The Development of an International Patent Regime: 
Sound Legal Theory or Misguided Leap of Faith?

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Proposals for the establishment of an international patent regime have occupied the attention of negotiators during the Uruguay Round of the GATT. While considerable resources have been devoted to determining the details of such a regime, little attention has been focussed on the justifications for such a system. The analysis of the philosophical, economic, and political justifications for the establishment of an international patent regime concludes that all current philosophical justifications rely on perceived normative economic benefits. In addition, the economic benefits of international patent protection cannot be assessed on the basis of existing economic data. The push for international patent protection is the result of the blind application of political and economic power by industrialized countries, and not a rational determination of national or global interest.

Les propositions pour l’établissement d’un régime international de brevets ont occupé l’attention des négociateurs pendant “l’Uruguay Round” du GATT. Quoique énormément de ressources aient été consacrées à la détermination des détails du régime, peu d’attention a été portée aux justifications de création d’un tel régime. L’analyse des justifications philosophiques, économiques, et politiques pour l’établissement d’un régime de brevet international conclut que toutes les justifications philosophiques présentes sont basées sur des avantages normatifs économiques perçus. De plus, les avantages économiques d’une protection internationale de brevet ne peuvent pas être estimés à partir des données qui existent présentement. L’initiative pour une protection internationale de brevet est le résultat de l’application aveugle de pouvoirs politiques et économiques par les pays industrialisés, et non une détermination rationelle des intérêts nationaux ou globaux.

"You see," he went on after a pause, "it's as well to be provided for everything. That's the reason the horse has all those anklets round his feet."

"But what are they for?" Alice asked in a tone of great curiosity.

"To guard against the bite of sharks," the Knight replied. "It's an invention of my own."

— The White Knight and Alice in Through the Looking Glass.¹

Law is a system of rules recognized by a community as binding. It is designed to serve the interests of the community, not to determine those interests. This is particularly true for international law where the sovereignty of nation-states permits the opting out of all but a select few peremptory norms.² Thus, in determining whether efforts should be made to establish an international patent system, it is critical that the interests of each of the participating communities be examined. In Alice's terms, the question is whether we need international patent protection to foster the optimal level of shark protection for horses.

This paper will focus on the philosophical, economic, and political underpinnings that should and will determine whether or not an international patent system is established. While detailed reference will be made to existing legal instruments and perceived difficulties with them, the paper will not focus on a clause-by-clause analysis of possible technical modifications to the existing legal regime that might create a more efficient body of law. The international patent system, despite its relatively long history, is at a stage where the members of the community cannot agree whether there should be a system of rules at all, let alone what the most efficient way of setting out those rules would be. As a result, it is critical that the underlying philosophical, economic, and political bases of an international patent system be examined.

This paper is divided into five sections. The first consists of a brief discussion of what patents are and what is meant by the establishment of an international patent system. The second reviews in detail the existing multilateral patent instruments including the perceived difficulties with those instruments. The third examines the philosophical bases of both utilitarian and rights theories in justifying a domestic or international patent system. In the fourth, the economic costs and benefits of an international patent system, including transfer costs, are broken down in an effort to determine if economics

² These norms superseding the authority of domestic legislatures have been severely limited in interpretations by the International Court of Justice. See generally H. Kindred et al., International Law Chiefly as Interpreted and Applied in Canada, 4th ed., (Toronto: Emond Montgomery, 1987); S.S. Lotus (France v. Turkey) (1927), Ser. A. Vol. 2, No. 9, 1, at 18-30; Vienna Convention on the Law of Treaties (1969), I.L.M. 679, Arts 53, 64.
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provides us with a normative decision on the establishment of an international patent system. Finally, the political underpinnings of domestic patent systems are examined in an effort to determine whether international political realities are likely to ensure the establishment of an international patent system, regardless of arguments for or against such a system.

I intend to demonstrate that current dissatisfaction with the international patent regime is likely to result in the establishment of an international patent system under the General Agreement on Tariffs and Trade (GATT) in spite of the fact that there is insufficient economic data with which to judge the efficiency of such a system. Consequently, rather than focussing their resources on negotiating detailed terms of a potential GATT agreement, the legal community should be fostering research in an effort to determine whether there are sound philosophical or economic bases on which to support or reject the establishment of an international patent regime.

The International Patent

Patents and inventors' certificates are the two forms of industrial property rights that have the common goal of fostering economic development through the encouragement of invention. Inventors' certificates provide a financial reward to the inventor in return for which the state obtains all rights to the invention. Although inventors' certificates were commonly used in Marxist societies, including China and the Soviet Union, the remarkable economic transformation in Marxist states led by Deng Xiaoping's reforms of China has resulted for the most part in the abandonment of inventors' certificates in favour of patents. Consequently, this paper focusses on patents as the most accepted means through which industrial property rights are protected.

The World Intellectual Property Organization defines a patent as:

A legally enforceable right granted by virtue of a law to a person to exclude, for a limited time, others from certain acts in relation to a described new invention; the privilege is granted by a government authority as a matter of right to the

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4 The Economics section of this paper will show that patents are not the only vehicle, nor are they necessarily the most efficient means, by which a societal goal of increased innovation can be met.
person who is entitled to apply for it and who fulfils the prescribed conditions.”

In short, a patent grants a bundle of rights for inventions that meet certain tests. Both the rights and tests applied vary among the patent systems of different states. The rights granted to inventors range from sixteen to twenty years of monopoly protection in most industrialized countries to no protection in Afghanistan. The tests for patentability of a product also differ from country to country, but three broad tests are generally used. The first is that the invention be new. Inventors will not be rewarded with a patent for technology that is already in use or has been patented by someone else, even if they arrived at their invention without knowing of its existence. The second test is that the invention must be non-obvious. Even if the product is new, it will not be eligible for a patent if the invention would be obvious to a person skilled in the field in which the invention was made. The final test is that the invention be applicable in industry.

In discussing the establishment of an international patent system, it would be easy to fall into the lawyer’s trap of drafting appropriate provisions for patent rights and criteria through a comparison of existing domestic patent systems. However, as has already been noted, if this international patent law is to be reflective of the interests of the international community, it must be based on sound philosophical, economic, and political underpinnings. In order to provide a framework for discussion of these underpinnings, this paper examines the current push by industrialized countries for a harmonized international patent system that would establish minimum standards, both in terms of the scope of patent protection and in the duration of patent rights. Before examining the merits of such a system, existing international patent mechanisms and the pressures to reform them will be outlined.

THE EXISTING MULTILATERAL PATENT INSTRUMENTS

The Paris Convention

Multilateral cooperation in the field of patent protection began in 1883 with fourteen nations signing the International Convention for the Protection of Industrial Property (Paris Convention). The Convention protects a full range of intellectual property, including patents, utility models, industrial designs, and

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5 Quoted in United Nations, The role of the patent system in the transfer of technology to developing countries UNCTAD, 1975, UN DOC TD/B/398 [hereinafter The role of the patent system.]
6 Ibid. at 54.
trademarks. The treaty remains the dominant international document in the field of patent protection and its paramountcy has only come to be challenged in the last two decades. Since 1967, the Paris Convention has been administered through the World Intellectual Property Organization (WIPO) which is one of 15 specialized agencies of the United Nations. By the beginning of 1990, the Paris Convention had 100 member states, with two-thirds of those states being developing countries.

The Convention has been revised on six occasions and its key components with respect to patents can be divided into seven major areas. They are: equality of treatment, right of priority, independence of patent systems, right to import patented articles, compulsory licensing and revocation, right to special agreements, and enforcement.

The pillar of the Convention is its guarantee of equality of treatment. This clause requires member states to treat foreign and domestic patent applications in the same way and accord them the same rights. While individual countries are free to determine their own criteria and levels of patent protection, they must accord the same level of protection to foreigners and nationals.

The second element of the Convention is the right of priority. This gives the inventor a priority right of twelve months to file for protection in all member countries after having filed in one member country. This provision is designed to ensure that filing for protection in one country cannot be deemed to be publication for the purposes of determining whether or not protection may be obtained in other member countries.

The third element of the Convention is the general right of each member state to maintain its own patent system. This allows member states to set their own standards for determining the criteria to be met for patent protection, whether any products or processes may be excluded entirely from protection, and the duration of patent protection.

The fourth element of the Convention is protection against measures to

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7 As shall be argued later, perceptions in some industrialized countries that the Paris Convention insufficiently protects patents has shifted the focus of international patent protection toward the Uruguay Round of the General Agreement on Tariffs and Trade (GATT).
8 A concise overview of the activities of WIPO can be found in WIPO: General Information (Geneva, United Nations, 1989).
10 The most recent of these was the Stockholm revision of 1967.
11 See Article 2(1).
12 See Article 4(A)(1).
13 See Article 4bis(1).
prevent the importation of patented articles. This precludes member states from forfeiting a patent on the basis that the invention is being imported into the country. The article was designed to prevent member states from utilizing patent requirements as a non-tariff barrier that would force the production of each patented item in the country granting the patent.

The fifth area of the Convention places limitations on the use of revocation and compulsory licensing in member states. While there is a general freedom of states to control their patent system under article 4(1), they are prevented from granting compulsory licences until at least three years after the grant of the patent. Revocation is not permitted until at least two years after the granting of the first compulsory licence.

The sixth major element of the Convention is found in article 19 which permits member states to enter into special agreements outside the Convention. The only restriction on these agreements is that they not contravene the provisions of the Convention. Examples of such special agreements are the Patent Cooperation Treaty and the European Patent Convention.

The final key element of the convention is the dispute resolution section. The preferred settlement mechanism is negotiation, but members have recourse to the International Court of Justice (ICJ) if negotiation fails. This procedure requires the consent of both parties before an action can be brought before the ICJ and there is no effective enforcement mechanism to ensure compliance with ICJ rulings.

Criticisms of the Paris Convention

Despite the longevity of the Convention, it has come under increasing attack from both developed and developing countries. The critique of developing countries has been that the Convention fails to provide adequate protection for the intellectual property of inventors. The critics argue that the Convention is biased in favor of developed countries, as it grants them more protection than developing countries. They argue that the Convention is not effective in preventing developed countries from using their patents as a barrier to trade.

14 See Article 5(A)(1).
15 See Article 5(A)(2).
16 See Article 19.
17 See Article 28(1).
18 The only real weapon at the disposal of an aggrieved country is to deny the other country patent protection. This crude weapon may not be effective if the aggrieved country is dependent on the other country as a market. For example, it can be argued that the United States Semiconductor Chip Protection Act of 1984 is in violation of the Convention as it only grants protection in the United States to nationals of foreign countries that provide comparable protection to American nationals. This would violate Article 2 of the Convention governing national treatment. Still, 18 countries have enacted reciprocal legislation in order to meet the American demand. None has taken action under the Paris Convention against the United States. See R. M. Gadbaw, "Intellectual Property and International Trade: Merger or Marriage of Convenience?" (1989) 22 Vand. J. of Transnat'l L. 223 at 234-239.
nations has centred on the general intent of the Convention and a perceived lack of specific measures to deal with the problems of industrial development faced by technology-poor countries. The critique from the developed world has stemmed from the perceived ineffectiveness of the *Paris Convention* in securing the protection of intellectual property rights, including patent protection.

**Attack from the Developing World**

Although two thirds of the Convention members are developing countries, they have had little influence in determining the terms of the treaty. Many developing countries were not in a position to influence the last of the Convention revisions in 1967 as they had only recently gained their independence from colonial powers.

The holistic criticism made by many developing nations is that the Convention is directed toward reward of the inventor and not to the technology transfer and development needs of developing nations. The Committee on Transfer of Technology of the United Nations Conference on Trade and Development describes Article 1 of the Convention as follows:

> It is in fact a charter of rights for patent holders, its essential concern being to determine and safeguard their privileges. As contrasted with the detail and precision with which their privileges are stated, there is little about the rights of the States which grant these privileges. There is little recognition of the public interest that is expected to be served by the system of patents and few provisions about the remedial measures to deal with possible abuses of the system.\(^{19}\)

The Committee recommended a revision in the philosophy of the Convention that would enable developing countries to place technological and industrial needs ahead of inventor rights.\(^{20}\)

In order to effect this philosophical shift, the Committee recommends changes to specific provisions of the Convention. Not surprisingly, the major shift is in the principle of national treatment. The Committee argues that this principle “merely protects the rights of foreign patent holders so far as the developing countries are concerned, and can be characterized as a reverse system of preferences in the markets of developing countries for foreign patent

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holders.\textsuperscript{21} Given the technological advantage of developed countries over developing countries, it is argued that national treatment ensures that local inventors in developing countries would be overwhelmed by foreign inventors while having virtually no chance at having a product patented in a developed country.\textsuperscript{22} In order to avoid the national treatment requirement, some developing nations such as India have refused to participate in the Paris Convention.

The Committee argues that developing countries should be free to designate certain sectors with a local novelty requirement that would grant patents only where the invention was adapted to local conditions.\textsuperscript{23} This type of patent would only be available to nationals of the developing country to encourage the application of foreign technology to their particular needs. Such a provision in national patent legislation would leave the country in violation of the national treatment rule of the currently constituted Paris Convention.

A second suggested change to specific convention provisions concerns Article 5(A)(4) of the Convention governing compulsory licensing. The Committee states "the compulsory licensing procedure [of the Paris Convention] has proved in practice of virtually no value whatsoever."\textsuperscript{24} Developing nations argue that the article gives inventors an abusive monopoly for three years after the grant of the patent. Examples of abusive practices include the failure to work an invention in the developing country with the expressed intention of preventing it from competing with an existing product or the sale of a quantity of the invention well below demand to drive up the price. The failure to work is of particular concern to developing countries given that estimates of the percentage of patents not worked run as high as 95 percent.\textsuperscript{25}

The third major change suggested to the Convention concerns article 5(A)(1) which prevents forfeiture of the patent on the grounds that the patented item is being imported into the country. The Committee argues that developing countries should be free to demand local production of the patented item, at least

\textsuperscript{21} Ibid. at 25.
\textsuperscript{22} This would appear to be borne out by findings of the United Nations (see \textit{The role of the patent system, supra} note 5). It was found that nationals of developing countries own 16 percent of patents in their own country and 1 percent of the world stock of patents. Both the relative deficiency in technological infrastructure and the lack of capital available to test inventions in developing countries are seen as contributing to the inability of the developing country inventor to compete with the developed country inventor. See \textit{ibid.} at 41-42.
\textsuperscript{23} Committee on Transfer of Technology, \textit{supra} note 19 at 25.
\textsuperscript{24} \textit{Ibid.} at 10.
\textsuperscript{25} Differences in figures stem from the difficulty in obtaining accurate figures of what inventions are and are not worked in a specific country. The 95 percent figure is arrived at by Shlomo Cohen using United Nations data in "Compulsory Licensing of Patents – The Paris Convention Model," (1979) 20 \textit{Idea} 153 at 186.
in those sectors where the national economy can support such production.\textsuperscript{26}

After being presented with the findings of the Transfer of Technology Committee, developing nations began a concerted push to alter the \textit{Paris Convention} in the March 1980 Geneva meetings of the Convention members. They called for a reexamination of the convention in light of the role of the patent system in the transfer of technology to developing countries.\textsuperscript{27} To date, their efforts have been unsuccessful.

\textbf{Attack from the Developed World}

While developing nations have expressed concern about excessive restrictions in the \textit{Paris Convention} as currently constituted, developed nations have complained about its lack of effectiveness. Two approaches have been utilized by developed countries to achieve their goals. The first was the multilateral approach adopted through the acceptance of a model law for invention in 1970. The second has been the unilateral approach of the United States since the early 1970s, which is largely a response to the perceived ineffectiveness of the multilateral approach. Both approaches attempt to secure a minimum level of patent protection for all countries.

The multilateral approach began in 1963 with discussions at the United International Bureaux for the Protection of Intellectual Property (BIRPI)\textsuperscript{28} for the development of a model law for inventions in developing countries. The model law contained four principles supporting the acceptance of a minimum patent protection period: the first was that inventor disclosure is preferable to the maintenance of trade secrets; the second was that a patent system encourages research and invention; the third was that it would attract investor capital; and the fourth was that it would provide a self-regulating means of rewarding inventors.\textsuperscript{29}

The model law argues for the adoption of a 16-20 year patent protection period, stating that "[t]here would be no particular advantage in developing countries in having a shorter period. It would adversely affect local patentees, or

\textsuperscript{26} Committee on Transfer of Technology, \textit{supra} note 19 at 16.
\textsuperscript{28} BIRPI was the predecessor to the World Intellectual Property Organization (WIPO).
\textsuperscript{29} UNCTAD, \textit{Restrictive business practices: An analysis of the World Intellectual Property Organization model laws for the developing countries from the point of view of the export interests of the developing countries}, UNCTAD, 1972, UN DOC. TD/B/398 at 5 [hereinafter \textit{Restrictive Business Practices}].
local licensees of patent rights originating abroad."³⁰ The obvious bias of this model law toward developed countries has been highlighted by later United Nations studies critical of it. A 1972 U.N. study noted that "the model on inventions is based on the patent system as generally accepted in very many developed countries of the world for the protection and exploitation of new inventions."³¹ Perhaps not surprisingly, many developing countries refused to adopt the legislation or did so with considerable exceptions as to products that were covered by patents.³²

Partly as a result of the ineffectiveness of the voluntary model law on inventions and partly in response to protectionist domestic trade pressures, in 1974 the United States embarked on a unilateral program of protection of American intellectual property rights abroad. The American ideal can be seen in the comments of American patent lawyer Charles A. Hunnicutt at a forum discussing the intellectual property implications of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations. Hunnicutt states:

A reality I think we tend to lose sight of in our current movement to protect intellectual property is that intellectual property costs money; it costs government resources and it costs private sector resources in terms of the costs of multiple searches and registrations as well as enforcement. These costs would be significantly reduced if registration for intellectual property were available through one application, in the applicant's language, for the issuance of one patent, or trademark, or one copyright world-wide.³³

Implicit in Hunnicutt's paradigm is that the one level of universal patent protection is closer to the American standard of protection than that of India.

Unlike the developing countries, which lack the economic and political clout to unilaterally effect significant changes in the patent system, the United States has been able to take national measures that have enforced certain minimum levels of compliance from other countries. This has been accomplished through successive strengthening of the United States Trade Act as a tool for enforcing American trade goals.

³⁰ Ibid. at 9.
³¹ Ibid. at 5.
³² The United Nations Report on the role of patent system in technology transfer provides a list of areas commonly excluded from patent protection including food and pharmaceutical products as well as the countries that exclude them from protection. See supra note 5, at 53.
Intellectual property first became a target of American trade legislation with the adoption of the 1974 Trade Act\textsuperscript{34} that authorized the executive branch to negotiate a reduction in barriers to trade in services while providing American exporters of services with recourse against unfair trade practices. Congressional dissatisfaction with presidential utilization of this weapon led to the passage of the 1984 Trade Act\textsuperscript{35} which required the President to take into account the protection a foreign nation affords to intellectual property rights when determining that country's eligibility for the Generalized System of Preferences and whether actions of the country should be considered unreasonable for purposes of section 301 of the 1974 Trade Act\textsuperscript{36}.

The unilateral approach has met with considerable success among countries that rely heavily on the United States for trade. South Korea, Taiwan, and Singapore all made substantive revisions to their patent systems in response to threatened use of the section 301 provisions of the 1974 Trade Act.\textsuperscript{37} Similar changes have recently been enacted in Mexico.\textsuperscript{38}

The United States has shown a willingness to impose intellectual property standards on developed as well as developing countries. The 1984 Semiconductor Chip Protection Act\textsuperscript{39} is an example of the former practice. It limits American patent protection in the area of semiconductor designs to the nationals of countries that provide similar protection to American nationals. Although this provision could be challenged as a violation of the Paris Convention guarantee of national treatment in Article 2(1), eighteen countries have applied for and received reciprocal protection from the United States.\textsuperscript{40} While it is not clear that semiconductor chip designs are a patent issue, the fact that the United States is willing to apply trade leverage against developed as well as developing countries in securing intellectual property protection is significant. It demonstrates the degree to which the United States is prepared to

\textsuperscript{34} Trade Act of 1974, Pub. L. No. 93-618.
\textsuperscript{36} The Generalized System of Preferences is a classification tool by which the American government determines the duties to be applied against the products of other countries. Section 301 of the 1974 Trade Act allows the executive to take action against "unfair" trade practices of other countries by applying duties against their products. A good overview of the evolution of American trade legislation can be found in Gadbaw, supra note 18 at 229.
\textsuperscript{37} Each of these countries passed comprehensive legislation governing patents, copyrights and trademarks. See Gadbaw, supra note 18 at 229.
\textsuperscript{40} See Gadbaw, supra note 18 at 236.
violate existing international norms in pursuing domestic economic goals. As will be shown later, the political capacity of the American government to act as a "rogue elephant" in pursuing its goals may have much more weight in determining whether or not an international patent system is established than any philosophical or economic factors.

American power to apply punitive sanctions against countries with "inadequate" patent systems was further strengthened in 1988 with the adoption of the Omnibus Trade and Competitiveness Act. The Act has two key components with respect to intellectual property rights. The first is that it has "inscribed the protection of intellectual property rights as one of the principle priorities of United States trade policy." The second is the strengthening of section 301 by giving the United States Trade Representative the power to:

a) suspend, withdraw, or prevent the application of, benefits of trade agreement concessions...
b) impose duties or other import restrictions on the goods and fees or restrictions on the services of, such foreign country...or
c) enter into binding agreements with such foreign country...
[to] eliminate the unfair act, policy or practice.

Thus, if the Trade Commissioner believes a country is failing to provide adequate intellectual property protection to American companies or exporters, she or he can take actions against such countries. The shift in power to the Trade Commissioner is significant in that the President loses full discretion over decisions relating to the imposition of trade sanctions.

Conclusion

The Paris Convention's perceived failings are effectively summarized by Ulrich Joos and Rainer Moufang in an address to the Max-Planck Society Conference on Foreign and International Patent, Copyright and Competition Law. They state that:

Demands – triggered by the UNCTAD study dealing with the role of the patent system in the transfer of technology – to adapt the Convention to the specific needs of developing countries were rejected, in particular by the U.S. standing in the forefront of the countries that defended the status

42 See Gadbad, supra note 18 at 223.
44 Hannicutt provides an excellent overview of the 1988 Act. See supra note 33 at 301.
This experience apparently led the U.S. to the conclusion that an improvement of the *Paris Convention* could not be achieved in the present context of the North-South conflict. On the other hand, the U.S. share the opinion that the existing intellectual property Conventions do not guarantee any longer a sufficient protection corresponding to the needs of inventors and authors and of the respective national economies. Lack of enforcement provisions and of dispute settlement procedures is criticized.

Thus, the *Paris Convention* is seen by a growing number of participants as either too restrictive or not restrictive enough. Furthermore, the rift is increasingly emerging outside the diplomatic realm through the American use of unilateral trade sanctions to secure patent compliance from other countries.

**The International Convention for the Protection of New Varieties of Plants**

The *International Convention for the Protection of New Varieties of Plants* attempts to provide plant breeders protection for the development of new plant varieties, filling a gap left in the scope of the *Paris Convention*. Applicants must apply to each of the member states separately for protection, and they gain a minimum of 15 years protection for their plant variety if successful. In addition to the *Paris Convention* principles of national treatment and right of priority, the *Plant Variety Convention* requires member states to protect a minimum number of plant varieties under their national law before they may join the convention.

Participation in the Convention has been limited to 19 developed nations, however its significance extends beyond its immediate subject material. As it is not administered by the World Intellectual Property Organization, it demonstrates a willingness of industrialized countries to act outside existing multilateral cooperative mechanisms to promote minimum levels and scope of patent protection. Agreements such as the *Plant Variety Convention* may form the basis for a new international developed country patent system under the auspices of the General Agreement on Tariffs and Trade.

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46 The Convention is set out in Leaffer, *supra* note 9 at 55-75 [hereinafter *Plant Variety Convention*].
47 Articles 1 and 2.
48 Leaffer, *supra* note 9 at 53.
49 Article 8.
50 Article 4.
51 Leaffer, *supra* note 9 at 54.
Patent Cooperation Treaty

The Patent Cooperation Treaty (PCT) is the most extensive agreement concluded under the auspices of the Paris Convention. The PCT greatly eases the administration of multiple-nation patent applications by allowing the patent seeker to make one application to the central organization (WIPO) which will conduct a full search of the international state of the art. The applicant can select the countries to which they wish to apply for protection and the results of the international search are then sent to each of the relevant member nations. The international bureau then publishes the patent applications.

In addition to the state of the art review, the international bureau will also do a preliminary examination to determine whether the invention appears to be new, non-obvious, and industrially applicable if the applicant so requests. The results of this review are not binding on member states.

While the organization provides a central registry and common applications process, it does not circumvent domestic patent processes. Applicants are still required to meet the relevant criteria for patent protection in each country applied to, and to pay the relevant registration fees of those countries. As of the beginning of 1990, 43 countries were party to the PCT with roughly half of the members being developing countries.

Strasbourg Agreement Concerning the International Patent Classification

The Strasbourg Agreement Concerning International Patent Classification was concluded in 1971 under the auspices of the Paris Convention. It is an information-sharing and categorization agreement which divides the technology that may be the subject of patents into 8 sections and 46,000 subdivisions. Each classification is given a symbol that can be used in universal searches to determine the prior art. While the agreement encourages the unification of patent legislation, it only requires that member states utilize the classification system as a primary or subsidiary means of classifying patent applications.

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52 The treaty was concluded in Washington in June of 1970 and entered into force in 1978.
53 Articles 15-17 of the Treaty govern search procedures.
54 Article 20 of the Treaty.
55 Article 21.
56 See Leaffer, supra note 9 at 77-78.
57 See generally Leaffer, supra note 9 at 531.
58 See Article 4(2).
Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure

This 1977 treaty came into force in 1980 and endeavoured to ensure common procedures for the disclosure of microorganism patents.\(^{59}\) It sets up a number of international depository authorities (IDA) which keep the deposited sample organisms in storage. Deposit in a single IDA is deemed to meet the requirements of deposit in all member states.\(^{60}\) As with the Plant Variety Convention, membership in the Treaty has been limited to developed countries.

Treaty Patent System

The most sweeping proposals for change within the Paris Union came with a WIPO conference in May 1984 that was initially designed only to deal with questions of grace period harmonization. Ultimately, this meeting led to an examination of broader areas of cooperation.\(^{61}\) Representatives of 48 nations have participated in this “Treaty Patent System” (TPS) round of negotiations and preliminary positions have been established in five key areas: a common grace period after public disclosure, application of the first-to-file principle, transferability of patent applications, patent rights, and patent remedies.\(^{62}\)

The common grace period is an effort to address the problem of public disclosure of an invention leading to its loss of novelty for the purposes of making a patent application. Only a limited range of countries currently allow inventors grace periods in the case of non-prejudicial disclosure of inventions.\(^{63}\) Grace periods have been supported on three grounds: that many inventors are unaware that disclosure will jeopardize patentability, that inventors often are unaware that an invention is patentable until someone to whom they show it draws this to their attention, and that inventors are often required to disclose

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\(^{59}\) The Treaty is set out in Leaffer, *supra* note 9 at 127-140.

\(^{60}\) Article 3(1)(a).


\(^{62}\) This material has been drawn from Curesky, *ibid.*, and W.T. Fryer, “Patent Law Harmonization Treaty Decision is Not Far Off -- What Course Should the U.S. Take?: A Review of the Current Situation and Alternatives Available,” (1990), 30 Idea 309. The commentary is on the 7th meeting of the group of experts on patent law harmonization which shaped the August, 1991 draft Treaty.

\(^{63}\) An example of a non-prejudicial disclosure would be if an invention was stolen and its details published. Currently, only the EEC, Japan, Canada, the United States, Belgium, Australia, Japan, USSR and Brazil apply grace periods. See Curesky, *supra* note 61 at 298.
their inventions in order to receive financial backing. The TPS would establish a one-year common grace period for the non-prejudicial disclosure of inventions.

The second, and perhaps most surprising recommendation, is the universal adoption of a first-to-file system. In March 1987, the United States delegation to the TPS indicated that the American government was willing to consider the adoption of a first-to-file system if it were part of a balanced treaty package.64 This system is philosophically grounded in the notion that the first true inventor should have sole claim to the invention. It allows the first true inventor (in fact) to file for and successfully claim patent rights years after another (but later) true inventor has filed for and received a patent. Consequently, it leaves patent holders uncertain about their rights as other inventors might come forward at a later date claiming they were the first true inventor. All other nations in the world rely on a first-to-file system that awards the patent to the first true inventor to file the application.

The next major item is the requirement that members accept applications following the guidelines set out in the treaty. The acceptance of a common patent application form, in combination with the provisions already in place under the Patent Cooperation Treaty, would allow inventors to submit one form to a central office. The information contained on that form would be sufficient to meet the patent information requirements of each country, eliminating the inventor’s need to tailor applications to each country.

The fourth area concerns the definition of the scope of patent rights. This includes, for example, the level of scientific research utilizing patented inventions that should be allowed prior to the expiry of the patent. While agreement has not been reached on all factors determining what is to be protected, a consensus appears to be developing on the doctrine of equivalents.65 The United States currently utilizes a doctrine of equivalents to prevent the copying of the essence of an invention. This contrasts with countries such as Japan which allow the copying of the essence of an invention as long as there are minor modifications.66 The adoption of the doctrine of equivalents would broaden the scope of existing patents, providing additional protection for inventors.

On the most critical of patent rights, the duration of protection, consensus also appears to have developed among the key industrialized countries.67 The

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64 Ibid. at 294. Since November 19, 1987 when Royal Assent was given to Bill C-22 in Canada which changed the Canadian approach to a first-to-file system, the United States and the Philippines have been the only two countries retaining a first-to-invent system.

65 Ibid. at 300.

66 Ibid. at 300.

67 Ibid. at 302.
United States, the Federal Republic of Germany, France, Japan, the Netherlands, and Switzerland all recommended the adoption of a twenty-year minimum patent protection period at the Fourth Session of the TPS negotiations. However, Brazil and Argentina, which lead the developing nations at the TPS negotiations, argued that the goal of the TPS should be harmonization and not uniformization. They contended that nations should be left to set their own periods of protection in order to tailor their systems to local development needs.

The final area of discussion in the draft Treaty is the scope of exclusions from patent protection. The United States, Switzerland, and Japan insisted that any balanced package would have to place limitations on the products and processes that could be excluded from patent protection. Of particular interest to the United States were guarantees that genetically engineered plant and animal life, along with the processes for producing them, would be protected against exclusion in national patent systems. The question of exclusions has been the most controversial area in the TPS discussions. Developing countries have argued vociferously for their right to exclude products where it is necessary to support local economic or development interests and propose that there be no restrictions on exclusions in the treaty.

The final area dealt with in the draft Treaty is the provision of remedies for the violation of patent protection. While there is general agreement that remedies should be provided, member states have been unable to agree on compensation and damage standards.

The draft Treaty provides evidence that many nations are willing to discuss patent harmonization, but agreement is likely to be limited to procedural issues such as the transferability of patent application forms between countries. William Duffey has observed that in the opinion of many in the legal community, "even if an international harmonization treaty were to emerge from the World Intellectual Property Organization (WIPO) within the next year or two, few countries would ratify the treaty."

**Regional Treaties**

The most comprehensive examples of regional cooperation are the African and Malagasy Industrial Property Office (OAMPI) and the Scandinavian Patent

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68 Ibid. at 304.
69 Ibid. at 305.
71 Member states are the Central African Republic, Chad, Congo, Benin, Gabon, the Ivory Coast, Madagascar, Mauritania, Niger, Senegal, Togo, the United Republic of Cameroon, and Burkina Faso.
Community (SPC). In both systems, identical patent laws are in place in each country with full transferability of patents among the member states. OAMPI was launched in 1962 with the adoption of the Libreville Accord and has been a financial, as well as a cooperative, success. Since 1964, fees generated from applications have covered the operating costs of the organization. The Scandinavian Patent Community was established in 1964 and maintains national patent offices for the application of a Nordic Patent Law.

Quickly approaching OAMPI and the SPC in comprehensiveness is the European Economic Community (EEC). The current basis of EEC patent cooperation is the European Patent Convention which was adopted in 1973 and came into force in 1977. The Convention establishes common rules for the issuance of patents among member states but leaves enforcement to the national levels of government. The Common Market Patent Convention, which is due to enter into force on January 1, 1993, would take this cooperation even further by establishing common enforcement mechanisms.

The GATT

Since 1947, members of the General Agreement on Tariffs and Trade (GATT) have worked to reduce barriers to trade among its members. The current negotiations of the GATT began in 1982 with a Ministerial Meeting in Geneva that concluded there should be an examination of barriers to trade in the service sector. The scope of the negotiations has gradually expanded, but four contentious areas remain: agriculture, textile safeguards, services, and the protection of intellectual property.

Under the current terms of the GATT, Article XX(d) places adoption of enforcement of necessary measures to secure "the protection of patents, trade marks and copyrights, and the prevention of deceptive practices" among the general exceptions of the GATT. Consequently, trade sanctions are not permitted in attempting to secure compliance with intellectual property standards. Thus, when Brazil challenged the decision of the United States to

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72 Participating members are Denmark, Finland, Norway and Sweden.
73 United Nations, The role of the patent system, supra note 5 at 16-17.
75 Leaffer, supra note 9 at 141-42.
76 Ibid. at 142.
remove trade concessions on the basis of Brazil's failure to meet U.S. intellectual property standards, Brazil was able to bring action against the American government under the GATT.  

Largely at the insistence of the United States, change was sought to Article XX(d) which led to the adoption of what Braga has termed "a masterpiece of diplomatic compromise." The negotiating basis for the Trade-Related Aspects of Intellectual Property Rights (TRIPs) states:

In order to reduce the distortions and impediments to international trade, and taking into account the need to promote effective and adequate protection of intellectual property rights and to ensure that measures and procedures to enforce intellectual property rights do not themselves become barriers to legitimate trade, the negotiations shall aim to clarify GATT provisions and elaborate as appropriate new rules and disciplines.

Although there would likely have been an American push to include patent protection in the GATT in any event, the perceived futility of the Paris Convention negotiations resulted in increased efforts to obtain reform through the GATT process. As Hans Peter Kunz-Hallstein notes:

It may be that this experience has led the United States to believe that in the present political context of North-South conflict, there is no possibility of agreement among the great number of member states of the Paris Union on proposals to further improve the system of the Paris Convention. This may also be one of the reasons why the United States has proposed to include intellectual property matters in the negotiations of the so-called "Uruguay Round" of the General Agreement on Tariffs and Trade (GATT).

The United States has not been alone in its attempts to secure patent protection under the GATT. In June 1988, a joint statement was issued by key segments of the European, Japanese, and American business communities. It called for priority to be given to intellectual property protection in the Uruguay

79 Gadbaw, supra note 18 at 231.
80 Braga, supra note 78 at 248.
81 Ministerial Declaration of Punta Del Este, of September 20, 1986, as quoted in Ibid. at 248.
82 Kunz-Hallstein, supra note 27 at 266-67.
83 The business communities are: in Europe, the Union of Industrial and Employers' Confederation of Europe; in Japan, the Keidanren; and in the United States, the Intellectual Property Committee. See R.E. Berenbeim, Safeguarding Intellectual Property (New York: The Conference Board, 1989) at 2.
Round with the approval of a three-part code. The first was the assurance of effective, equitable, and non-discriminatory enforcement of intellectual property rights. The second was the establishment of dispute settlement procedures to ensure domestic laws of GATT members include basic intellectual property protection and enforcement mechanisms. The third was the granting of preferential trade treatment for signatories to encourage adherence to intellectual property standards.  

Although the GATT approach represents a potential political abandonment of the *Paris Convention*, it would not represent a legal violation of the Convention as provision is made for the establishment of special agreements under article 19. Kunz-Hallstein states, “we may therefore conclude that member states of the Paris convention would not be hindered under this treaty in seeking improvements of the international system of industrial property protection within the framework of other international arrangements such as GATT.” Thus, as long as the terms of the *Paris Convention* were met, such as national treatment, there would be nothing stopping GATT members from refusing to grant preferential trade status to countries refusing to meet specified standards for the protection of intellectual property.

**Conclusion**

The *Paris Convention* was one of the first and most comprehensive multilateral attempts at regulating state behaviour in international law. It has also been one of the most successful in terms of meeting its goals. However, the *Paris Convention* and related agreements are increasingly seen as inadequate by both proponents and opponents of an international patent system.

Efforts by the developing world to alter the terms of the *Paris Convention* under the auspices of the United Nations Commission on Trade and Development provide evidence of the developing world’s dissatisfaction with existing arrangements. Efforts by the United States and other developed countries to cooperate outside the World Intellectual Property Organization structure through agreements such as the *Plant Variety Convention* and, more recently, through the GATT, demonstrate the danger of a collapse in the existing system. Were the GATT to permit trade discrimination on the basis of “inadequate” patent protection, developing nations that are increasingly orienting their economies to international markets would have little choice but to comply with demands that a rigorous protection of patent rights be accepted. Before accepting such a fate, it would be imperative that the philosophical and

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84 Ibid.
economic arguments, which ground current assumptions about the benefits of an international patent system, be analyzed.

PHILOSOPHICAL PERSPECTIVE

The first known patent statute containing what would now be regarded as having the basic elements of patent protection was enacted by the City State of Venice in 1472. The Venetian statute outlined four key goals for the grant of patents. They were general utility to society, encouragement of inventive activity, refund of costs incurred by the inventor, and the inventor's rights to the fruits of his or her mind. The Venetian goals have elements of both major philosophical approaches to the granting of patents. These approaches may be classified as the rights approach and the utilitarian approach to patent protection.

Rights Approach to Patent Protection

The rights approach to patent protection is rooted in the last of the Venetian goals, that the inventor has the right to the fruits of her or his mind. The purest form of this approach can be found in the preamble of the 1791 French patent law: "Every novel idea whose realization or development can become useful to society belongs primarily to him who conceived it, and it would be a violation of the rights of man in their very essence if an industrial invention were not regarded as the property of its creator."

The rights approach is grounded in a perceived imperative that the individual owns that which they improve or create. Perhaps the best known proponent of this approach is John Locke. Section V of Locke's *Second Treatise of Government* entitled "Of Property," outlines the basis of ownership rights: "As much land as a man tills, plants, improves, cultivates, and can use the product of, so much is his property. He by his labour does, as it were, inclose it from the common." Although Locke did not consider the specific issue of patents, the argument for patents can be made by analogy to his theory. If inventions are seen as a mixing of physical resources with intellectual capabilities (Locke's cultivation of land) and inventions are limited to areas not

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86 United Nations, *The role of the patent system*, supra note 5 at 32. Though this was the first actual patent legislation, Ladas describes a system of trade marks in Ancient Greece and Rome that could be seen as the rudimentary beginnings of an industrial property system. (S.P. Ladas, *The International Protection of Industrial Property* (Cambridge: Harvard University Press, 1930) at 6-7.
87 United Nations, *ibid.* at 44.
88 *ibid.*
90 *ibid.* at 21.
already deemed "state of the art" (the unenclosed land) then an individual is entitled to protection for novel inventions.

While Locke's rights can be used to outline the effects of a right to patent protection, the goal of this paper is to analyze the benefits of an international patent system. Consequently, the various underlying justifications for the rights approach must be examined in order to assess their validity. While there are a number of ways to present the differing justifications for rights based systems, a helpful division can be found through the use of a spectrum from natural law to positivist conceptions of rights. Pure natural law justifications (such as Locke's) ground their rights conceptions in reason while pure positivist rights schemes base their rights on political legitimacy. Between these extremes are the reciprocal rights schemes which utilize a combination of rationality and political justifications. The underlying justifications of each of these four broad categories will be examined to determine their legitimacy.

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Pure Natural Law Rights

Natural law conceptions of rights justify the existence of rights through rationality. Margaret MacDonald notes that "[p]ropositions about natural law and natural rights are not generalizations from experience nor deductions from observed facts subsequently confirmed by experience. Yet they are not totally disconnected from natural fact. For they are known as entailed by the intrinsic or essential nature of man. Thus they are known by reason."91

There are two major strands of natural law justifications for patents. The first, which I term the moral imperative strand, rationally deduces that individuals have a moral right to the product of their labours. As this right is not grounded in economic qualifications, it would result in a patent system with rights of unlimited duration (or at least for the lifetime of the inventor). This moral right is seen as a trump to considerations such as the economic welfare of others. Given the potentially dire and continuing consequences, both in terms of crowding out future inventions and in monopolistic price gouging, this strand of natural law has not been adopted in any country with respect to patents. No patent system grants an unlimited duration of protection.

The second strand of natural law patent justification, which I term the economic imperative strand, argues that the awarding of patent protection to individuals is rationally the most efficient means of securing economic development. The classic proponent of this theory is John Locke whose rationality is grounded in Christian conceptions of God granting the world to Adam (the embodiment of humanity in common) "to make use of it to the best advantage of life, and convenience."\(^92\) Locke argues that the grant of land was for industrial and rational use and that this use can best be secured through his system of private property rights.\(^93\) Thus, patent rights would be seen as a rational right to the fruits of one's hands based on the fulfillment of God's desire that the productivity of land be maximized through the encouragement of industrious behaviour from individuals.

It is interesting to note that Locke places an important qualification on his property rights doctrine. He argues that "nor was this appropriation of any parcel of land, by improving it, any prejudice to any other man, since there was still enough, and as good left; and more than the yet unprovided could use."\(^94\) Given the educational and technological advantages of industrialized states over developing countries, it is difficult to argue that there is "enough, and as good left," for them to invent. Thus the equity which Locke would claim in the system would be lost.

While Locke's conception of rights is only one natural law approach, it serves to highlight the two difficulties inherent in any justification relying on natural law. The first is that the assumptions underlying the right are not necessarily shared by individuals from differing socio-political backgrounds. The second is that "rational" individuals can arrive at different results using the same assumptions.

While many Christians may accept the assumption that the Earth was given to men and women to use as they see fit, other cultures place a premium on harmony with nature, not domination over it.\(^95\) If maximizing productivity is not the aim of society, the rational deduction that a patent system is necessary to secure this production would be challenged.\(^96\)

\(^92\) Locke, supra note 89 at 18.
\(^93\) Ibid. at 18-30.
\(^94\) Ibid. at 21.
\(^95\) While traditionally tribal-based societies, including many of Canada's First Nations, may be a visible example of this, the growing acceptance of sustainable development as outlined by the Bruntland Commission provides evidence that Western industrialized societies may be tempering their view of environmental domination.
\(^96\) For example, it may be more efficient to hunt with a gun than a boomerang, but the invention of such a device in a tribal grouping need not be viewed as an "advance". Ritualistic aspects of the traditional hunt may be critical to the social well-being of the
Even if it is assumed that there is general acceptance of the maximization of production principle, "rationality" need not dictate that patent rights be granted. The rationality MacDonald highlights as common to all natural law conceptions of rights is not a neutral mathematical standard that all would agree is correct. For example, Marxist theory views differential rewards based on a measure of talents as an inefficient way of maximizing wealth. Consequently, natural law conceptions of rights based on Marxism would rationally deduce that wealth would be distributed according to needs and not talents. This was largely the case in the People's Republic of China prior to the adoption of the new Patent Law in 1984. As patents systems are rooted in financially rewarding the individuals who make the invention, they would be unacceptable given the assumptions of natural law utilizing Marxist principles.

It may be argued that given the collapse of the Eastern Bloc and moves in remaining Marxist countries such as China to accept incentive rewards, the rational argument for rights is becoming unified through an acceptance of the right to the product of one's labour as the most efficient means to production. The key to this argument is that rights-based private property systems (with patents as a component of them) are more economically efficient than other models. If it were shown that patents were not the most efficient system or that the effects of such a system were economically ambiguous, this "rational" argument would fall. Thus, current natural law justifications for patents (derived from the second strand of natural law thinking) are rooted in reasoning about economic efficiency. The statistical validity of this reasoning will be examined in the economics section of the paper.

tribal group. Thus, inventions may be viewed as a backward step in social development. See generally K. Marx and F. Engels, The Communist Manifesto (London: Penguin, 1967) at 96-100 arguing for an egalitarian distribution of property and K. Marx, "Critique of the Gotha Programme" in Marx and Engels: Basic Writings (London: Fontana, 1984), particularly at 153-161 from which the quotation "From each according to his ability, to each according to his needs!" was drawn.

98 Beaumont, supra note 3 at 45.

99 As with any interpretation of Marx, care must be taken in drawing conclusions. In the Communist Manifesto, Marx states that "Do you mean [to abolish] the property of the petty artisan and of the small peasant, a form of property that preceded the bourgeois farm? There is no need to abolish that." (see supra footnote 97 at 96) Thus, Marxist theory could allow a restricted use of rewards for inventions by "small" inventors. Still, Marx's overriding concern is that individuals receive societal output according to needs, thus any use of these patent-style rewards would be severely restricted.

Full Reciprocal Rights

The next rights-based justification of patents can be found in full reciprocal rights systems such as that of Gewirth.\(^{101}\) Again, there are two elements of right-obtaining process: the assumption and the processing of the assumption. Gewirth assumes that rights are to be granted where individuals would not want others to be able to interfere with their scope of action in a particular area. In general terms, the assumption is processed by individual A demanding a right. Individuals B, C, and D would have to ask: "Would I want others to be able to control my actions in that area?" If the answer is no, a right is found.

In terms of patents, an individual might ask for the right to the products of her or his labour, in this case, patent protection. If the others decided that they would not want any individual to prevent them from getting the fruits of their labour (protection for their inventions), then a right to patent protection would be found.

The key criticism of this approach is that patent rights are not likely to be granted in situations where society is not made up of individuals with equal economic potential. If an individual knew that they did not have inventive capabilities, they would be likely to reject the inventor's claims, arguing that everyone should have immediate access to inventions.

Gewirth's argument can be transferred on a national level to current disagreements between developing and developed countries over patent systems. Developing countries lack the educational and technological infrastructure necessary to compete with developed countries in many areas of invention. Consequently they would be likely to argue that others should be able gain the fruits of their citizens' inventive labour in the full knowledge that this loss would be more than compensated for by the gain in free access to the fruits of the inventors of the developed world.

Tempered Reciprocal Rights

John Rawls utilizes a veil of ignorance to attempt to avoid the problem that knowing one's own economic status poses for Gewirth's system.\(^{102}\) Rawls argues that the test for economic distribution should be done behind a veil of ignorance where individuals are unaware of their earning potential (or inventive potential in the case of patents). He predicts that behind this veil, individuals would rationally calculate that they might be the least well-off individual after

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the veil was lifted and would choose to maximize the minimum level of wealth for each individual. This would result in an initially egalitarian distribution of wealth. Rawls argues that this egalitarian distribution would only be departed from where it could be shown that the transfer of additional income to one individual would leave the least well-off individual in a better position — hence my term tempered reciprocal rights.

In terms of the patent system, Rawls’ approach would deny reward based on invention unless it could be shown that in giving such an advantage to an individual, the least well-off individuals in society would benefit. Thus, patents could only be supported if the economic gains from such a system would leave the poorest individuals in society better off. Again, we are left with a theory of patents that relies on economic assumptions which will be dealt with in the economic section.

**Pure Positivist Rights**

Pure positivist arguments for rights are easier to deal with as they rely solely on legislative sanction for their justification. Rights to patents can be justified wherever individuals vote for the establishment of a patent system.

The difficulty with this approach is that there is not universal agreement among even elected developed country governments of the value of a patent system. In June 1976, the Canadian Minister of Commerce and Corporate Affairs, recommended the abolition of the patent system in 10 years if doubts remained about its utility.103 Among developing countries, elected governments such as the Indian government have consistently rejected calls for the establishment of a comprehensive international patent system.104

Even if there were universal governmental agreement on the benefits of patents, the result could be challenged on the grounds that governments are not truly representative of all interests in their own society or even the interests of the majority. As will be demonstrated in the Political Perspectives section, game theory can be used to predict the predomination of groups with small but concentrated economic gains over groups with wider but more dispersed economic losses.105 Positivist theory rests on the assumption that societally

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103 Committee on Transfer of Technology, *supra* note 19 at 3.
104 India is not a member of the Paris Convention and grants only limited protection to foreign and domestic inventors. While a patent system is in place, it contains significant limitations from the inventors’ perspective including the automatic licensing of food, medicines or chemical processes three years after the grant of a patent.
105 In brief, economic gains from the patent system are arguably concentrated in corporate entities that rely on the system to maintain current profit levels. Given the central importance of the system to these corporate entities, it is rational for them to lobby
sanctioned agreements are "correct" agreements. Game theory predicts that a patent system may be established in the face of the majority of society passively opposing such a system with a concentrated minority actively lobbying in favour of patent protection. Thus, deficiencies in the democratic process call into question the validity of the positivist assumption that the agreed-to system is truly the system most individuals favour or benefit from. Once again, the only neutral standard against which to measure the patent system would appear to be its economic impact.

**Utilitarian Approach to Patent Protection**

Utilitarian justifications for patents share a common focus on the perceived economic benefits of the system. In broad terms, one commentator argues that the purpose of patent laws, "like that of most civilized laws, is an ever-more heightened, enjoyable and secure social existence."\(^{106}\) This social existence is secured on the assumption that inventions benefit society and that exclusivity is the most efficient incentive to promote inventions.\(^{107}\)

While utilitarian justifications were present even in the City State of Venice Patent Law,\(^{108}\) it is only since the nineteenth century that they became the paramount justification for patent systems. Evidence of the shift can be found in the Austrian patent law adopted in 1810 which stated "that inventors had neither any property rights in their invention, nor any rights to patents."\(^{109}\) Patents were justified only in terms of their contribution to economic development. The rudimentary international patent system agreed to at the Vienna Conference of government in an effort to maintain or strengthen the system. Even if the patent system produced even greater economic losses in society generally, the losses would be spread widely over consumers. Each individual consumer would be tempted to operate under the "free rider principle," knowing that their contribution to any campaign to abolish patents would likely have an insignificant effect. In other words, the "rational" consumer will defect by refusing to contribute to a lobbying effort. The best case outcome for the individual would be to have others contribute with the patent system being eliminated. The worst outcome would be for them to contribute with others cheating, resulting in an economic loss for them and no economic gain as there was insufficient lobbying to defeat the patent system. Thus, it is in each individual's rational interest to "cheat," leaving no consumer lobby and the corporate lobby dominant in determining whether there will be patent protection.


\(^{107}\) Oddi argues in "The International Patent System and Third World Development: Reality or Myth?" [1987] Duke L.J. 831 at 837 that this argument has been largely intuitive for much of the 500 years that modern patents have been in existence.

\(^{108}\) The first two of the Venetian goals (utility to society and the encouragement of inventive activity) were clearly utilitarian. See United Nations, *The role of the patent system, supra* note 5 at 44.

1873 marked a key turning point as the justifications for patents focused exclusively on economic arguments.\textsuperscript{110} Patents were supported at the conference as a reward to inventors to give them an inducement to encourage inventive activity and to disclose secrets.

While most countries with patent systems now focus their justifications on utilitarian arguments, the United States has, at least until recently,\textsuperscript{111} retained a focus on rights-based justifications.\textsuperscript{112} Evidence of this can be found in the retention of the first-to-invent system which has as its aim the reward of the true inventor, as opposed to the individual who first files for protection. Robert Rines, President of the Franklin Pierce Law Centre, provides clear, if somewhat bombastic, evidence that the individual rights approach in the United States is alive and well. Arguing that the absolute novelty (or first-to-file) doctrine used in most patent systems works against the American first-to-invent system, Rines states:

\begin{quote}
It is not because the "absolute novelty" doctrine is at variance with our American system that the author urges the world to, at least, modify this doctrine. It is rather because this author believes the American understanding of the needs of the inventive process is an intellectually superior understanding... As in all areas where freedom and the rights of individuals are to remain superior to the mere convenience of our administrators, it is admittedly more difficult to administer the American way or parts thereof. But that is the price of everything worthwhile in attaining individual rights.\textsuperscript{113}
\end{quote}

Utilitarian justifications for patents are all rooted in notions of economic

\textsuperscript{110} \textit{Ibid.} at 44-45.
\textsuperscript{111} In March, 1987 the American delegation to the Third Session of the Committee of Experts (set up to review patent cooperation under the World Intellectual Property Organization) agreed to consider the adoption of a first-to-file registration system. This would replace the first-to-invent system currently in force in the United States that is philosophically grounded in the notion that the true inventor has a right to the fruits of their invention. Caution should be used in interpreting this concession as a wholesale change in philosophy as the American decision was partially rooted in an effort to obtain reciprocal concessions from other nations. By making this concession, the U.S. delegation hoped to convince other nations to widen the scope of patent protection to include the patenting of living microorganisms.
\textsuperscript{112} The American support for the right of the inventor to protection has been relatively recent. Benjamin Franklin argued that "as we enjoy great Advantages from the Inventions of others, we should be glad of an Opportunity to serve others by any Invention of ours, and this we should do freely and generously." Quoted in R.E. Berenbeim, \textit{supra}, note 83 at 1.
efficiency. While utilitarian theories may differ on whether the final goal is the greatest good for the greatest number or the maximization of total economic wealth, they all demand that the system adopted produce the most economically efficient result in attaining the goal. Thus, support for any utilitarian theory of patent protection would have to be grounded in findings that the patent system was more efficient at producing its economic outcome than all alternative systems— from no patents to government sponsored invention. Once again, we are led to an economic analysis of patents as critical in justifying their existence.

Conclusion

Support for patent protection can be grounded in a range of theories on both the rights and utilitarian spectrums. With the exception, however, of the moral imperative natural law strand, all of these theories are grounded in an assumption or reasoning that views patents as an economically efficient system. Consequently, it is critical that the economic impact of patents be analyzed.

ECONOMIC PERSPECTIVE

If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible on the basis of our present knowledge, to recommend abolishing it.\textsuperscript{114}

Fritz Machlup, 1958

Although economic arguments have been critical in justifying the existence of patent protection since the Venetian Patent Laws,\textsuperscript{115} few resources have been devoted to testing the validity of these claims. Economic arguments for and against patents almost always consist of generalized allegations about categories of costs and benefits and rarely endeavour to quantify these variables. Indeed, the author has been unable to find any economic model that attempts to explain patent protection in terms other than lists of costs and benefits.\textsuperscript{116} Consequently,\textsuperscript{114}

\textsuperscript{114} Quoted in Oddi, \textit{supra} note 107 at 841-42.
\textsuperscript{115} Recall that two of the four goals outlined in the Patent Statute of the City State of Venice in 1474 were general utility to society and the encouragement of inventive activity. See United Nations, \textit{The role of the patent system}, supra note 5 at 44.
\textsuperscript{116} In all the literature reviewed by the author including a number of economic texts, not one model for international patent protection was found. Carlos Braga (\textit{supra} note 78) has developed an equation for the net welfare effects of a patent system in a small, developing country in which little invention takes place. However, the equation does not go far beyond a list of potential costs and benefits and a conclusion that if the costs exceed the benefits, a patent system should not be adopted. Braga notes that there is virtually no economic data to quantify each of his variables.
current economic analysis is limited to setting out potential costs and benefits of patent protection and attempting to use comparative economic development data, either between countries or at differing stages of a country's development, to evaluate the magnitude of these costs and benefits.

The goal of the economic component of this paper is to determine whether it is possible to move beyond Malchup's recommendation and calculate the net economic cost or benefit of the establishment of an international patent system. In order to accomplish that goal, the analysis will be built in three stages. First, protection for an individual product in a closed economy will be assessed. Second, protection for a range of products will be assessed in the context of an open economy with all countries maintaining patent protection. Finally, the cumulative costs and benefits from differing country types will be assessed in determining the effect of global patent protection on total economic welfare.

In each case, an effort will be made to separate direct costs and benefits in the adoption of a patent system from indirect effects - for example, the utilization of monopoly power to force purchasers to sign contracts agreeing to buy at the monopoly price beyond the life of the patent. Each of the indirect costs will be evaluated to determine the degree to which they can and have been mitigated through legislative sanction of such practices.

**Single Product Patent**

The first step in attempting to calculate the costs and benefits of an international patent system is to isolate the results of the imposition of a patent for a single product category (the sword) in a closed economy (Narnia). It is assumed that the only source of inventive activity and production is from within the country. It is further assumed that current inventiveness (sword development) is below the socially optimal level.\(^\text{117}\)

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Despite a number of efforts made by the author to develop such a model, all were quickly rejected by other economics students with whom the model was discussed. The inherent difficulty is that patent protection produces a host of potential influences on economic development, some positive and some negative. Given that virtually none of these influences have been quantified, it is difficult to begin to imagine what a graph might look like plotting years of patent protection against economic development. Developing such a model based on the current dearth of economic data is analogous to a person trying to draw a road map to an unmarked city on the map. Even if we know the city is on this continent and are constrained to existing roads (analogous to our generalized knowledge of potential economic costs and benefits) the chances of drawing a correct routing are small based on our current level of information.

\(^{117}\) The socially optimal level is a subject of considerably controversy. As was noted in footnotes 97 and 98, it may differ greatly depending on the economic assumptions of various cultures. Even under a liberalized market, agreement does not exist as to what
Sabatier sets out the general benefits of providing patent protection as follows:

En matière d’invention, la société est au plus haut point intéressée. Elle protège l’inventeur afin de stimuler le progrès technique et de satisfaire ainsi aux besoins de ses membres. Elle s’efforce d’activer le développement de l’économie dans le sens d’une production plus abondante à meilleur prix de revient, pour fabriquer davantage de biens répondant mieux à ses besoins.119

Sabatier’s perceived increase in economic development is achieved through an increase in inventive activity that produces longer term economic development in the form of more efficient products. The increased inventive activity is achieved through two mechanisms: increased investment in inventive activity and increased knowledge.

The increased investment in inventive activity [Variable A] is a response to a guarantee of economic reward for successful inventions during the period of patent protection. This causes both human and capital resources to shift to the relatively higher rewards being offered by the inventive sector. The increased level of invention is presumed to be needed because the market fails to produce the socially optimal level of inventions. Without protection for inventions, it is argued that insufficient resources will be invested in inventions. Williamson argues that "[t]he problem is that no one would have an incentive to invest in making inventions which could immediately be copied by everyone since the imitator would compete the price of the original down to a point that would deprive the inventor of any profits to compensate him for his costs of making the invention."120 Thus, it is contended that insufficient resources will be devoted to Narnian sword research by the private sector because the government refuses to guarantee patent protection.

In assessing the benefits of a patent system to investment in inventions, it

the optimal rate of invention is. Economists such as Edith Penrose argue that a patent system may encourage too much invention in the sense that resources are drawn away from more productive sectors of the economy. Thus, it is possible that the socially optimal level of invention will be produced without resort to government incentives such as the establishment of a patent system. See E. Penrose, The Economics of the International Patent System (Baltimore: The John Hopkins Press, 1951), at 35-36.

118 For a summary of all variables and equations utilized, see Appendix I.
must be noted that not all inventiveness is the result of economic reward. Technological innovation did not begin with the development of the Venetian Patent Law in 1472.\textsuperscript{121} Clearly invention would not cease if sword innovations were not granted patent protection in Narnia. In the modern setting, invention may be more reward-responsive than in Narnia, but given the importance of the corporation in determining where resources are focussed, it must be recognized that a significant factor in invention is the gratification obtained in the development of a useful product.\textsuperscript{122} Thus, a certain level of invention would be attained without the need to introduce a patent system [Variable B].

The second benefit, increased knowledge [Variable C], is a function of the publication of detailed information about the invention, which might otherwise remain secret, in order to secure the patent. This information can be used to generate further inventive activity. Thus, by releasing the details of the new sword alloy, other Narnian inventors could more efficiently engage in further sword research.

This benefit is also mitigated by the fact that, even under a patent system, the best option for the inventor would be to keep the technology secret and maintain a monopoly of unlimited duration [Variable D]. Thus, if an inventor were able to keep an invention secret while selling it, they would not apply for a patent. Edith Penrose notes:

\begin{quote}
There is no way of determining whether or to what extent patents prevent the loss of new inventions and ideas to society because the inventors would otherwise carry their secrets to the grave. It is difficult to see why an inventor would go to the trouble of taking out a patent if the danger of imitation or of independent discovery of the same invention were slight.\textsuperscript{123}
\end{quote}

As a result, the economic activity from knowledge that would have been available in the absence of the patent system must be subtracted from the

\textsuperscript{121} The levels of innovation and technological advancement during the Chow dynasty in China or the rule of Sesostris III in Egypt were as successful as any modern period at producing technological innovation. Yet, there is no evidence of monopoly grants in any of these societies. Indeed, even in modern times, the explosion in scientific knowledge and technological innovation in Renaissance Italy was not the result government guarantees of monopoly profits but of a higher pursuit of knowledge. Thus, it is possible that technological advancement is not primarily a function of economic reward but of the establishment of a culture conducive to the quest for knowledge.

\textsuperscript{122} This can be extended to the corporation in certain instances as evidenced by the decision of Bavarian Motor Works not to enforce their patents for structural safety designs in the interests of allowing all car-makers to produce safer cars. [Information drawn from B.M.W. commercials on television and in the print media during 1992.]

\textsuperscript{123} E. Penrose \textit{supra}, note 117 at 34.
economic activity generated from knowledge under a patent system, in order to produce the net benefit.

**Economic Costs**

The economic costs of patent protection can be broken down into two categories: procedural costs and monopoly costs. Procedural costs [Variable E] stem from the need to set up a system for judging whether the sword variations were significant enough to merit patent protection and from the legal costs of making, defending, and hearing claims of patent violations in a court system.

Direct monopoly costs take three forms. The first is the underutilization of inventions [Variable F] that would have been available without the monopoly premium if there were no patent system. Assuming that the Narnian administrators could not separate out inventions that are the consequence of the patent system, sword inventors that otherwise would have made advances and been unable to charge monopoly prices for their swords are now able to do so. The second monopoly cost is the devotion of research expenditures to “inventing around” existing patents [Variable G]. Rather than building on existing knowledge, inventive efforts may be channelled toward duplicating existing inventions with different technology. The third potential monopoly cost is the overallocation of resources in applied research as compared with basic research [Variable H]. Given that it is only the useful applications of technology that are patented, this will shift resources away from the basic research sector. It is possible, however, that the total level of basic research will actually be higher under the patent system than without it, given the general reward incentives offered by a patent system.

While there are a number of other indirect costs associated with the patenting of a product, these are not the direct result of a monopoly system and may be mitigated by legislative action. The first of these indirect costs is the setting of the monopoly price well above even the monopolist profit maximizing level. The most extreme example of this practice is non-use [Variable I]. Leading sword makers may hold patents to a number of sword variations that they do not release as they would compete with an existing line of swords.

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124 I have relied heavily on the analysis of Samuel Oddi in developing a list of potential costs. See *supra* note 107 at 840-41. Again, for a summary of the variables and equations utilized, see Appendix.

125 This may not hurt a country like Japan that historically imported basic research from centres such as Germany and the United States. However, in our Narnia model, no such research may be imported. Consequently there will be an overall monopoly cost in the form of an underallocation in basic research that would otherwise have generated economic activity.
Thus, society would be denied direct economic benefits from these patents. Non-use and price gouging, however, may be regulated through the establishment of compulsory licensing schemes or the revocation of patents that are not worked within a certain period of time.  

The second indirect cost is contractual agreements to extend monopoly power beyond the immediate scope of patent protection [Variable J]. Using their monopoly power, patent holders have attempted to extend protection periods beyond the scope of the patent, to limit use of patented items to a particular sector, to force the granting back of technological innovations gained in using the patented item, and to agree not to contest the validity of the patent.  

The Narnian government, however, would be free to enact legislation preventing the use of such practices as a number of nations have done.

In deciding what level of patent protection to accord swords, Narnia should set the number of years of patent protection at the level where the total benefits $[TB = (A-B) + (C-D)]$ exceeds the total costs $[TC = (E+F+G+H) + (I+J)]$ by the greatest amount. If benefits never exceed costs, patent protection should not be granted. Given the relatively different time periods needed to recover investments for different products, it would be probable that the optimum number of years of protection would differ from product to product.

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126 Compulsory licensing is a provision that forces patent holders to negotiate reasonable licence fees for users of their patented technology. Revocation is the overturning of a patent, here on the grounds of non-use of the patent. The Paris Convention allows the use of compulsory licensing and revocation though it insists that at least four years pass from the filing date for the patent to the issuance of a compulsory licence. Section 83 of the Indian Patents Act (1970) is an example of a national provision for revocation or compulsory licensing. It provides that "patents are granted to encourage inventions and to secure that the inventions are worked in India on a commercial scale and to the fullest extent that is reasonably practicable without undue delay." Fifty-five nations maintained provisions for compulsory licences in the case of a failure to work the patent in a United Nations survey conducted in 1975 (see supra note 5 at 12.) Other measures for dealing with non-use include licences of right, which may be imposed provided non-use is shown, and automatic lapsing provisions, which provide that a patent will automatically lapse after a specified period of time unless evidence of patent use is provided.

127 For example, the makers of Nutrasweet attempted to force purchasers of their product to agree to continue buying the product at monopoly prices after the expiry of the patent in return for immediate use of the product. Examples of other abuses of patent monopolies are chronicled in the United Nations Report on The role of the patent system, supra note 5.

128 The United States has legal sanctions against all the practices described. For a more complete list of legislative responses to the abuse of patent monopolies, see ibid. at 21-23.

129 Estimates for the time needed to recover research costs for a new pharmaceutical product range up to fifteen years. See generally T.G. Field Jr., "Pharmaceuticals and Intellectual Property: Meeting Needs Throughout the World," (1990) 31 Idea 3. Thus, a
Even if Narnia concludes it is operating at below the optimal level of innovation for a given product, it should be noted that patent protection is not the only option available to the government to increase the level of innovation. Dasgupta and Stoneman\textsuperscript{130} suggest two other ways in which the socially optimal level of innovation could be met. The first would be the direct government production of knowledge with the knowledge being distributed free to all. The second would be the use of subsidies to encourage the private production of knowledge. In practice, most industrialized countries use both of these methods as a supplement to the patent system. Another possibility is described by Ulf Anderfelt in his classic work \textit{International Patent Legislation and Developing Countries}.\textsuperscript{131} Anderfelt makes reference to Alexander Hamilton's proposal of federal rewards paid to inventors for useful discoveries with the inventions then being available to all.\textsuperscript{132} This system continues to be utilized in China for Chinese nationals.\textsuperscript{133} Thus, in theory, it would be possible to generate any desired level of invention through the use of non-patent mechanisms.

\textbf{Single Country Patent System}

When moving to the analysis of a patent system imposed over a range of products in an open economy, two key variables change. The first is that the total cost/total benefit equation is no longer maximized for each individual product [Variable K]. While some countries maintain broad categories with different levels of patent protection,\textsuperscript{134} current economic knowledge would not allow an accurate assessment to be made of the costs and benefits of each specific item in determining its appropriate patent protection period. Thus, some products would be overprotected by a common patent protection period and others would be underprotected. This would create economic losses in the form of misallocation of inventive resources.

The second variable is the possible import and export of patented goods, investment, and knowledge in the open economy [Variable L]. Given the

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socially optimal level of patent protection in a closed economy such as Narnia for a given level of pharmaceutical innovation may be considerably higher than the socially optimal level for sword protection due to the relatively longer development period for pharmaceuticals.

\textsuperscript{130} P. Dasgupta and P. Stoneman quoted in Braga, \textit{supra}, note 78 at 254.


\textsuperscript{132} \textit{Ibid.} at 62-63.

\textsuperscript{133} See Kay \textit{supra} note 3, at 337-38.

\textsuperscript{134} For example, India maintains a different period of patent protection for food and medicines than for other products. Egypt maintains different patent protection period for chemical processes than other products.
differing resource endowments of each country including “inventive” intellectual resources, it is important to analyze the impact of a patent system on different types of countries. The patent product exporting, neutral, and importing countries will be examined in turn. Patent exporting countries are those that are strong exporters of inventive technology. Patent neutral countries are those that export and import inventive goods but have an equal balance of trade on these goods. Patent importing countries are those that import inventive goods into their economy.

**Patent Product Exporter**

An intellectual property exporting country such as the United States would obtain additional gains in four forms. The first would be revenues from the export of their intellectual property products to other countries which now have protection. The second would be increased activity in the inventive sector creating technological advances as a response to the guaranteed access to markets larger than the home market. This would represent an addition to variable A in the closed economy as it becomes more lucrative to invest in the invention sector given the larger market [Variable $A_w$]. The third benefit would be gains in knowledge from patent information around the world. This represents an increase in the magnitude of variable C in the closed economy [Variable $C_w$]. The final gain comes as a result of the fact that even patent exporters import some goods, consequently they would have access to inventive technology otherwise unavailable in the closed economy and would generate additional economic activity.

Against these gains are a potential outflow of investment in the open economy. Large patent exporting countries like the United States and Germany are usually exporters of capital for inventive operations in the form of branch plants conducting research and development in other countries [Variable M]. This net outflow of investment need not represent a cost to the patent exporting country. Presumably the primary reason for investment is the higher rate of return obtainable in other countries. Thus, assuming profits can be repatriated, the exporting country need not be left worse off.

**Patent Product Neutral**

The patent neutral country would have an equilibrium between patent exports and imports that leave the trade gains from patents neutral. The country would experience, however, the three other gains available to the patent exporting country, gains in the form of increased internal investment, knowledge, and direct technology access.
Another potential gain to the patent product neutral country would be external investment in the patent sector that would not be available in a closed economy. This external investment would generate additional economic activity in the patent neutral country. In theory, it would be possible that external investment would be attracted even in the absence of patent protection, given that ability to export to countries with patent protection. In practice, multinational corporations, which are the critical players in these investment decisions, are reluctant to invest in countries without "adequate" levels of patent protection.\textsuperscript{135}

It should be noted that the impact of this additional investment is not entirely positive. Assuming that profits could be repatriated by the country which invested the capital, the patent neutral country would see an outflow of funds in the form of dividend profit payments from research conducted in the patent neutral country [Variable N].

**Patent Product Importer**

The patent importer has an outflow of funds exactly equal to the inflow to patent product exporters in the form of resources devoted to purchasing the inventive technology. The patent importer, however, receives gains in three forms: increased inventive activity, increased knowledge, and direct access to technology which produces economic gains [Variable O].\textsuperscript{136} The first two of these gains are likely to be extremely small in the importing country since as a large importer of patents, it is at a comparative disadvantage in the development of inventive goods.\textsuperscript{137}

As with the patent neutral country, there are potential gains from external investment in the inventive sector of the patent importing country. Again, this

\textsuperscript{135} For example, investment in research and development in the Canadian pharmaceutical industry has increased since the introduction of stronger patent legislation [PMAC Fact Sheet No. 3, 1991]. Whether this increased investment will be sustained when the agreement between the multinational pharmaceutical companies and the federal government runs out remains to be seen.

\textsuperscript{136} Michael Gadbaw and Timothy Richards engage in a brief discussion of how these variables might be measured in their study of intellectual property rights in Argentina, Brazil, India, Mexico, Korea, Singapore and Taiwan. However, they do not attempt to estimate the value of these variables. See *Intellectual Property Rights: Global Consensus, Global Conflict?* (Boulder: Westview, 1988) at 97-102.

\textsuperscript{137} A comparative disadvantage exists for country A when other countries have a relatively higher endowment in inventive resources than country A. Thus, while there may be an increase in knowledge and a potential for increased invention given access to the global market, a country like Burkina Faso would be unable to take advantage of these factors given their relative poverty in inventive resources in terms of the development of products that would be internationally competitive.
gain is likely to be small if the importing country lacks the educational infrastructure to support such investment. Furthermore, this gain must be balanced against an outflow of dividend profits reaped from the external investment in the inventive sector.

The total gains and losses are summarized below with a breakdown of the impact of these costs and benefits for each of the three classes of countries.

<table>
<thead>
<tr>
<th></th>
<th>Total Benefits</th>
<th>Total Costs</th>
</tr>
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<tbody>
<tr>
<td>Patent Exporting Country</td>
<td>(A-B) + (C-D) (L+N+O) + (A_w+C_w)</td>
<td>(E+F+G+H) + (I+J) + (K+M)</td>
</tr>
<tr>
<td>Patent Neutral Country</td>
<td>(A-B) + (C-D) + (M+O) + (A_w+C_w)</td>
<td>(E+F+G+H) + (I+J) + (K+N)</td>
</tr>
<tr>
<td>Patent Importing Country</td>
<td>(A-B) + (C-D) + (M+O) + (E+F+G+H) + (I+J) + (K+L+N)</td>
<td>(E+F+G+H) + (I+J) + (K+L+N)</td>
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Global Patent System

When calculating the cumulative effects of the costs and benefits of individual countries in a global patent system, one reduction in costs and one additional cost emerges. The reduction in costs comes in the form of a lessening of the individual administrative costs (Variable E) of each country through the adoption of a common patent system. The additional cost is the misallocation of inventive activity with the acceptance of a common patent protection period. This misallocation is the global equivalent of variable K on the domestic level. Just as the setting of a common period within a country overprotects some products and underprotects others, the establishment of a global period would create similar costs as differing countries have differing optimal levels of protection assuming different relative allocations of inventive resources.

When calculating the overall equation for global patent protection with a common period of protection, the variables L, M, and N disappear as they are equal and offsetting as they represent direct transfers from one country to another. These variables, however, will be evaluated as it may be argued that even if global welfare is maximized by the adoption of a patent system, it could not be recommended if losses were concentrated in a particular class of countries and the gainer were unwilling to subsidize those losses. Consequently, we are left with the following equations:

138 Recall that in all cases, the (I+J) costs are potentially mitigable through legislation.
139 E will be used to represent economic gains in administration and reduced litigation from the establishment of common patent rules.
140 K represents global costs of misallocation of inventive resources from the adoption of a common protection period.
141 Where is the sum of the variables of all countries and (I+J) are mitigable through
Total Global Benefits = (A_t - B_t) + (C_t - D_t) + (O_t) + (A_w + C_w)

Total Global Costs = (E_t - E_w) + (F_t + G_t + H_t) + (I_t + J_t) + (K_t) + (K_w)

Transfers = L_t, M_t, and N_t = 0

While this model is no doubt incomplete, it is useful to attempt to break down the potential costs and benefits of a global patent system in order to place some order on existing economic data. No comprehensive economic assessment has been made of the costs and benefits of the system. Consequently, it is necessary to assess the sparse economic data available for the assessment of each of these variables to determine whether an assessment can be made as to the merits of such a system.

Evaluating the Variables

Total Benefits

Variables A_t, B_t, C_t, and D_t

It is a sad commentary on the state of current economic knowledge that the domestic variables A through D have not been comprehensively evaluated in any country for which the author has been able to find information. The challenge made by then Commerce and Corporate Affairs Minister Bryce MacKasey in June 1976 that the patent system be abolished in Canada if further studies confirmed doubts about its economic utility has not been answered. In short, no detailed econometric analysis has been done which separates the additional domestic investment and knowledge produced by a patent system that otherwise would have already been present in the economy.

Variable O_t

In evaluating the direct technology gains from access to patents (variable O_t), some work has been done in developing countries in an attempt to measure legislation.

142 The closest we have to this would be the seminal 1951 work of E. Penrose, The Economic of the International Patent System (see supra note 117). However, Penrose focuses on the costs and benefits of such a system to the developing countries and makes no effort to quantify these variables. She simply states her opinion that the magnitude of the cost variables would be relatively high and the magnitude of the benefit variables would be relatively low.

143 The reader may wish to refer to the Appendix which contains a list of all the variables for ease of reference.

144 See Committee on Transfer of Technology, supra note 19 at 3.
the difference in development patterns between countries with strong patent protection and countries with weak patent protection. The most comprehensive study was undertaken by Arman Kirim of the patent-free pharmaceutical industry in Turkey.\textsuperscript{145} Kirim states, "it can convincingly be argued that abolition has not had a ‘negative technology flow’ impact."\textsuperscript{146} In fact, Kirim found that foreign pharmaceuticals were often introduced faster into the Turkish market than elsewhere given less stringent testing requirements in Turkey. While Kirim's study is comprehensive, it focusses exclusively on only one type of product. Consequently, it is difficult to draw analogies to an entire system of patent protection.

A broader, though far less thorough, study is the 1981 United Nations Conference on Trade and Development Report, \textit{Examination of the Economic, Commercial and Developmental Aspects of Industrial Property in the Transfer of Technology to Developing Countries}.\textsuperscript{147} The study reviewed the experience of developing countries that significantly weakened their patent laws, largely in response to the 1975 United Nations Report that found the patent system was not working in their interest.\textsuperscript{148} The study suggests that “the drop in foreign patent applications has not been accompanied by a decrease in imported technology to these countries. Trends in transfer of technology agreements (Argentina and India) or direct foreign investment (Columbia, India, and Mexico) suggest that foreign technology has continued to flow into these countries."\textsuperscript{149} While technology may have continued to flow into these countries, the study does not provide a list of similarly-situated countries that maintained a patent system and their levels of technology transfer. Thus, we can conclude that technology transfer is not entirely the product of a patent system, but are unable to calculate the degree to which patent protection promotes such transfer.

Two additional points must be made in examining the value of variable $O_t$. The first is the existence of rigidities in the technology market that might restrict the flow of technology even with the adoption of a patent system (thus reducing the overall value of $O_t$). The second is the impact on the total supply of

\textsuperscript{145} Since 1961, Turkey has refused to accord patent protection to the pharmaceutical industry.


\textsuperscript{147} UNCTAD, \textit{Examination of the Economic, Commercial and Developmental Aspects of Industrial Property in the Transfer of Technology to Developing Countries}. Review of Recent Trends in Patents in Developing Countries, UNCTAD, 1981, UN Doc. TD/B/C.6/AC.5 [hereinafter \textit{Economic, Commercial and Development Aspects}].

\textsuperscript{148} United Nations, \textit{The role of the patent system}, supra note 5.

\textsuperscript{149} UNCTAD, \textit{Economic, Commercial and Development Aspects}, supra footnote 147 at iv.
technology if one country acts as a free rider in refusing to adopt a patent system while utilizing the technology produced by countries with patent systems in place.

On the first point, the United Nations Report on *The Role of the Patent System in the Transfer of Technology to Developing Countries* found that imperfections in the technology market were perhaps the most important factor in the limited utilization of existing technical knowledge in developing countries.\(^{150}\) Theoretically, these rigidities could be corrected, however, if they were not then the value of variable \(O_t\) might be very low as the existence of a patent system would not be key in determining whether access could be obtained to this technology.

The second point is based on the flawed argument that, "[m]oreover, no matter what the cost of [technological] development, its use by others does not diminish the supply of technology to its originator or to anybody else." This point is strictly true. If a single country were to abolish its patent system, it would still be able to review the patent information of all the other countries (given the requirement that patent information be published) and copy this information in producing goods. This would not diminish the supply of existing technology. What is in the individual interest of one country, however, is not necessarily in the interests of all. If all countries were to rely on the publication of technological information from the patent systems of other countries, there would be no such information. The "cheating" pattern that appears to work in the interests of a single country falls apart if all try to act in the same manner.

Furthermore, the "pirating" of technology from other countries will not reduce the existing base of technological development, but it could reduce future development. Variables \(A_{wt}\) and \(C_{wt}\) would be reduced for every country that pulled out of a patent system. Thus, in making an overall assessment of variable \(O_t\), we find that patents may not be critical in determining technology flows, but that to the extent that technology flows are patent-related, global costs would result from the pirating of technology.

**Variables \(A_{wt}\) and \(C_{wt}\)**

The value of increased economic activity resulting from higher levels of internal investment (\(A_{wt}\)) and greater access to knowledge (\(C_{wt}\)) as a result of guaranteed access to a global patent market also lack hard economic data. Supporters of an international patent system like Richard Brennan, President of the International Anticounterfeiting Coalition, argue that "adequate and effective

\(^{150}\) United Nations, *The role of the patent system*, supra note 5 at 31.
intellectual property rights protection is fundamental both to competitiveness and to increased economic development around the world."\textsuperscript{151} No study of which the author is aware, however, examines the extent to which guaranteed access to foreign markets factors into investment decisions of companies in invention exporting countries. Similarly, it is difficult to calculate the global benefits of the common knowledge bank that would be the result of an international patent system.

Opponents of an international patent system have also made broad generalizations without providing data to support their claims. Edith Penrose argues that the "incentive effect on foreign industry of a monopoly in one additional market would usually be negligible."\textsuperscript{152} However, as has already been pointed out, the Penrose argument is flawed in that it fails to consider the effect of multiple country defections from the patent system of global inventiveness. Thus, while the impact on global research of the defection of Mongolia may be slight, the cumulative impact of the defection of the entire developing world would likely be significant.\textsuperscript{153}

Total Costs

*Variables* \(E_t\) and \(E_w\)

Variables \(E_t\) and \(E_w\) are quantifiable, though the author was unable to find an estimate of the value of these variables. Administration costs can be broken down into the direct operating costs of individual patent offices and the deadweight loss to the economy of the activities of lawyers in making applications and litigating patent protection. While the direct administration costs of a patent office are relatively small,\textsuperscript{154} the costs of legal support for applications and post application litigation is considerably larger. The application costs of filing a patent in a single country are generally under \$200


\textsuperscript{152} Penrose, supra note 117 at 113.

\textsuperscript{153} It can be argued that the free transfer of technological information to the developing world might be an appropriate form of foreign aid to foster economic development. Thus, using a cycle theory of patents, countries would gradually strengthen their patent structures as they became economically more developed. This pattern of gradual strengthening in response to economic development occurred in both the United States and Japan. For a discussion of the Japanese experience, see C. Mackley, "The Role of the Patent System in Technology Transfer: The Japanese Experience," (1987) 26 Col. J. Transnat'L L. 131.

\textsuperscript{154} The World Intellectual Property Organization administered the terms of the Patent Cooperation Treaty (which includes the preliminary determination of patentability of an invention) for about 18 million Swiss francs (about \$15 million Canadian) in addition to the nominal fees for the processing of individual applications.
One author has estimated, however, that the full legal costs of filing the necessary five patents to protect a single product in ten countries at $50,000 U.S.\(^{156}\) This does not take into consideration the litigation costs associated with defending and challenging patents.

These costs would be significantly reduced through the establishment of a common patent system (variable \(E_w\)). Lawyers would only be able to charge for their knowledge of one set of patent laws – the global standard. Furthermore, only one application would be required rather than the existing system of one per country.\(^{157}\) Post-application litigation costs could also be reduced as challenges could only be made under the international patent system, and not under a range of national patent laws. While the value of \(E_t\) minus \(E_w\) is not insignificant, it would represent a considerable advance over current costs of \(E_t\). Both, however, represent a cost when compared against the option of no patent system at all.

**Variables \(F_r, G_r\) and \(H_r\)**

As with variables \(A_t\) through \(D_o\), it is disappointing that so little research has been done into the economic costs of the underutilization of inventions otherwise available, research devoted to “inventing around” and overallocation resources to applied research. Given the lack of hard economic data, it is difficult to assess the basis on which both proponents and opponents of an international patent system claim such a system would be either of huge economic benefit or a disaster.

**Variables \(I_r\) and \(J_r\)**

Although these variables are mitigable with appropriate legislative action, they are perceived to be among the greatest costs of the establishment of a patent system. Criticisms of price gouging and non-use (variable \(I_r\)) and of contractual abuses of monopoly powers (variable \(J_r\)) are at the heart of many of the critiques

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\(^{155}\) See United Nations, *The role of the patent system*, supra note 5 at 60 for a full, if somewhat dated, fee listing.

\(^{156}\) Blair, quoted in Field, *supra* note 129 at 22.

\(^{157}\) Although the *Patent Cooperation Treaty* allows application to a central body, this is only the first stage in the patent process. Applications must then be pursued in each of the countries in which the applicant desires protection and are evaluated independently in each of those countries according to national law. The exceptions to the one application per country rule would be the European Economic Community, the Scandinavian Patent Union and the African and Malagasy Industrial Property Office for which one application is sufficient for all member countries.
of the existing patent structure and its impact on developing countries.\textsuperscript{158} In attempting to assess the importance of these variables, it is also essential that the degree to which they are a function of the patent system and the degree to which they are mitigable are also examined.

Price gouging and non-use (variable I\textsubscript{1}) are particularly visible and have been the focus of much of the criticism of existing patent structures.\textsuperscript{159} The effects of price gouging are not limited to developing countries. In 1973, the British Monopolies Commission found that the British subsidiary of Swiss pharmaceutical giant Hoffmann-La Roche AG was paying $925 U.S. per kilogram for the active ingredient in Librium and Valium which could be purchased in Italy for $22.50 US per kilogram.\textsuperscript{160} On the issue of non-use, the United Nations found that 81 percent of American patents in Mexico and 94.5 percent of Japanese patents in that country were not worked.\textsuperscript{161} In an earlier 1974 study, the United Nations found that the products of between 90 and 95 percent of patents in developing countries were not used in those countries.\textsuperscript{162} The inference is made from statistics such as these that the reason the patents are not worked is the fact that many of them are taken out to prevent competing products from being introduced in the market. Thus, the country is denied both the benefits of the new technology and still must pay the monopoly price.

Both the price gouging and non-use arguments assume that, in the absence of a patent system, such practices would not occur, or would be significantly reduced. Kirim’s findings in Turkey, however, call these conclusions into question.\textsuperscript{163} Kirim found that in the patent-free Turkish pharmaceutical industry, the imported price of selected raw materials sampled ranged from 274 percent of the world price to 3586 percent of the world price. In a similar sample of imported active ingredients, prices ranged from 171 percent of the world price to 25,416 percent of the world price. Thus, price gouging may be primarily a function of the oligopolistic nature of the inventive industry as well as rigidities in the international market, and not a product of the patent system.

Kirim came to similar conclusions with respect to non-use. All pharmaceuticals in Turkey must obtain a product licence. Of the 20,000 product

\textsuperscript{158} See for example Anderfelt, \textit{supra} note 131 c. 2, 3.
\textsuperscript{159} For example, Vaitos has focussed his criticism of the patent system in the pharmaceutical sector on price gouging and related monopolistic practices. See “Patents Revisited: Their Function in Developing Countries.” (1972-73) 9 \textit{Journal of Development Studies} 71.
\textsuperscript{160} The example is taken from United Nations, \textit{The role of the patent supra} note 5 at 58.
\textsuperscript{161} UNCTAD, \textit{Economic, Commercial and Developmental Aspects, supra} note 147 at 22.
\textsuperscript{162} United Nations, \textit{The role of the patent system, supra} note 5 at 42.
\textsuperscript{163} See Kirim, \textit{supra} note 146 at 221-226.
licences that had been taken out, Kirim found only 1482 or 7.41 percent were actually being marketed. This figure is well within the range of non-use of patents in Mexico.164 Thus, it appears that non-use is not primarily a function of the presence or absence of a patent system.

With respect to variable $J_t$ (contractual abuses of monopoly powers) it has been argued that the granting of a patent provides the holder with monopolistic leverage to extend the patent beyond the formal terms of patent protection. Examples of such contractual abuses include agreements to extend monopoly prices beyond the legislative period of protection, to limit the use of patented items to a particular sector, to force the granting back of technological innovations gained in using the patented item, and to agree not to contest the validity of the patent.

Again, it is possible that many of these potential costs are the consequence of oligopolistic power that may be present in an industry and not the existence of a patent system. Kirim found that "even when licensing agreements are not based on patents, as in the case of the Turkish pharmaceutical industry, all of these restrictive conditions can still be included in the contracts."165 Similar practices have been utilized in American contracts with Indian importers.166 This is because of the oligopolistic power of the American companies that allows them to set the terms of trade with their Indian counterpart. Thus, it is the oligopolistic power and not the patent system that would have to be challenged if contractual abuses of monopoly power are to be avoided.

Consequently, patents may be a relatively small component of the overall power base of oligopolistic industries. In the 1970s, the United Nations Commission on Trade and Development – dominated by developing countries – saw patents as the key element of monopoly power in developing countries. By 1982 the patent was seen as playing a relatively secondary role in monopoly power. In their 1982 Guidelines on Technology Issues in the Pharmaceutical Sector in the Developing Countries, the United Nations Commission on Trade and Development concluded that:

Trade marks have become a source of market power in the pharmaceutical industry, perhaps of greater importance than patents....Trade names, i.e. the name identifying the enterprise, although less important than trade marks in the marketing policies of the pharmaceutical companies, also play an important role in sales promotion. The reputation of certain companies has been an additional factor in securing the loyalty

164 UNCTAD, Economic, Commercial and Developmental Aspects, supra note 147 at 22.
165 Kirim, supra note 146 at 229.
166 United Nations, The role of the patent system, supra note 5 at 20.
of the medical profession... Once the brand name is established, competitors entering the market after the expiry of the patent period find it difficult to compete successfully with the established brand, even if they offer the product at sharply reduced prices. 167

By 1988, a United Nations Conference entitled Technology Policies for Development and Selected Issues for Action failed to make any significant reference to the patent system in technology policies. Instead, the conference focus was on the establishment of free trade zones and other methods of attracting foreign investment. 168

Overarching any discussion of price gouging, non-use, and contractual abuses of monopoly power is the realization that all of these abuses may be dealt with through legislation. They are not a direct function of the patent system. For example, article 16 of the Zambian Industrial Development Act restricts contractual monopoly power in that "[a] contract for the transfer of technology and expertise shall not contain any condition:... (e) Which restricts the volume or structure of production; [or] (f) Which limits the ways in which any patent or other know-how may be used." 169 In short, while these abuses often have severe economic consequences for developed and developing countries, they are not a direct consequence of the imposition of a patent system and cannot be counted as costs in determining whether or not to establish a global patent system. 170

Variables $K_1$ and $K_w$

Given the scarcity of econometric analysis of the optimal period of patent protection, it should not be surprising that it is not possible to calculate either the misallocation costs of a common protection period for each country or of the adoption of a global patent protection period. Assuming such econometric tools

169 UNCTAD, Control of restrictive practices in transfer of technology transactions: Selected principal regulations, policy guidelines and case law at the national and regional levels UNCTAD, 1988 UN Doc. TD/TT94 at 9.
170 It is assumed that the international patent system would not prevent member states from taking such actions. The Paris Convention as currently constituted does place one significant limitation on revocation and compulsory licensing in the face of non-use. Articles 5(A)(2), 5(A)(3), and 5(A)(4) require members to wait at least four years from the application for the patent before taking such action. One possible balancing provision in the adoption of an international patent system might be the modification of these articles to allow the immediate suspension of patent rights where there is evidence that the patent holder is acting outside the provisions of the patent grant.
were to become available, it may be possible to fine tune an international patent system with different protection periods for different products. On the basis of current economic knowledge, however, neither these costs nor the fine tuning of an international system could be accomplished.

One note should be made about the likely level of protection for an international system. It has been assumed in the Treaty Patent System and GATT negotiations that the protection period would be in the range of 15 to 20 years. Assuming all countries participated in the common patent system, it would seem logical that a shorter period of protection be adopted. Given guaranteed access to greater numbers of people, the number of years required to recover research investments would presumably decline. By adopting the 15 to 20 year range, there would be an implicit assumption that the current level of global invention is too low and that guaranteed market access is required to increase that level of invention. As Penrose has noted, this assumption is open to debate.172

Transfer Implications

Although the net impact of transfer costs on global welfare are, by definition, zero, consideration should be given to their distributional consequences in order to identify whether there are any major gainers or losers from the establishment of an international patent system.

Variable L

The calculation of the flows of patented goods is made easier by the existence of data on the nationality of patents around the world. A 1975 United Nations study helps to demonstrate the sharp split in patent ownership:

An overwhelming majority (84 percent) of the patents in developing countries is owned by foreigners, mainly multinational corporations of five developed market-economy countries....The nationals of developing countries hold in their own countries no more than 1 percent of the world stock of patents, and in other countries, no more than about two thirds of 1 percent of foreign-owned patents. These countries have plainly been on the periphery of the patent system.173

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171 See The Historical Perspective Chapter for a more complete discussion of these negotiations.
172 Penrose, supra note 117 at 128.
173 United Nations, The role of the patent system, supra note 5 at 42.
The mere fact that a country or group of countries has a comparative advantage in producing a particular type of goods is not necessarily evidence of a problem. Canada is almost wholly reliant on Morocco and Spain for its production of clementines. Developing countries are gaining a growing hold on the world’s textile markets. Dependence on foreign technology, however, is often seen in a different light than dependence on other goods.

Among relatively developed countries such as Canada, there is a fear that unless they maintain competitiveness in the technological sectors, they will be consigned to acting as providers of unprocessed and semi-processed resources. This view is buttressed by economic theories about the existence of a learning curve in technological industries.\(^{174}\) It is argued that by investing in technological industries a critical mass of technological innovation can be generated. Once generated, this mass feeds on experience gained to make further technological advances that foster more research; the country begins “riding the curve” without the introduction of additional resources in the technological sector. Thus, if it were determined that the maintenance of a strong domestic technological sector was key to the maintenance of quality jobs, there would likely be objection to the imposition of a global patent system that would favour economies that are currently innovation-intensive.

**Variable M**

The significance of investment that flows as a consequence of patent protection has been questioned by a number of economists. Penrose argues that “the evidence does seem to support the proposition that in by far the greater number of cases the willingness of a country to grant patents on inventions already patented and worked abroad is of no great importance one way or another as an inducement or obstacle to foreign investment.”\(^{175}\) Penrose’s view is supported by a 1981 United Nations study that examined the effects of the weakening of patent legislation in a number of developing countries in the early 1970s. The study found that compound annual investment rates were comparable in the pre and post reform periods.\(^{176}\) The study, however, does not compare the growth rates of these countries with similarly situated states that maintained strong patent regimes. Thus, while there is some doubt about the

\(^{174}\) American economist Michael Porter of is one of the current proponents of this theory. See, for example, *The Competitive Advantage of Nations* (New York: Free Press, 1990).

\(^{175}\) E. Penrose “International patenting and the less-developed countries” (1973) 83 *The Economic Journal* 768 at 775.

\(^{176}\) See UNCTAD, *Economic, Commercial and Developmental Aspects*, supra note 147 at 14-20.
investment benefits resulting from patent protection, there is insufficient economic data to make a firm judgement about the magnitude of investment flows and their responsiveness to the strength of a national patent system.

**Variable N**

The calculation of the flow of dividends resulting from patent-related investment suffers from the same problems of measurement as the calculation of investment flows. While it is possible to calculate the value of dividend profit flows from each country, the extent to which these flows would be present in the absence of a patent system has not been calculated. Consequently, no clear assessment can be made of the value of these flows.

**Conclusion**

Given the lack of economic data available to calculate the value of virtually all of the variables set out in the equation, only three relatively weak conclusions may be drawn. The first is that general evidence suggests that the patent system is not as important in determining levels of economic development as was once thought. International market rigidities and the presence of oligopolistic industries may serve to dampen any benefits or costs from the adoption of an international patent system.

The second conclusion is that among the variables for which there is data, there is some evidence that they may not be as significant as the proponents and opponents of the system proclaim. Thus, the benefits and losses may both be smaller than originally assumed by the two opposing camps.

The final, and overriding conclusion, is that there is insufficient economic data on each of the individual variables to make any firm conclusion about the fostering or abandonment of efforts to establish a global patent system with a universal patent. Thus, we have not really moved beyond Malchup's statement in 1958 that we have insufficient data to recommend for or against the establishment of a patent system. This view has been supported by two recent studies in the field. In 1985, Arman Kirim noted in his study of the Turkish pharmaceutical industry that “notwithstanding criticisms of the system, the actual economic implications of patents is still an unresolved issue because the existing empirical work on the subject is not yet sufficient.”\(^{177}\) In 1989, Carlos Braga came to a similar conclusion in finding that “[t]here is no a priori strong evidence that [developing] countries will necessarily benefit or lose from a

\(^{177}\) Kirim, *supra* note 146 at 219.
reform of their intellectual property systems.178 While the examination of each of the costs and benefits has cast doubt as to the magnitude of both the costs and benefits often alleged by proponents and opponents of an international patent system, the current level of economic knowledge is far from the point where it would be possible to make even an educated guess as to whether the benefits of such a system would outweigh the losses.

While there is insufficient economic data to make a recommendation on the establishment of an international patent system, it has been noted that many countries have altered their intellectual property laws in response to their stage of economic development. Damschroder has observed that early intellectual property protection in the United States was limited to works authored by American citizens and was expanded only gradually over the next 100 years.179 A similar pattern of evolution in protection has been observed in Japan by Mackley. He notes that “[t]he Japanese patent system has evolved at times to comply with changing needs of the economy.”180 While there may be no economic data to justify such evolving standards, the fact that two of the largest inventive nations once restricted patent protection would give cause for developing nations to argue that they should also be allowed to gradually evolve their protection.

If such a strategy were to be adapted to an international patent system, it might establish a universal patent but allow individual countries to alter their period of protection according to their stage of economic development. Thus, countries with more developed economies would be expected to subsidize less developed countries through free access to the inventive knowledge and related technologies. As these countries became more developed, they would be expected to improve their patent protection to feed the general pool of knowledge.

Having failed to find an economic justification for or against patent protection, political explanations will be examined in an effort to explain the existence of different phases of development in domestic patent systems. The same political factors will be analyzed in an effort to determine if it is likely the world is moving to the development of an international patent system.

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178 Braga, supra note 78 at 264.
180 Mackley, supra note 153 at 164.
POLITICAL FACTORS

Given the inadequacy in both the current scope of intellectual property protection worldwide and in the outlook for reform either through bilateral negotiations or through international intellectual property bodies, the new GATT round provides a most logical and promising vehicle for change.\(^{181}\)

Kenneth W. Dam (IBM Vice President, Law and External Relations)

While the philosophical and economic sections have failed to provide a normative explanation for the existence of an international patent system, political game theory\(^{182}\) may provide a positive explanation for why domestic patent systems strengthen with economic development and whether it is likely that these same pressures will produce an international patent system. Three stages of development will be examined in an attempt to formulate a general model: a weak innovation national economy, a strong innovation national economy, and an international economy containing both weak and strong innovation states.

**Weak Innovation Economy**

In the weak innovation economy it is assumed that most technology is imported or copied and produced domestically and that industrial interests in the innovation sector of the economy are relatively weak. At such a stage of development, game theory would predict that a patent system would not likely be developed. Economic interests are concentrated in sectors that rely on technology generated from other intellectual property systems. These sectors are reluctant to pay monopoly premiums for access to the technology or information on which it is based. Consequently, it is in their collective interests to set up a lobby to convince the government to maintain the existing regime of no patent protection. This lobbying behaviour was observed in the pharmaceutical industries in France until 1958, Germany until 1968, and Japan until 1976.\(^ {183}\) These industries relied largely on externally generated technology

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\(^{182}\) Game theory was developed by economists such as 1986 Nobel Prize winner James Buchanan as a method of assessing the economic behaviour of “rational” actors in predicting overall economic development. More recently, it has been expanded to the political realm in an attempt to explain political decisions in terms of “rational” voters interests and to predict future decisions. An excellent introduction to the political dimension of game theory can be found in Iain McLean’s *Public Choice* (Oxford: Blackwell, 1987).

\(^{183}\) These are the years in which pharmaceutical patent protection was introduced. See UNCTAD, *Economic, Commercial and Developmental Aspects*, supra note 147 at 29.
to generate their profits, and so, lobbied strongly to protect the source of those profits—the absence of a patent regime.

Against these relatively concentrated industrial interests are the interests of a weak innovation sector. Some domestic companies may develop their own inventive products or make significant modifications to imported inventive technology. It would be in their economic interests to have a patent system which would protect their innovation in the form of monopoly access to the market with their technology. These interests, however, are relatively weak in comparison with the technology pirating and using industries. Consequently, lobbying of the government is unlikely to pose a significant challenge to the status quo of a patent-free economy.

Application of the game theory model in the weak innovation economy has been summarized by Braga as follows:

Those who have a vested interest in avoiding the reform [of the patent system] would tend to lobby forcefully against enhanced intellectual property rights protection. The potential beneficiaries, in turn, would tend to be much less organized and prone to adopt a free-rider attitude in the policy debate. As a result, the political support for such a reform may not be sufficiently strong to override the opposition.184

Thus, game theory predicts that in the low-innovation economy, the non-innovation interests will win the political debate and no patent system will be introduced.

**Strong Innovation Economy**

In the strong innovation economy, the number of innovation industries has grown (as they did in the Japanese pharmaceutical industry over the late 1960s and early 1970s) to the point where they are a relatively important component of the economy. Given the potential gain to these industries of the establishment of a patent system, it would be in their rational economic interests to band together and fund a lobbying effort to convince the government to introduce such a system. More specifically, the gains to each innovating company would be relatively high. Consequently, it would be in their interests to contribute to a general industry campaign to obtain a patent system as the potential rewards would be large for each individual company.

Allied against this move might be the relatively weak pirating sector and the consumer lobby. Given the relatively diverse and often disorganized nature of

184 Braga, supra note 78 at 262.
the pirating industries, their lobby would be unlikely to match the strength of the innovation industry lobby. While it may appear that the strongest lobby of all would be the consumer lobby, game theory predicts that even if consumers were united in their opposition to the perceived higher prices of a patent system, they would not likely be successful. The potential losses to each individual consumer in the form of monopoly prices are relatively small. Consequently, while they might prefer to see a campaign funded to prevent such a system from being established, it would not be in their rational interest to contribute to such a campaign, given the relatively minor benefit they would derive from it. If each individual consumer arrives at this same decision – to act as a free-rider – then the consumer lobby will be severely underfunded or not funded at all. Thus, game theory would predict that patent systems would be developed more often than not in countries with relatively concentrated innovation sectors, even where the majority of the population would oppose the development of such a system.

International Patent System

When moving to the international system, a key pressure that is added is the potential lobbying of other governments. This lobbying has two avenues of impact. The first is directly on the government that is making a decision on whether or not to have a patent system or the strength thereof. The second is on industries that perceive the foreign government as willing to utilize trade sanctions that might hurt those industries and that, in turn, lobby their governments to establish a patent regime.

Evidence of the importance of this international pressure can be found in the decision of Korea to strengthen its intellectual property legislation in response to American trade threats. In November 1985, the United States Trade Representative initiated an investigation of Korea’s lack of intellectual property rights. The Korean government, backed by industry that was fearful of generalized American trade sanctions, quickly agreed to establish a comprehensive intellectual property system in an agreement with the American President in July 1986.185 Thus, for those countries that are susceptible to the trade leverage of innovation intensive economies, it is likely that they will be pressured into accepting changes in their intellectual property rights.186

186 Further examples of this trend can be found in the recent decisions of Taiwan, Singapore, Mexico and Brazil to significantly improve their intellectual property systems (including the patent component of them). The decision of Brazil is particularly important given its traditional role as one of the leaders of the weak patent movement in the developing world. Hunnicutt notes that Turkey has also given indications of a
Although individual countries may be pressured to establish patent rights, this would not leave us with a unified international patent system. Game theory, however, can also be used in predicting a probable outcome of the current push by developed countries to establish such a system in the GATT negotiations.

The GATT and the Establishment of a Global Patent System

As was outlined in the historical background section, the United States and other leading innovation-intensive economies\(^{187}\) appear to be abandoning existing international intellectual property forums such as WIPO\(^{188}\) in an effort to attain the goal of an intellectual property system that would include an international patent. This shift is consistent with the American view that inadequate patent protection is not a justifiable exercise of domestic policy determination but a conscious barrier to trade that must be eliminated.

The choice of the GATT forum is not random. Its use is a conscious abandonment by the United States of the existing mechanisms controlled by the World Intellectual Property Organization. Rather than bargain in a forum where the United States has little support and even less leverage, the American government has chosen to push for an international patent system in an organization where they remain the dominant player. American decisions on whether to open their markets to developing countries will be critical to determining those countries' levels of development in the post-Marxist, free enterprise world. Consequently, these countries will be reluctant to risk losing favoured trade status by opposing American pressures for the establishment of an international patent system.

As has already been noted, leading countries within the anti-international patent bloc such as Mexico have already altered their systems in response to American pressure. In the face of more generalized pressure by other leading innovation exporters, it seems probable that agreement will be reached on the establishment of an international patent system under the GATT.

Conclusion

Although game theory cannot provide a normative explanation of whether

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willingness to modify their intellectual property systems in the pursuit of trade benefits. See \textit{supra}, note 33 at 305.\(^{187}\) See \textit{supra} note 83 and related text.\(^{188}\) Kunz-Hallstein has argued that the combination of a strengthened WIPO and the right of reprisal under customary international law could be used in the development of an international patent system within existing WIPO structural mechanisms. See \textit{supra} note 27.
or not to establish an international patent system, it does provide a positive theory that predicts the establishment of such a system. The collapse of the alternate Marxist economic system has left developing countries even more susceptible to the pressures of innovation-intensive economies. Consequently, we are likely to see the establishment of an international patent regime under the auspices of the GATT.

CONCLUSION

The deliberate adoption of this economic policy [an international patent system] can be justified on economic grounds only if the gains that accrue to society from it exceed the costs incurred because of it. It is indeed awkward that the costs cannot be measured nor the gains counted. As a result the optimal limits on the patent system, whether with respect to time, space, patentability or restrictions on the use of the grant, must always remain a subject of controversy.\(^\text{189}\)

Edith Penrose

When acting in the role of legal practitioner, lawyers have a responsibility to engage in positive interpretations of existing law. In recommending the establishment of a new system of rules, however, the lawyer must move beyond positive law and include normative considerations that set out the philosophical, economic, and political bases of the law. Given the major stresses felt by the existing international patent mechanisms under the Paris Convention, a new legal structure is likely to be created. Thus, in determining the form of this new structure, it is critical that lawyers recommend a system of rules that reflects the interests of the community it is to serve.

An examination of the philosophical justifications of an international patent system reveals two possible strands of thought. The first is a moral imperative of patent rights that would dictate patents of unlimited duration in order to meet the inventor's natural rights to the fruits of their labour. Given that no patent system in the world has accepted unlimited rights, it appears that moral imperative thinking is not deemed to be in the interests of any of the communities the international patent law would be serving. All remaining philosophical justifications for patents are rooted in assumptions about the economic efficiency of such a system. Thus, lawyers must examine the validity of these economic justifications.

Unfortunately, as Penrose notes, most of the variables are impossible to quantify on the basis of current economic knowledge. Thus, any justification or opposition to an international patent system is fundamentally flawed in that it is

\(^{189}\) Penrose, supra note 117 at 225.
grounded in insufficient economic data. Rather than pressing ahead with GATT negotiations on the length of priority periods, the scope of patent protection or the criteria for non-use, the legal community should be encouraging further research into the underpinnings of an international patent system so that it would be possible to make an attempt at determining whether such a system would be in the economic interests of the community it serves. Unlike many legal debates that are grounded in fundamental and arguably irreconcilable philosophical differences, most major players agree on the economic terms of the patent debate. Without further study to evaluate those terms, it would be irresponsible to recommend for or against the development of an international patent system.

Unfortunately, international political events are overtaking rational calculations of whether an international patent system would serve the interests of the global community. Given the relatively concentrated gains accruing to innovation-intensive corporations, leading industrial countries have mounted a concerted campaign to enshrine intellectual property rights, including patent rights, in the Uruguay round of the GATT. Given the collapse of the Soviet Union and corresponding inability of developing nations to turn for assistance to institutions other than the market-oriented International Monetary Fund, they will have little choice but to conform to the wishes of the industrial powers or face possible exclusion from GATT trade preferences.

This is not to conclude that the establishment of such a system will necessarily have a detrimental impact on developing nations. Indeed, it is possible that they will obtain considerable long-term benefits from participation in an international patent system. Laws should not be recommended, however, on the basis of blind possibilities. Their impact on the various sectors of the community they serve should be carefully measured. On the basis of our existing knowledge, we cannot make such a measurement. Consequently, it would be unconscionable to pressure countries to modify their patent regimes to an international standard. Until a normative basis for an international patent system is found, Alice’s White Knight should be left to invent on his own and should not expect international patent protection.
APPENDIX – Variables Utilized

A = Economic activities from investment (human and capital) in inventions under a patent system

B = Economic activities from investment (human and capital) in inventions that are not based on economic rewards

C = Economic activity derived from knowledge available under a patent system

D = Economic activity derived from knowledge that would be present regardless of the patent system

**Total Benefits (TB) = (A-B) + (C-D).**

E = Administration costs

**Direct** ("legitimate" consequences of monopoly power)

F = Underutilization of inventions otherwise available

G = Research expenditures devoted to "Inventing around"

H = Overallocation in applied research

**Indirect** (mitigable consequence of abuse of monopoly power)

I = Non-use

J = Contractual abuse of monopoly power

**Total Costs (TC) = (E+F+G+H) + (I+J)***

* Apply only where there is no legislation to prevent them

K = Misallocation of inventive resources due to a common patent protection period

L = Net flow of patented goods

M = Net flow of investment in patent research

N = Net flow of dividends

O = Direct technology gains from increased access to patents

A_w = Economic activities from internal investment in inventions given access to a global market

C_w = Advances made as a result to access to knowledge obtained from patent information around the world

**Total Global Benefits: (A_t-B_t)+(C_t-D_t)+(O_t)+(A_wt+C_wt)**

**Total Global Costs: (E_t-E_w)+(F_t+G_t+H_t)+(I_t+J_t)+(K_t)+(K_w)**

Transfers: L_t, M_t, N_t = 0

Where t is the sum of the variables of all the countries and (I_t+J_t) are mitigable through legislation.