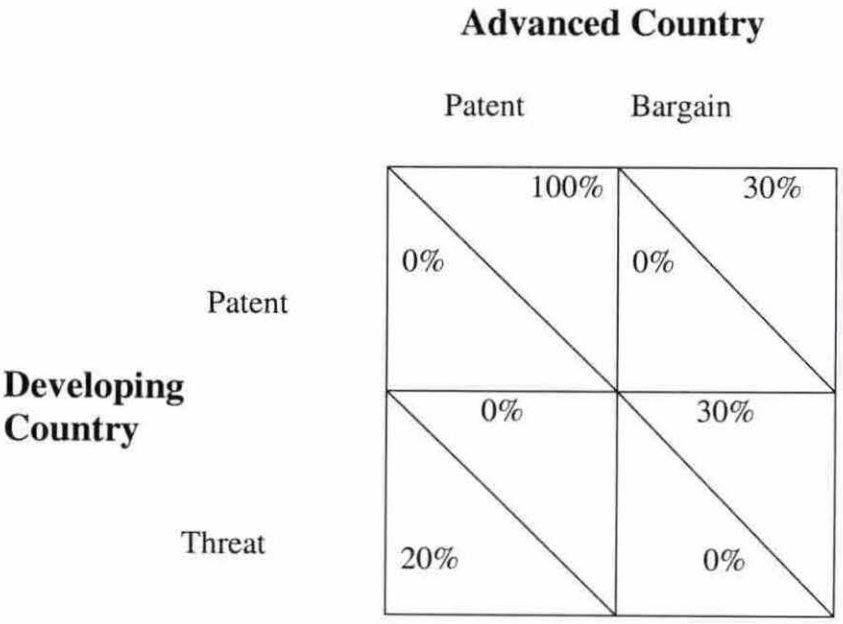
On the other hand politician in most developing countries, with possible exception of India, China, and Brazil and other middle-income countries, do not base trade decisions on political support from voters. Decisions are often made based on tribal influences. Besides, Least Developed Countries' (LDCs) politicians do not have much leverage to negotiate a trade treaty in the international arena. They have a weak bargaining position because even if they issue a threat in the course of bargaining for a fair trade deal, this threat is not credible due lack of political pressure from their own citizens. There is lack of social and political upheaval in the wake of an unpopular trade decision in a third world country. Often people who will benefit much from the relaxation of the TRIPS rules are lowly educated and remain

ignorant about local politics let alone the bargaining process at the WTO. For these third world countries, a prisoner's dilemma model cannot be used to explain the issue.

4.2 A Game Theoretic Approach

The bargaining position of LDCs under TRIPS is in sharp contrast to developing countries such as Brazil, India, and China. Okediji (2005) notes that in most least developed countries, domestic political momentum is likely to influence compliance with TRIPS whereas developing countries might not comply. Those countries have advanced medical and agricultural laboratories that are capable of manufacturing patented drugs and seeds. The bargaining process can be presented using the following pay off matrix:

Fig. 1. A Game Between an Advanced Country and a Developing Country over Existing IPR



The underlying assumptions are: there are two countries, developed and developing. Patent is held by firms in the developed country. When a developed country negotiates to supply the commodity at a reduced price, threat from a developing country is not credible. WTO regulation allows compulsory license for pharmaceuticals, but in this game it is assumed that the compulsory license rule also covers patented agricultural process.

Under the 1995 WTO regulations on TRIPS member countries are required to comply with IPR that is enforced in other countries. Thus a firm in country **A** cannot manufacture a product that is patented in country **B** without obtaining a license. Under WTO rule, patent holders are given maximum of 20 years to possess the sole right to exploit their inventions. By this rule the patent holders become monopolists, which means that they have the market power to determine prices. Since patent holders are the sole producers of the commodity, buyers in the developed world as well as developing countries consumers should pay 100% of the price of the monopolist patent holder. This is depicted in the northwest part of the matrix. An invocation of the WTO emergency rule means that a developing country can produce a commodity covered by patent without the permission from the license holder. This is referred to as compulsory license. In this scenario, the developing country will manufacture the commodity and sell it at price that is around 20% of the patent price to its citizens. This is indicated in the southwest part of the pay off matrix. Ignoring transportation cost, if the price of the domestic producer is equal or above the marginal cost of the patent holder, then the advanced country will negotiate and sell the product to the developing country at lower price rather than allowing the developing country to produce the commodity itself. This information is shown in the northeast corner of the matrix, where the patent holder in advanced country is hypothetically willing to negotiate to supply the commodity at

30% of the monopolist price to the developing country consumer. The outcome of the negotiation shows that both the developed country and the developing country accept the 30% of the monopoly price. Revenue goes to the patent holder since no compulsory license is used. The southeast part of the matrix indicates a hypothetical situation where the patent holder negotiates to supply the commodity at a reduced price of 30% of the original price. Here there could be a threat to violate the patent, but the threat is not credible due to the assumption that a negotiation leads to patent holder lowering the price to an acceptable level. The potential domestic producer receives 0% of the original price since the domestic producer does not get the opportunity to supply any generic product to the market. Clearly in this game the patent holders are better of negotiating and supplying the product at a reduced price.

This game is applicable to the practical challenges posed by the TRIPS agreement when it comes to developing countries access to essential drugs to treat disease such as malaria and HIV. In 2001, the Swiss pharmaceutical giant Hoffman La Roche reduced the cost of HIV drug, Viracept by, 40% when the Brazilian government threatened the firm that Brazil will invoke the compulsory license rule to produce the drug domestically. Hoffman La Roche reduced the price of the drug from $1.07 to $0.64. Brazil has been saving $ 35.4 million a year. Brazil's threat would have opened the floodgate for other pharmaceutical companies in the developing world to produce their own patented drugs. In the same year the United States filed and dropped a suit against Brazil because of the latter's intention to manufacture AIDS drugs patented by American pharmaceutical companies. The American withdrawal was due to the fact that Brazil had a stronger case backed by WTO legislation.

4.3 TRIPS and Famine in Least Developing Countries

Apart from the dispute over the right to produce patented drugs, another issue that might in the future cause the WTO to deliberate on is the copyrights of bio-engineered seeds. Unlike patents for such items like music, watches, and computers where no country can get a compulsory license from the WTO, the case for bio-engineered seed is formidable. Already there is a growing dispute over patented bio engineered seeds, and some plants. In particular, African countries are at the forefront of the crusade to prevent agribusiness firms in the developed world to possess any agricultural based patent. The position of African countries is that no patent should be granted to any life forms and natural processes. Africa has informed WTO of its intention to achieve food security. So far, the WTO only grants compulsory licenses to manufacture pharmaceutical drugs to combat diseases that are a threat to public health in developing countries such as malaria, AIDS, and typhoid. But there is a high likelihood that due to famine in Africa and other arid areas of the world, developing countries will negotiate for a change in the TRIPS treaty so that they will have the right to use patented drought resistance seeds in order to combat famine. A look at some of these countries paints a grim picture. In 2004, 30 million people in ten African countries: Mauritania, Ethiopia, Eritrea, Angola, Malawi, Lesotho, Swaziland, Zambia, Mozambique, and Zimbabwe were on the verge of famine that could kill more than 30 million people.

Developed countries as well as developing countries came to consensus in 2001 to modify the TRIPS agreement because its provisions posed a public health threat to the developing countries. A critical look at famine in the developing world would raise similar alarm. A future show down between advanced countries and developing countries over

TRIPS by be imminent. According to *1998 State of the Children Report* published by the United Nations:

Malnutrition nearly contributes to 7 million child deaths every year, more than any infectious disease, war or natural disaster.

Based on this statement one can assert that the case for the relaxation of TRIPS regulation on patent of biological organism and agricultural processes would be stronger than the argument that was advanced in 2001 to support the ease in regulation of TRIPS so that developing countries and less developed countries can have access to pharmaceutical products from the developed world. In the 2001 special "Declaration on Public Health and Developing Countries", declaration 1 of the WTO ministerial meeting states that:

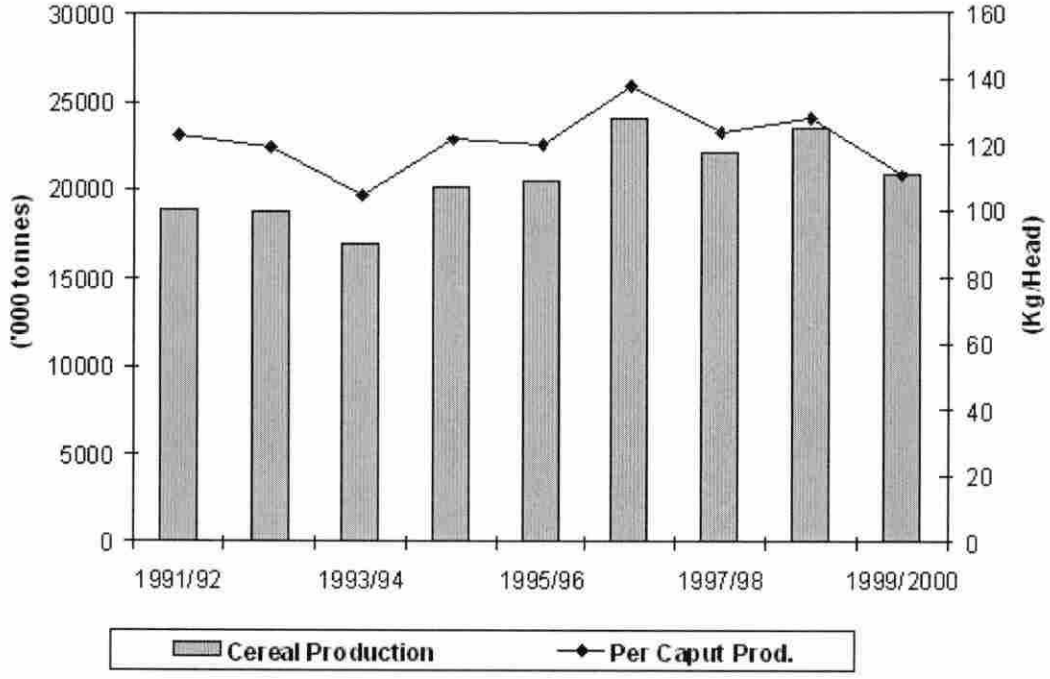
We recognize the gravity of public health problem affecting many developing, and least developed countries especially those resulting from HIV/AIDS, tuberculosis, Malaria, and other epidemics

What needs to be analyzed is whether famine in these countries presents a looming threat, greater that the devastating effects of these diseases, thereby making it plausible to invoke WTO rules that empower countries to violate the terms of a patent. Specifically declaration Five C on public health states that:

Each Member has the right to determine what constitutes a national emergency or other circumstances of extreme urgency, it being understood that public health crises, including those relating to HIV/AIDS, tuberculosis, malaria and other epidemics, can represent a national emergency or other circumstances of extreme urgency.

A careful look at famine in LDCs shows the dire consequence of hunger is close to being referred to as "a national emergency or other extreme urgency". The charts below show the grain production in one of the most famine-afflicted region of the world, Horn of Africa, which comprised of Kenya, Somalia, Ethiopia, Eritrea, Sudan, Tanzania, Djibouti, and Sudan.

Fig. 2 **Horn of Africa: Total Cereal Production and Per Caput Cereal Production (1991-1999)**



Source: Food and Agricultural organization

Although armed conflicts, drought, and other political instability might account for low production of cereals, the output level could be increased with a drought resistant hybrid

seeds. Most of these countries have had an annual population growth rate of over 3 percent per annum. Yet cereal production, which is staple in these countries, has not increased to commensurate with rapid population growth. A look at fig. 1 above indicates that grain production stays 18,500,000 tons in 1992/1993 season as 1991/1992 season. In the 1993/1994 season there was a slump in the production of grains. Grain production decreased from 18,500,000 tons in the previous season to 17,000,000 in the 1993/1994 season. Fig 1 shows that although there was a slight increase in grain production in this region from 1993/1994 to 1995/1996, the increase in production is evidently patchy.

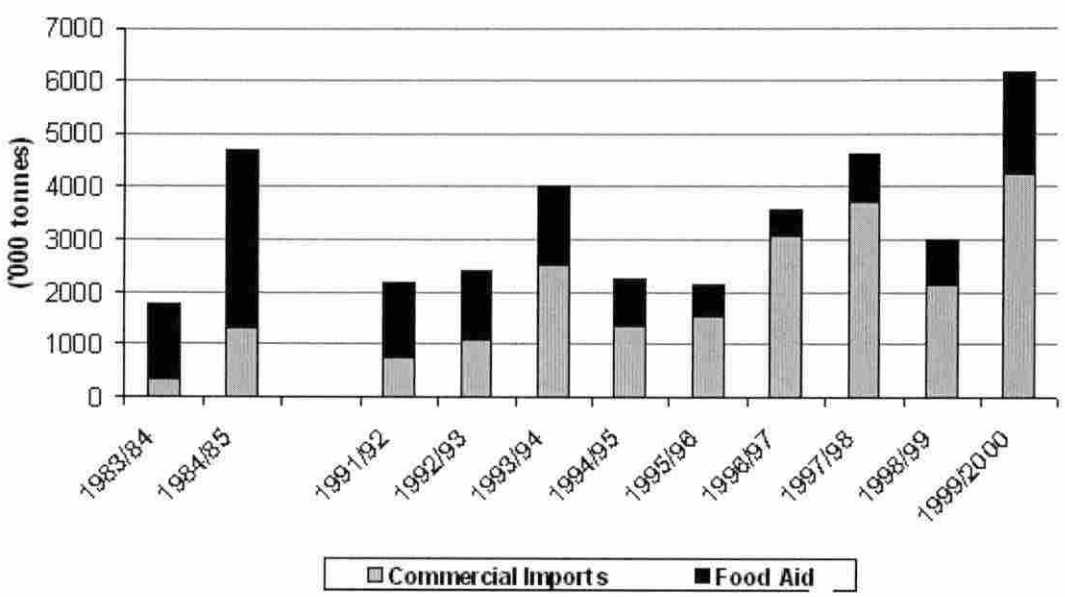
The overall picture drawn, shows lack of growth in the grain production. This low average production of grains has lead to serious health consequences. Starvation always leads to diseases. In Africa and other developing countries, women and children are known to be deficient in a number of micronutrients. In addition, people from famine-afflicted areas suffer from death as a consequence of eating unbalanced diet. Amartya Sen, (1984) a leading authority on famine has argued that none of the functioning democracies has experienced famine since 1820. His argument implies that the WTO call for the protection of economic and social interests of developing countries through a series of policies might be mere lip service if there are constraints, such as TRIPS, which inadvertently block the least developing countries from having access to high quality bio-engineered seeds to combat famine in the developing world.

It would be naively simple to suggest that famine in developing countries will be completely eliminated if TRIPS does not interfere with access to agriculture technology in these countries. The fact of the matter is that low rainfall, poor soil structure, poor farming method as well as wars contribute to famine. But some of the provisions pertaining to TRIPS,

contrary to WTO aims and objectives of assisting in economic development in the most impoverished part of the world, could harm economic development in these areas.

Achieving self-sufficiency in food production is the goal of many developing countries. In reality, this goal has eluded many developing countries as the chart below shows. The chart shows thousands of tons of foreign cereals that entered the horn of Africa from 1983 to 2000. It includes both foreign food aid and direct import.

Fig. 3 **Horn of Africa: Cereal Commercial imports and Food Aid (1983/84,1984/85,1991/92-1999/2000)**



Source: Food and Agricultural Organization (FAO)

Compared with Chart 1, it is seen that dependence on foreign cereal supply hinges on domestic harvest. Whenever the domestic supply of cereals goes down, countries in this region procure more foreign grain to supplement the scanty local production. For example in the 1999/2000 season when cereal production fell short of the of the 1998/1999 production

level, more foreign cereals entered the region in the 1999/2000 season than it did in the 1998/1999season.

Already, the comparative advantage that the developing countries have in international trade over developed countries is being undermined by the agricultural policies of these advanced countries. The European Union has its Common Agricultural Policy. The mainstay of this policy is governmental subsidy to European farmers to make European agriculture more competitive to the rest of the world. Not only the European Union but the United States also gives massive subsidies to its farmers, thereby impeding agricultural development in the developing world. The impediment comes in the form of artificially low world market prices due to the subsidies.

Brazil, for instance, has twice taken the United States and European Union to the Dispute Settlement Unit of the WTO over massive subsidies to farmers. In 2004 Brazil won an important case against the European union over subsidies given to sugar beet farmers. In the same year, the DSU ruled that United States subsidies to cotton farmers were in contravention with WTO rules. Thus, there are contentious issues between the advanced countries and the developed countries. Developing countries think that they are at the receiving end of an unfair trade practice from the developed world. Developing countries want to see TRIPS not as a tool to hamper trade, but unfortunately there are complications.

Currently, the interference of TRIPS in agriculture pales into insignificance in comparison to the dispute over access to pharmaceutical drugs. An attempt was made to get data on the marginal cost of production of antiretroviral drugs and other drugs that are used to treat diseases that are prevalent in developing countries. It is easier to get the market price of these drugs. Pharmaceutical companies also state the cost of R and D that goes into

developing and manufacturing the drugs. Data on marginal cost are hard to come by. Perhaps pharmaceutical companies are uncomfortable with the negative publicity that the publication of the data will generate.

The following table, however, shows the massive price difference between some brand name AIDS drugs and its generic counterpart

Table 2. Prices of Name Brand and Generic Brand Of Anti Retroviral Drugs

Product	Price sold to SA Private Sector (in US dollars)	WHO approved generic (in US dollars)
AZT (300mg)	674.52	180.00
Limuvidine (150 mg)	741.59	100.0
AZT/Limuvidine (300/150 mg)	926.98	265.00
Nevirapine (200 mg)	417.14	166.00
AZT Solution	528.14	160.60
Lamivudine Solution	408.47	113.88

Source: Treatment Action Campaign. (South Africa)

The table shows that in all of these antiretroviral drugs, the price of the World Health Organization (WHO) approved generic drug is far lower than the price of the brand name. Nevirapine (200 mg) has the highest generic price compared with the brand name. Yet the generic price of nevirapine constitutes only 40 % of the price of the brand name. The

cheapest generic drug is limuvidine (150 mg). The price of this drug is just 10% of the brand name.

Not all developing countries have a well functioning pharmaceutical industry capable of producing these antiretroviral drugs. Since there is no difference between the chemical components of the brand name and the generic drug, it is reasonable to assume that the marginal cost of producing a brand name drug and generic drug are equal. Since the generic drug producers are willing to supply the drugs at the WHO approved prices, it is assumed that the market price covers the marginal cost and a possible profit is earned.

4.4 Segmented Market

Patent-holders in bio-engineered seeds and brand drugs used to treat epidemics in the developing world can earn maximum profit if they could be successful in selling their products in segmented markets. TRIPS confers de facto monopoly powers on patent-holders. Free entry into the market is barred because a producer needs an authorization from the patent holder. As monopolists, patent holders under TRIPS can maximize profits by equating marginal revenue to marginal cost.

Assume the manufacturer of a patented drug or seed can sell to individual buyers according to each person's willingness to pay. This will eliminate any trace of consumer surplus and the producer will earn the highest profit available. But this strategy which is known as perfect price discrimination or price discrimination of a first degree is not achievable because it would be improbable for the patent holders to ascertain each consumer's willingness to pay. Rather we can separate the market of a patented drugs or seeds into three distinct markets:

1.Demand by consumers in developed countries.

2.Demand by consumers in developing countries.

3.Demand by consumers in least developed countries.

The first market is represented by consumers in countries like United State, Canada, Japan and most countries in Europe. The second market is represented by consumers in countries like India, China, Brazil, Thailand, and South Africa. The third market is represented by consumers in the most impoverished countries of the world such as Ethiopia, Somalia Kenya, Burkina Faso, and Sierra Leone. These segmented markets are based on the per capita GDP of the countries. Burkina Faso, for example is among the most impoverished countries in the world. Below is a per capita GDP data on countries in the various segmented market. This was compiled from Human Development Index (HDI) 2004 data.

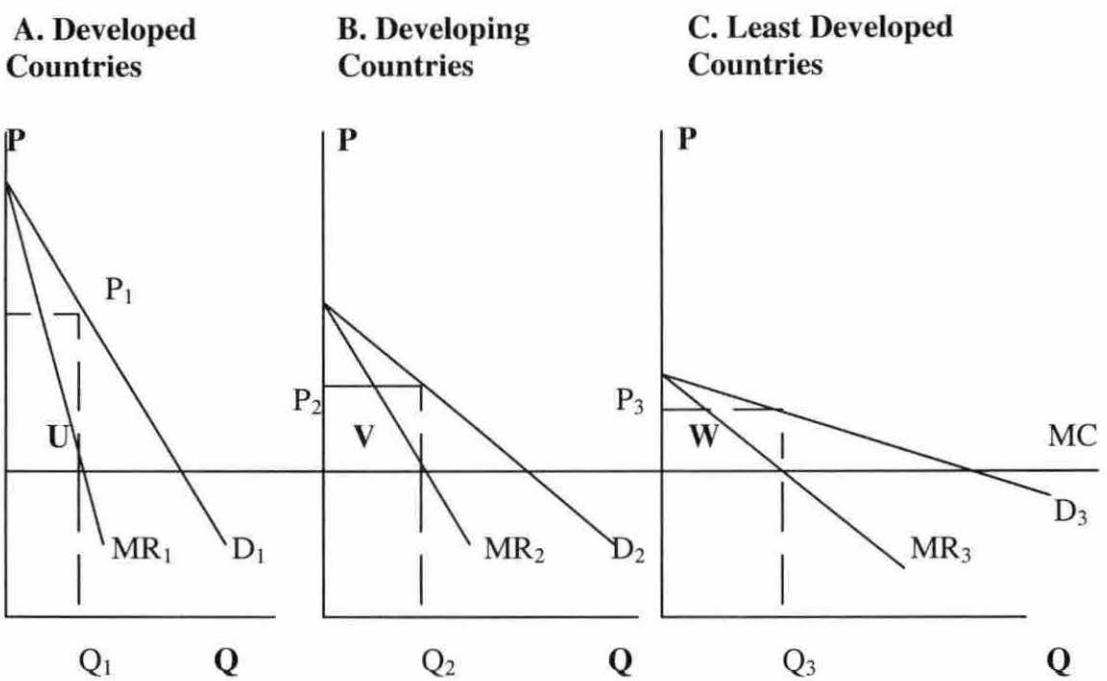
Table 3. Per Capita Income of Countries in the Three Segmented Markets

Developed Countries	GDP in US Dollars (PPP)
United States	35,750
Japan	26,940
Norway	36,600
Britain	26,150
Germany	27,100
Developing Countries	GDP in US Dollars (PPP)
Brazil	7,770
Thailand	7,010
China	4,580
South Africa	10,070
Malaysia	9,120
Least Developed Countries	GDP in US Dollars (PPP)
Burkina Faso	1,100
Sierra Leone	520
Tanzania	580
Ethiopia	780
Eritrea	890

Source: World Bank (Human Development Index 2004)

The data show that different countries have different purchasing power. Sierra Leone, the country with smallest per capita GDP on this table has per capita GDP that is just 1.42% of the per capita GDP of Norway. For the patent holders to make maxim profit, they must price the patented product differently in different markets. Assume the demand curve facing patent holders is linear, assume also that the marginal cost of the patented product is fixed. Then we will have the segmented market shown below.

Fig 4. Segmented Market for a Patented Product



Since perfect price discrimination is beyond the reach of the patent holders, a more practical approach is to use the per capita GDP data to segment the market as above. Market segmentation becomes necessary because the manufacturers cannot exploit a demand function that does not exist (Henderson and Quandt, 1980). In this model, patent holders can

get the highest price for a product in market **A** where the demand for the product is more inelastic than market **B** and market **C**. D_2 is relatively inelastic to D_3. This implies that $P_1 > P_2 > P_3$. Total profit in developed countries is given by area **U**. Total profit in developing countries is equivalent to area **V**. Area **W** represents total profit in developing countries. Even though $Q_1 < Q_2 < Q_3$, **U>V>W** because of the high price differences between the markets.

Assume constant marginal cost, price in each market is set according to the inverse elasticity rule given by

$$p_i\left(1+\frac{1}{e_i}\right)= p_j\left(1+\frac{1}{e_j}\right) \qquad (1) \text{ or}$$

$$\frac{p_i}{p_j} = \frac{\left(1+\frac{1}{e_j}\right)}{\left(1+\frac{1}{e_i}\right)} \qquad (2)$$

Where P_i and P_j are the prices charged in market i and j. Price elasticity of demand in market i and j are given by e_i and e_j respectively. The segmented market pricing policy shows that profit maximizing price will be greater in a market with an inelastic demand than a market with elastic demand (Nicholson, 1998). Assume $e_j = -5$ and $e_i = -2$ then $Pi/Pj = 8/5$. This means that price will be three-fifths higher in the inelastic market than the more elastic market.

Thus in Fig. 4, **market A** which represents a market in developed countries, the demand curve is relatively inelastic, the gap between price and marginal revenue is higher than the gap between price and marginal revenue in **market B** which represents the developing countries. Then the gap between marginal revenue and price in **market C** is less than the gap between marginal revenue and price in **market B**. Clearly more profit is made in **market A** followed by **market B**. Profit maximization requires that the patent holders supply Q_1 in market 1, Q_2 in market 2 and Q_3 in market 3.

This analysis is in line with Pharmaceutical Research and Manufacturers of America (PhRMA) survey that indicates that the people in the poorest regions of the world consume less pharmaceutical drugs compared with consumers in regions with advanced economies as table 4 shows.

Table 4. World Pharmaceutical market, Sales by Region, 2000

Region	Percentage of Market
United States	39.6
Europe	26.1
Japan	15.4
Latin America	7.5
South Asia & China	7.0
Canada	1.9
Africa	1.0
Middle East	0.9
Australasia	0.6

Source: Pharmaceutical Research & Manufacturers of America (PhRMA).

The data show that the market for pharmaceuticals is concentrated in high income countries followed by middle income countries. The impoverished regions of the world consume the tinniest fraction of the world's pharmaceuticals. In fact, Connecticut's spending on pharmaceuticals is greater than the total amount that the 38 countries that comprise of Sub Saharan Africa spend on pharmaceuticals (World Bank, 2001: U.S. Census, 2000)

There is a caveat, however, to price discrimination. If patent holders perceive that a lowering of the price of a patented product to the developing countries will lead to agitation for a lower price in the developed countries, then they will be less willing to voluntarily reduce the price.

4.5 Cost of Production

Developing countries that are capable of producing a patented product have low cost production. Labor cost is extremely low in these countries as indicated by the low per capita income. Pharmaceutical companies can take advantage of this low wage rate and establish firms that will manufacture the patented products.

This low wage rate in developing countries, compared with the high wage rate in advanced countries is often the factor that leads to counterfeiting. Developing countries have comparative advantage in the production of counterfeit goods. This low cost more than compensate for the legal cost of producing counterfeiting.

Firms outsource to reduce the cost of production so as to make more profit. If a developing country has a well-developed infrastructure to produce a patented product then,

the patent owner must consider establishing a subsidiary company abroad. This will protect the patent against unauthorized use.

CHAPTER 5

CONCLUSIONS AND SUGGESTIONS

A practical solution is to use the method already in place in the United States. Drug manufacturers in the United States do not have a uniform price for drugs. The lowest prescription drugs sales are made to the Department of Veterans' Affairs and Department of Defense (Frank, 2002). In Europe prescription drug arbitrage is allowed. Prices that are charged by brand manufacturers to government health care providers in less affluent in southern part of Europe are low. Whereas arbitrage is allowed in Europe, in the United States, The Prescription Drug Marketing Act of 1987 clearly prohibited hospitals and other third parties from reselling the drugs that they have negotiated at a lower price. This law bars any form of arbitrage. Apart from personal use, this same law does not allow for re importation of prescription drugs sold to other countries by United States drug companies (Berndt, 2002). In much the same way, governments of the least developing countries, which lack the technical capability to manufacture essential drugs, may negotiate drug prices with international pharmaceutical companies.

TRIPS is now at a crossroads. The issue here is whether patent holders in the advanced countries will continue pressuring their governments to enforce the strict international rules. TRIPS allows a country to authorize its pharmaceutical firm to produce a patented drug under compulsory license without consulting the foreign patent holder. But the supply of a product under compulsory license is confined to the domestic market alone. This limitation was designed specifically to prevent countries such as Brazil and India, two

countries that have large pharmaceutical companies, to export patented drugs to other developing countries. (American Journal of International Law, 2003)

What has to be taken into account is that patent is not developed specifically for a product that would be sold in a foreign market, it is granted locally. The patent holders main concern should be the prevention of arbitrage. The advanced countries possess enormous amount of market power in international trade, access to the market of advanced countries in particular, is critical to many developing countries. One would expect that the advanced countries would have more influence on trade negotiations. There is the need to reform the provisions of TRIPS so that WTO's main goal of achieving accelerated economic development in developing countries through international trade can be achieved.

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