# The Economic Implications of Liberalizing APEC Tariff and Nontariff Barriers to Trade

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### PATENT SYSTEMS IN APEC: ROLE IN NONTARIFF TRADE BARRIERS AND STRATEGIC TRADE POLICY

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<u>Abstract:</u> Do differences in national patent systems constitute nontariff barriers to trade (NTBs)? Are national patent systems an instrument of strategic trade policy (STP)? Is the harmonization of patent systems necessary to reduce patent-related NTBs and STPs? This paper describes the state of patent laws across APEC nations, examines case studies of patent-related NTBs and STPs, and assesses whether patent harmonization in APEC will help reduce trade distortions. It is argued that some patent reforms are needed to reduce or avoid patent-related NTBs and STPs, but that the harmonization of patent laws itself is a limited solution. Patent *laws* per se are often not the source of trade distortions, but rather the *practises* of strategic private and public interests. More attention needs to be shifted to competition rules and to determining which features of patent systems are most conducive to social welfare.

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#### I. Introduction

"And?"

"The Japanese had already patented the products. In Japan." "You mean they already had the algorithms?"

"No. They just had patents. In Japan, patenting is a form of war. The Japanese patent like crazy. And they have a strange system. It takes eight years to get a patent in Japan, but your application is made public after eighteen months, after which royalties are moot. And of course Japan doesn't have reciprocal licensing agreements with America. It's one of the ways they keep their edge.

"Anyway, when I got to Japan I found Sony and Hitachi had some related patents and they had done what is called 'patent flooding.' Meaning they covered possible related uses. They didn't have the rights to use my algorithms - but I discovered I didn't have the rights, either. Because they had already patented the **use** of my invention."

-- <u>Rising Sun</u>, Michael Crichton (NY: Ballentine Books, 1992), p. 202.

The Asia-Pacific Economic Cooperation (APEC) has been formed to pursue, among other things, greater trade and technological cooperation. An important consideration in this pursuit is how well established intellectual property rights are, for such rights influence the market access and market share of domestic and foreign interests. In addition to the fictional novel <u>Rising Sun</u>, a number of surveys of U.S. corporate officials have expressed concern that countries (particularly Asian and especially Japan) are using patent policies as part of some strategic industrial plan, and that such behavior is a threat to free trade.<sup>1</sup> Thus a concern is that unless international patenting conflicts are addressed, some of the objectives of APEC might be undermined.

This paper reviews patent systems among APEC members and examines whether differences in patent laws and policies might constitute *nontariff barriers to trade (NTBs)* or enable nations to use patent policies as instruments of *strategic trade policy (STP)*. The paper then considers whether the *harmonization* of APEC patent systems could reduce the use of patent laws and policies as NTBs or STPs. Thus a contribution of this paper is in helping to assess the level of priority that patenting matters should receive in APEC negotiations.

The main findings of the paper are as follows: there are ways in which patent systems can be used as NTBs or STPs, and there have been instances where they were used as such. However, it is argued that harmonizing international patent laws is a limited solution. In many instances, it is not the laws per se that are the sources of trade conflicts, but the ways the laws are practised. Secondly, not all patent-related barriers to trade are the result of *public* strategies but of *private* (corporate) strategies, which fall outside the scope of public laws.

First, a few remarks on a working definition of NTBs or STPs. As Olechowshi (1987, p. 120) points out, they are easier to define by what they are not than by what they are, and offers as a working definition: "all public regulations and government practises that introduce unequal treatment for domestic

<sup>&</sup>lt;sup>1</sup> See, for example, GAO (1993) and Oppenheimer and Tuths (1987).

and foreign goods of the same or similar products." The UNCTAD classification of NTBs rests on this sort of working definition. In addition, Laird and Yeats (1990, p. 16) point out that "intent [should be] a factor used for the identification of nontariff barriers," but that "intent cannot be determined without ... [an] investigation of their nature and actual operation." In other words, the discrimination may not exist in any of the properties of a policy measure but in the way the measure is applied.

The relevance of the above remarks for the study of trade and patent systems is that, first, both *public* and *private* measures may restrict trade or lead to discriminatory domestic and foreign treatment. Often, reports of international patent conflicts have failed to distinguish between actions caused by governments and those by private agents (e.g. corporate strategies). This has implications for global patent harmonization in that legal reforms which set standards for government actions only will have limited effects on reducing trade impediments.

Secondly, on the issue of *intent* to intervene or discriminate in trade, patent laws can be either inherently discriminatory (for example, when foreign evidence is outlawed in national court) or discriminatory in operation (for example, when certain types of inventions - e.g. pharmaceuticals - are declared unpatentable, thus hurting foreigners who tend to invent them and benefiting domestic inventors who tend to imitate them). More difficult to establish are cases where the laws or execution of the laws are applied to both domestic and foreign patentees (i.e. national treatment) in a non-discriminatory and transparent way, but nonetheless the system favours domestic inventors. For example, to the extent that the domestic system has features which foreign systems do not have (such as opposition to a competitor's patent grant, or native language requirements), domestic agents may be better able to utilize their system (that is, to win patent grants). In these cases, governments might be fully aware that their systems give domestic inventors an advantage but do not change their laws. Other patenting difficulties that foreigners face might better be categorized as *unintended* structural impediments to global patenting (for example, registration procedures, trial procedures, fees, and staffing problems).

Despite the potential for patent laws or practises to act as trade barriers, the UNCTAD classification of nontariff trade barriers does not include patent policies.<sup>2</sup> There might be several justifications for this. First, overall cases of patent policies used as an NTB/STP might be relatively very small compared to other policies like government procurement or standards. Secondly, patent policies are not, for the most part, "border" measures. Patent policies determine internal (national) and global market shares and access. Thirdly, patents affect trade flows rather indirectly. Patents are more concerned with trade in "ideas." *New* patents issued, for example, do not translate into commodities or services until reduced to practise, if at all and usually with some time lag. Trade flows are affected when counterfeit or infringed products violate *existing* patent rights.

A few related literature should be mentioned. A number of studies have raised the issue that disharmony in international patent laws may constitute NTBs.<sup>3</sup> These studies do not, however, go into the details of patent systems in order to examine the sources of international conflict, as in this paper.

<sup>&</sup>lt;sup>2</sup> See Table 2.1 in Laird and Yeats (1990).

<sup>&</sup>lt;sup>3</sup> See, for example, Stern (1987), Oppenheimer and Tuths (1987), Tussie (1993), Tyson (1993), and Primo Braga (1996).

Secondly, there are some empirical work on whether stronger patent rights encourage or impede trade.<sup>4</sup> These studies, however, cannot indicate whether differences in patent regimes have acted as NTBs, for the following reasons: the empirical studies focus on an aggregate index of patent rights. As discussed in this paper, it is not the overall level of rights that discriminate in trade but the composition of rights (that is, the individual features of patent systems). Furthermore, their unit of analysis is the firm (exporter), and the focus is on how patent rights affect the profit-maximizing export behavior of firms. In the case of NTBs and STPs, the unit of analysis is the government, and the focus should be on how governments choose patent system features or policies to block imports or shift rents to domestic industry.<sup>5</sup>

The next section reviews some trends in intra-APEC patenting. It also reviews some basic features of patent systems and describes how these features differ across APEC. Section III examines cases of international patenting conflicts and examines which features of national patent laws, if any, played a role in the conflicts. These cases help to shed light on the extent to which patent systems have been used to restrict imports or foster domestic firms - that is, used as NTBs or STPs. Section IV, in light of the cases discussed in section III, evaluates whether patent harmonization is likely to be effective at minimizing international patenting conflicts.

#### II. Trends in Intra-APEC Patenting and APEC Patent Systems

At present, intra-APEC patenting activity is rather modest. Table 1 shows patent applications received by APEC members from domestic inventors, other APEC members, and total foreign inventors, in 1980 and 1990.<sup>6</sup> Patent application data are useful in showing where inventions come from and where they go. Furthermore, by disclosing technical knowledge, patent applications are a useful source of knowledge spillovers; otherwise, should inventors not apply for patents, new pieces of knowledge would remain trade secrets, unless they are leaked or discovered through reverse engineering. Of course, there are some limitations with patent application data. They, for instance, do not capture all the flow of new inventions. Some new inventions are not patented, either because the subject matter is unpatentable (for example, biogenetic discoveries; weapons; toys) or because the inventor chooses to keep them secret. The quality of inventions is also not accounted for. A modest invention and a major invention each get counted as one new patent application. Thus a rise in patenting could be due to a mixture of increases in quantity and quality. Finally, not all inventions are marketed or manufactured (i.e. they may be "sitting on the shelf"). An increase in patenting activity need not suggest that society is utilizing newer technologies.

Subject to these provisos, the data in Table 1 provide some indication of the extent of intra-APEC trade in "ideas." The U.S. and Japan are the largest sources of new ideas, as well as being the prime destinations. While there has been a significantly greater rise in total foreign and intra-APEC patenting than in domestic patenting (with the exception of Japan), most of the new ideas tend to flow among the richer members of APEC (Australia, Canada, Japan, Korea, and the U.S.). There are several possible

<sup>&</sup>lt;sup>4</sup> See Maskus and Penubarti (1995) and Smith (1996).

<sup>&</sup>lt;sup>5</sup> One could argue that this empirical literature captures the *effects* of government patent-related NTBs on trade *indirectly*. To the extent that patent-related NTBs restrict trade, they should be reflected in the data.

<sup>&</sup>lt;sup>6</sup> Absent from the table are Brunei, China, Papua New Guinea, and Taiwan, for which data are not available.

#### Table 1. Intra-APEC Patenting

#### 1990 Patent Applications from:

	Domestic	A	<b>\PEC Memi</b>	bers:			Total	
	Residents	Aus	Can	Jpn	Mex	New Z	USA	Foreign
Aus	6948		520	1895	6	148	8681	19559
Can	2782	612		4444	8	29	16832	35135
Chile	, <b>19</b> 1	8	14	11	2	4	285	642
H. Kong	21	6	2	273	n/a	1	404	1060
Indon*	49	20	4	144	n/a	2	259	731
Jpn	333373	637	663		7	33	19578	43419
Korea	9083	365	332	7346	5	1	7360	22304
Malay	92	57	32	357	1	5	912	2213
Mex	750	24	71	124		6	2893	4539
New Z	802	361	77	141	1	n/a	1699	3869
Philip	147	44	3	173	1	1	960	1822
Singa*	4	13	7	233	n/a	5	371	1003
Thai	73	47	12	360	1	<del></del>	813	1867
USA	91410	1398	3683	35771	76	105	-	84690

# 1980 Patent Applications from:

	Domestic	omestic APEC Members:						Total
	Residents	Aus	Can	Jpn	Mex	New Z	USA	Foreian
Aus	6582		183	1015	7	181	3883	9354
Can	1785	233		2018	18	37	13125	23189
Chile	140	n/a	n/a	n/a	n/a	n/a	n/a	685
H. Kong	10	7	6	142	0	0	240	723
Indon	5	17	4	60	0	3	174	475
Jpn	165730	154	271		20	27	10391	25290
Korea	1241	21	9	1622	1	2	1151	3829
Malay	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Mex	665	0	2	56		5	340	4132
New Z	1148	235	28	69	0	-	857	2290
Philip	1 <b>1</b> 9	48	15	192	1	5	654	1454
Singa	2	13	2	98	0	1	233	631
Thai	18	8	1	35	1	1	69	184
USA	62098	517	1969	12951	77	119	_	42231

## Notes:

\* indicates data from 1985

n/a indicates not available

Total Foreign indicates total non-resident applications (including from APEC members)

# Source:

WIPO (1980, 1990)

reasons why new ideas tend to flow less to the rest of APEC. First, the markets may be small; for example, while Hong Kong and Singapore are fast growing economies, their markets (other than their financial markets) may be considered relatively small. Secondly, the patent rights may be weak (or application procedures unwieldy) to attract patent applications. Thirdly, the risk of imitation might be low enough that inventors believe they can introduce their inventions without the need for a (costly) patent. It remains to be seen whether improved economic relations within APEC will enhance intra-APEC patenting, due say to an increase in market size, patent rights, and scientific capability.

Currently, patent laws vary across APEC members, although there has been a greater convergence of standards recently owing to the Trade-Related Intellectual Property Rights (TRIPs) agreement. This can be seen from some measures of overall patent protection levels shown in Table 2. The patent rights indexes range from 0 (no protection) to 5 (strongest protection).<sup>7</sup> Between 1980 and 1990, patent protection levels diverge somewhat due to a strengthening of rights in countries that already provide strong protection, but by 1995, the overall levels converge, as measured by the standard deviation. Generally, patent protection levels are highest in those APEC nations that, as shown in Table 1, are the major recipients of international patent applications.

There are, of course, some major limitations with the patent rights indexes shown in Table 2. First, the levels refer to "laws on the books," that is, to statutory provisions. They need not reflect the "actual" level of protection since there is no indication of how laws are actually carried out or have been carried out. Secondly, the indexes aggregate patent features. Often it is the individual features that are the subject of trade controversy. For example, both the U.S. and Japan rate very highly in terms of providing overall patent protection, but their differences in patent system details give rise to suggestions that their patent laws act as barriers to trade. Thus, to analyze issues pertaining to NTBs and STP, it is important to disaggregate patent systems by their features.

The differences in overall *levels* of protection are important nonetheless, particularly between the strong patent rights countries (usually the developed) and the weak (usually less developed). Weak patent rights nations can, for example, by imposing compulsory licensing, providing lax enforcement, or citing public interest claims, divert the market away from foreign nationals who own patent rights to local domestic producers, and thus distort international trade. Weak patent rights nations can discriminate against foreigners even when adhering to the national treatment principle, provided the same low levels of protection are provided to both domestic and foreign innovators. This favours domestic producers (at the expense of foreign) if domestic producers are imitators.

Thus differences in *overall* levels of patent protection are still relevant in so far as there still are some APEC members with very weak or no patent laws. For example, Papua New Guinea does not yet have a patent system; Indonesia joined the Paris Convention in 1970, but did not have patent laws until

<sup>&</sup>lt;sup>7</sup> The measures are based on Ginarte and Park (1997) and Rapp and Rozek (1990). Both indexes are similar in rating national patent laws on the basis of whether certain patent rights and enforcement provisions exist. The indexes differ in their method of scoring. The Ginarte-Park measure allows for more variability. They also differ in the coverage of countries and time periods. The Rapp-Rozek covers more countries but only a single time period.

	1980	1990	1995	1984*
Austral	3.23	3.32	3.63	4
Brunei	n/a	n/a	n/a	4
Canada	2.76	2.76	3.05	4
Chile	2.41	2.41	2.61	2
China	n/a	n/a	n/a	1
H. Kong	2.24	2.57	2.71	3
Indon	0.33	0.33	n/a	0
Japan	3.94	3.94	4.33	4
Korea	3.28	3.94	4.05	3
Malay	2.57	2.37	n/a	3
Mexico	1.40	1.63	1.95	2
New Zeal	3.32	3.32	3.32	4
Papua NG	0	0	n/a	0
Philip	2.67	2.67	n/a	4
Singap	2.57	2.57	2.57	4
Taiwan	n/a	n/a	n/a	3
Thail	1.85	1.85	1.85	1
USA	4.19	4.52	4.52	5
Std Dev	1.14	1.21	0.87	1.46

# Table 2. Index of Patent Rights among APEC members

Sources:

Ginarte and Park (1997), Park (1997) \* from Rapp and Rozek (1990) (n/a indicates not available) 1989; Brunei's patent system is not independent as it is based on the patent systems of the U.K., Singapore, and Malaysia (meaning that any patent granted in any of those countries can receive protection in Brunei provided it is registered within three years of grant date).<sup>8</sup> Hong Kong is also dependent on the U.K. patent system. Singapore has only recently (in 1994) ended its dependence on the U.K. patent system and enacted its own laws.

Turning now to differences in patent systems, the following features will be highlighted for consideration: priority; novelty; interpretation of claims; publication; examination; opposition; duration; working requirements; and compulsory licensing. Table 3 provides a summary of these patent features across APEC.

**Priority**. In all APEC nations (except the U.S.), the *first-to-file* rule prevails, under which the first applicant to file for a particular invention has priority (in the awarding of any patent) over subsequent applicants. In the U.S., the *first-to-invent* rule prevails, under which the original inventor has priority. In the event of a conflict (where two or more inventors seek protection for substantially the same invention), *interference* proceedings are held in the U.S. to determine the first inventor. Such proceedings are costly and time-consuming (which is one reason given for advocating a switch to a first-to-file system). However, they are not as numerous; about one percent of total applications result in such proceedings, and less than one-tenth of one percent of them result in a patent being granted to someone other than the first to file.<sup>9</sup>

The question is whether the coexistence of these two different priority rules constitutes a structural impediment to trade. Before the TRIPs agreement, the U.S. rule was discriminatory because foreigners were unable to use evidence from outside the U.S. to establish that they were the first to invent.<sup>10</sup> The U.S. laws (sections 102 a, b of Title 35) have since been modified to permit evidence from WTO member nations. This removes one advantage that U.S. inventors had over foreign; however, U.S. inventors who desire more time to developing their inventions before applying for patents abroad might be disadvantaged if some other party files abroad first for a similar invention. As Wiggs (1993) points out, however, the disadvantage to

<sup>&</sup>lt;sup>8</sup> A dependent patent system is likely to be convenient for a small economy like Brunei, with a population under 300,000 and with limited qualified manpower and technical expertise. Brunei is currently considering developing an independent system in the near future (see the APEC *Industrial Property Rights 1996 Symposium* Web Site - www.jpo-miti.go.jp/pate/repo/apec).

<sup>&</sup>lt;sup>9</sup> See GAO (1993).

<sup>&</sup>lt;sup>10</sup> See Moy (1992).

#### Table 3. Patent System Features among APEC members

	1 Exam for Novelty	2 Opposition After Grant	3 Working Required Within	4 Compul- sory License	5 Member- ship in	6 Duration (yrs)	7 Public- ation in or upon	8 Grace Period	9 Doctrine of Equiv.
Australia	yes	3 months	3 yrs	х	a,b	20	18 months	6 months	yes
Brunei	no	none	•	-	b		grant	none	•
Canada	yes			Х	a,b	20	18 months	1 year	yes
Chile	yes			-	b	15	60 days	none	-
China	yes	3 months		Х	а	20	18 months	none	yes
H. Kong				-	a,b	20	grant	none	
Indon		6 months	3 yrs	Х	a,b	14	6 months	none	
Japan	yes	pre-grant	3 yrs	XX	a,b	20	18 months	6 months	no
Korea	yes	2 months	3 yrs	XX	a,b	20	18 months	none	
Malay	-		3 yrs	Х	b	15	grant	none	
Mexico	yes		3 yrs	-	a,b	20	18 months	none	
New Zeal	yes	3 months	3 yrs	Х	a,b	20	grant	none	
Papua NG									
Philip	yes		2 yrs	Х	a,b	17	grant	none	
Singap	yes		3 yrs	Х	a,b	20	grant	none	no
Taiwan	maybe	3 months	3 yrs	Х		20	grant	none	no
Thailand	yes	180 days	3 yrs	Х	b	15	grant	none	
USA*	yes	none		-	a,b	20	grant	1 year	yes

Notes:

For column 4:

X denotes yes

XX denotes yes after non-working for 4 years from filing date or 3 years from date of grant - denotes no explicit provisions in laws

For column 5:

a. Paris Convention b. WTO

#### For Column 9:

This doctrine permits judges to declare an invention to be infringing upon another if it operates in "substan the same way, and is therefore "essentially" an equivalent invention.

\* U.S. Patent Award is based on "first-to-invent." All others on "first-to-file."

Blank indicates information not available

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#### Sources:

Jacobs (1996), Park (1997)

U.S. inventors stems not from the first-to-file rule but from the absolute novelty requirements abroad, a feature which is next considered.<sup>11,12</sup>

**Novelty**. A patent is awarded to an invention that is novel, non-obvious, and industrially applicable.<sup>13</sup> An invention loses its novelty if it were publicly known, sold, or used before application. Some countries allow exceptions if the disclosure occurs during experimental testing or at an officially recognized international exhibition. The U.S. and Canada provide a *grace period* of one year, during which time inventors may use an invention commercially or publish information about it before deciding whether to apply for a patent. An advantage of a grace period is that inventors can begin marketing to determine whether the pursuit of a patent is worthwhile. The disadvantage is that, by using this option, inventors lose their patent rights in countries that do not have grace periods. Thus differences in grace periods across countries tend to distort marketing and patenting decisions.

One way in which novelty is not destroyed by disclosure is when a patent applicant first files in a country that is a member of the *Paris Convention* (of course, before disclosing anything). The applicant then has one year to apply for patents in any other member countries. During that time, the applicant can publicly disclose her invention, and the other member countries will not void her application, as they will treat the filing date in the first country of application as the effective filing date.

It is still the case, however, that an applicant cannot take advantage of grace periods in the U.S. or Canada because grace periods apply to actions taken *before* a patent is filed. In Paris Convention countries without grace periods, the inventor must still file first (somewhere in a Paris Convention country) before disclosing or marketing her invention.

The grace period complements the first-to-invent rule. By first inventing and then commercially practising her invention (for up to twelve months), the inventor in effect prevents other applicants from applying for a patent on a similar invention. Not only is she the first to invent, but her disclosure destroys novelty for other inventors (including those who might file first in other jurisdictions with the first-to-file rule). Only she can exercise the option to apply for a patent within one year of disclosure. A grace period with a first-to-file rule would effectively operate like a first-to-invent system since the grace period extends

<sup>&</sup>lt;sup>11</sup> Wiggs's (1993) point is that even if the U.S. also had a first-to-file rule, U.S. inventors could still see their foreign patent rights in jeopardy unless similar novelty concepts are adopted abroad. If an inventor is from a country with a one year grace period (see below) and publishes her result before applying for a patent, she qualifies for a patent in her home country but forfeits her rights in countries with absolute novelty. Thus where grace periods are not provided, it is likely to be the novelty condition which spurs inventors to file first rather than the fear that a rival will file a similar invention first.

<sup>&</sup>lt;sup>12</sup> Another argument against the first-to-file rule is that it disadvantages the small inventor. However, this assumes that large inventors cannot often be the first to invent. Larger inventors with more resources (for instance, laboratories and personnel), connections to the research world, and a large stock of accumulated knowledge (and variations of inventions), might possibly produce stronger evidence of being first. Small inventors are also likely to find the cost of interference proceedings especially prohibitive.

<sup>&</sup>lt;sup>13</sup> Note that a patent is not granted on the basis of its value in terms of its the net present discounted benefits. The economic value of a patent is useful to economic (welfare) analysis but is not a patent examiner's criteria, at least officially.

only to the inventor who first publicly discloses the invention.<sup>14</sup> Only she can file within twelve months of disclosure and not have the disclosure used against her. Others who try to file before her *will* have the disclosure used against them. Thus systems with grace periods and the first-to-file rule will in effect give priority to those who are *first to disclose*. This would defeat the purpose of having a grace period in order to allow inventors to test-market their inventions or improve their ideas further before applying for a patent. Under this hybrid system, inventors may race to disclose incomplete ideas.

**Interpretation of Claims**. Once an invention is determined to be novel, the next question is "how novel?" This is where the scope of protection is relevant. Patent claims are outlined in the patent's *specifications*. If the patent applicant drafts claims too broadly, she is likely to be rejected for a patent since broad claims are likely to step on some prior knowledge, in which case the invention is not novel. If she drafts claims too narrowly, her competitors are likely to invent around her invention. The claims define the scope of protection and determine whether other inventions will infringe on hers; other inventions must, in other words, lie outside the scope of her invention. Some examiners (particularly in Japan and Korea) favour a relatively narrow scope while others (in the U.S.) permit a relatively broad scope, thus resulting in different kinds of infringements suits and judgements across countries. Some countries (the U.S., Australia, Canada, and China) allow, in infringement suits, claims of an existing invention to cover not only those that are *explicitly* expressed in the patent but also those that are implicit. This is the exercise of the *doctrine of equivalents*, which holds that inventions that substantially perform the same function, in substantially the same way, and produce substantially the same result, are the same inventions. Hence, by exercising the doctrine of equivalents, patent holders can make certain technologically neighbouring inventions around theirs liable for infringement.

**Publication**. Another key difference between patent systems concerns the publication of patent applications. In some APEC nations, the application is kept confidential until the patent is granted, and is kept confidential if the patent is not granted. In other APEC countries, the contents of the application are published after 18 months of application. While early publication contributes to quicker knowledge diffusion, it has some ambiguous effects on the patent applicant's incentives for patenting. On the one hand, it enables competitors to build on the knowledge and possibly make improvements which lead to patented inventions that compete with the applicant's or force parties into cross-licensing. On the other hand, the information in the application can be used by potential competitors to distance themselves from the applicant - that is, to develop inventions that avoid infringement and costly litigation, or avoid unwanted cross-licensing arrangements.<sup>15</sup>

**Examination**. A notable factor here is that in Japan patent examinations can be deferred (for up to seven years). Like grace periods, this feature permits applicants to modify their inventions during the deferral

<sup>&</sup>lt;sup>14</sup> The case where it will not be like a first-to-invent system is if the first inventor keeps the knowledge secret till applying, while a second (but later) inventor discloses the invention before the first inventor applies. The disclosure makes the invention no longer novel but the inventor who first brought the disclosure (i.e. the second, later inventor) has a grace period to decide whether to apply for a patent.

<sup>&</sup>lt;sup>15</sup> Unless of course the objective is specifically to get involved in litigation and cross-licensing. The next section discusses patents as instruments of rent-seeking.

period, while obtaining first-to-file status early on. A criticism with this feature is that it leads to strategic patenting behavior. Applicants who do not have a complete invention to file may nonetheless, by filing first and requesting a deferral of examination, prevent others from applying for a patent on a similar invention.

**Opposition**. Some systems allow the public to oppose the granting of a patent. Others (like the U.S.) do not provide for opposition. Where opposition is permitted, it takes place after a patent is granted. Only in Japan does it take place before the granting of a patent. Pre-grant opposition is preferable if only to prevent the granting and later revoking of an invalid patent. Post-grant opposition is preferable if rivals tend solely to use the process strategically to delay or prevent the granting of a patent to the applicant. The advantage of having oppositions in the first place is that they spread the burden of establishing novelty (and other proof of qualification for a patent) among the public and examiners. It is possible for examiners to overlook factors that are pertinent to the establishment of novelty, non-obviousness, and industrial applicability. The disadvantage is that rivals may offer self-interested (possibly frivolous) arguments against granting.

**Duration**. Most APEC nations provide 20 years of protection from the date of application. While adequate for some firms, it may not be adequate for others. Pharmaceutical firms, for example, use up much time to obtain marketing approval (through clinical tests). If, for instance, it takes 12 years to obtain approval, firms have 8 years of effective protection left, which may not be enough to recoup their fixed innovation costs.

**Working Requirements**. Some countries require that an invention be worked - i.e. utilized (manufactured or marketed) - or else the patentee forfeits her rights. Other countries (like the U.S. and Canada) do not require working. One advantage of requiring working is that it prevents patentees from hoarding knowledge. In the absence of such requirements, an inventor may patent strategically to prevent others from acquiring her technology (and putting it to use) or to wait patiently for the arrival of future innovations that might infringe on her technology, thus leading to profitable legal settlements or collection of royalties. A disadvantage of working requirements is that it does not give inventors the option to choose the most opportune moment to market or manufacture.

**Compulsory Licensing**. Some countries may require patent holders to license their inventions to others. This helps to diffuse the invention more widely (and possibly lower prices). Such mandated licensing can also be used by the government to break deadlocks (for example, when patents *block* each other - i.e. contain overlapping subject material that causes the manufacturing of one invention to infringe upon the other), or be used by the government in the event of national interest (health or safety). On the other hand, compulsory licensing reduces the patent holder's exclusive rights, and has been a major source of complaint against patent systems that feature this.

In short, patent features vary across countries. No one particular feature is ideal for all countries. Each has advantages and disadvantages, making any attempt at global patent harmonization difficult since it is unclear which feature (or combination of features) is best for national or global welfare. The next section explores how these patent features have been utilized in public policy and in private practise. The objective is to examine the extent to which differences in national patent features have resulted in NTBs and STPs.

#### III. Strategic Patenting Cases

This section examines some case studies of patent-related trade barriers. It is useful to divide the cases into two groups (though in some cases it is not very easy to make this distinction): namely those due to public sector strategies and those due to private sector strategies. The former includes examples of NTBs and STPs resulting largely from government actions; the latter are examples of patent-related barriers to trade resulting largely from corporate strategies. The distinction is relevant for public policy initiatives like patent harmonization since it helps to identify the source of conflict and the likely nature of policy response required - whether it be in the area of patent law, competition law, or other. Table 4 contains a brief summary of the case studies.

The distinction is also important because it is often easy to mistakenly conclude that the discriminatory treatment of foreign firms is the outcome of public policy (i.e. as an NTB or STP). Yet a simple fact must not be overlooked: that private firms will choose their patenting strategies to maximize their well-being, not society's. Their chosen strategies may very well deviate from *socially optimal* strategies. Among their strategies, it must be allowed that private firms will try to pre-empt or frustrate the patenting efforts of rivals (both domestic and foreign). It is somewhat surprising that surveys of patent-related NTBs or STPs sometimes ignore the basic point that private firms act to promote their own welfare, not society's. Consequently many surveys tend to view international patenting conflicts as the result of national or government policy.

While most of the case studies describe conflict between the U.S. and Japan, certain similarities in the patent systems of Japan, Taiwan, Korea, and Singapore, and in those of the U.S., Canada, New Zealand, and Australia, make the lessons from the case studies applicable to a wider APEC context.

On the surface most laws themselves do not appear inherently discriminatory. According to Wineberg (1988, P. 12):

"... an examination of the principal provisions of the Japanese patent laws does not reveal anything particularly different or discriminatory. Japan has patterned its patent laws on that of the Federal Republic of Germany."

Kotabe (1992, p. 157) supports this view noting that:

"Pre-grant opposition and deferred examination are the only procedural mechanisms unique to the Japanese patent system ...."

Thus, as Thorson and Fortkort (1993, p. 212) put it, "one must look beyond the mere form of the laws." A key theme in the case studies that follow is that it is not necessarily the laws per se that give rise to discriminatory treatment of foreigners but the way the laws are carried out or practised.<sup>16</sup>

<sup>&</sup>lt;sup>16</sup> Wineberg (1988) also stresses the cultural factors behind the differential effects of patent laws on foreigners.

# Table 4. Strategic Patent Cases

Parties (National	ity):	-	Patent Issue:
Allied Signal (USA)	VS.	MITI Consortia <sub>.</sub> (Japan)	Pre-Grant Opposition
Texas Instruments (USA)	VS.	MITI (Japan)	Compulsory Licensing
Dow Corning (USA)	VS.	Sumitomo Electric (Japan)	Compulsory Licensing
Ampex (USA)	VS.	Sony, JVC, Matsushita (Japan)	Narrow Scope
Lemelson (USA, 1992)	VS.	Toyota, Nissan Mazda, Honda (Japan) Ford, GM, Chrysler (USA)	Submarine Patenting
Honeywell (USA)	VS.	Minolta Camera (Japan)	Non-Manufacturing of Auto-Focus Technolo
Fusion System (USA)	VS.	Mitsubishi Electric (Japan)	Patent Flooding
SanDisk (USA)	VS.	Samsung (S. Korea)	Narrow Scope
Citibank (USA)	VS.	Sakura Bank, Mitsubishi Bank (Japan)	Pre-Grant Opposition
Intel (USA)	VS.	Twinhead (Taiwan)	Purchase of Non-Intel Microprocessing Chip

<u>Sources:</u> Bremmer et. al. (1996), GAO<sup>.</sup>(1993), McDonell (1995), Purchasing (1996), Shota (1992), Wysocki Jr. (1997)

#### A. Public Patenting Strategies

The following describe situations where foreign patentees believed that there were *public* motives impeding their access to national markets.

**Examination Difficulties.** A generic problem faced by patent applicants in Japan is the lengthy examination period. Some view this as a strategic trade barrier. However, the examination period is long for Japanese applicants as well. It can be somewhat longer for foreign nationals partly because they need more time to comply with Japanese legal requirements (for example, to translate technical information into Japanese *kanji* characters)<sup>17</sup> and partly because they must deal with Japanese patent agents (*benrishi*) and not with attorneys from their home country. Some foreign patents applicants have complained of communication problems with their benrishi.<sup>18</sup> Japanese law does not admit foreign attorneys to practise before the Japanese Patent Office (JPO); likewise the U.S. does not admit Japanese attorneys but only those attorneys from countries which reciprocally admit U.S. attorneys.

It is difficult to determine whether the lengthy examinations are used (intentionally) to discriminate against foreigners. To the extent that foreign patent applications are discouraged, there would be less new knowledge to be disclosed to the Japanese public (from the publication of foreign patent applications); this would be counterproductive to any public strategy to try to exploit and imitate foreign technologies. The lengthier examinations may have some other purpose, say to induce cross-licensing.<sup>19</sup>

Examinations are generally longer in Japan because the JPO is relatively understaffed. The average workload per examiner is three times that in the U.S.<sup>20</sup> The workload can be reduced by either increasing the number of qualified examiners or decreasing the number of applications. Due to a practise called *patent flooding* and the patentability of minor inventions (*utility models*) - both of which are discussed more fully below - the JPO receives the greatest number of patent applications (see Table 1).

**Pre-grant Opposition**. Because firms can oppose a grant before the patent is even granted, opposing firms can create a long delay in the patent application process. During this time, the patent application is made public (i.e. 18 months after filing), and Japanese competitors can invent around the applicant's patent, taking advantage of the narrow scope examiners accept to make minimal changes without infringing on the applicant's patent.

The following example shows how this patent system feature can be used to promote domestic industry. In the early 1970s, *Allied Signal*, a U.S. firm, developed an amorphous metal technology useful as a transformer in power utilities. This was targetted by MITI as a critical technology. A consortia of Japanese firms opposed Allied Signal's patent application. Eventually, Allied Signal did get protection, but

<sup>&</sup>lt;sup>17</sup> Patent applications in Japan must be filed in Japanese, whereas they may be filed in any language in the U.S. and translated later.

<sup>&</sup>lt;sup>18</sup> See GAO (1993) and Thorson-Fortkort (1993).

<sup>&</sup>lt;sup>19</sup> See Wineberg (1988) for a discussion of this point.

<sup>&</sup>lt;sup>20</sup> See Kotabe (1992).

the pre-grant opposition consumed much time (10 years). Consequently, since protection issues from the date of application, Allied Signal received only 10 years of effective protection.

**Compulsory Licensing**. Using this patent system feature, the Japanese government was able to help promote its domestic semiconductor industry. As a condition for entering the Japanese market, *Texas Instruments (TI)* was required to take on *Sony* as a joint venture partner and to license its patents to the Japanese semiconductor industry. In Japan, TI faced tremendous difficulty obtaining a patent for its *Kilby* patent. It first filed in 1960 and faced numerous oppositions. The JPO rejected TI's application on the grounds that TI's patent claims were too "broad." By 1989, the JPO eventually granted a patent to TI, but the protection lasts until 2001.

As another example, in the early 1980s, *Dow Corning* sought a patent for optical fiber cables in Japan, but MITI deemed that telecommunications was a vital national interest. Dow Corning was compelled to license the technology to Japanese firms. Subsequently the technology leaked and *Sumitomo* developed a very similar technology which it then tried to export to the U.S. Dow Corning requested the U.S. Trade Representative to ban the imports of Sumitomo's cables; Sumitomo sued to have the patent invalidated, but the U.S. courts rejected it on the grounds that its technology was developed in substantially the same way (this is an example of the use of the doctrine of equivalents).

**Joint Research Ventures**. Strategic government preferences to domestic interests can be pursued through this forum. In MITI's *Very Large Scale Integration (VSLI)* project, while Japanese firms obtained free access to the patented technologies developed under this project, foreign participants were required, in quid pro quo fashion, to cross-license their technologies to obtain access.<sup>21</sup>

**Patent Examination**. The judgement of novelty, non-obviousness, industrial applicability, and scope is often subjective. In other words, patent examiners within or across countries can vary in their interpretation of the inventive step and claims of a patent. With this degree of discretion that patent examiners have, some U.S. firms have felt that examiners in Japan tend to reject foreign patent applications for technologies that MITI might target as critical to Japanese industry.

For example, a case study in Oppenheimer and Tuths (1987) describes the patenting difficulties faced by a small U.S. software developer. It developed a pattern-recognizing invention. But around the same time, Japan's *Nippon Telephone & Telegraph (NTT)* was sponsoring a *Pattern Information Processing System (PIPS)* project of its own. While the software company obtained patents in the U.S., Canada, Europe, and South America, it could not as easily in Japan. The Japanese examiner claimed that the utility or application of the technology was not clear. Eventually the company pared down its claims, as narrowly as possible, and was awarded a patent. The narrow scope of the patent granted to the company enabled Japanese competitors to pursue the PIPS project without infringing upon the software company's rights.

<sup>&</sup>lt;sup>21</sup> See Oppenheimer and Tuths (1987).

As another example, *Ampex*, a U.S. VCR producer, was also required to narrow its claims for its prototype VCR invention. This enabled several Japanese companies (Sony, JVC, and Matsushita) to develop close variations of Ampex's invention - in particular, compact home versions.

#### **B.** Private Patenting Strategies

Patents can be an important tool in strategic competition. The possession of patents can be a trump card for firms that seek favourable licensing terms, joint ventures and other strategic alliances. The following are examples and methods of patenting to capture market share. In the process, private strategic patenting may cause market share away to be taken away from domestic as well as foreign rivals.

**Submarine Patents.** Also known as *stealth* patents, these patents surface rather unexpectedly (sometimes decades after being filed) to challenge the rights of new technologies. That is, they surface with claims that their technological territory covers the claims of new technologies. The idea is to enable the holder of such patents to collect royalties or damages from infringement suits against the users of new technologies. While sometimes it is legitimate to claim that a new invention is a variant of an older one, other times submarine patenting is a lucrative form of activity. Both domestic and foreign firms may fall prey to submarine patenting. Thus, this activity can also be an obstacle to international trade.

An example of the effects of submarine patenting on trade relations is the case of *Lemelson* vs. twelve Japanese automotive companies.<sup>22</sup> Jerome H. Lemelson, the namesake of the annual MIT-Lemelson prize, is a major patent applicant (owning nearly 500 patents). He neither manufactures nor makes prototypes of his inventions. In 1992, he successfully collected \$100 million from twelve Japanese automotive companies (including Toyota, Nissan, Mazda, and Honda) which all settled with him rather than go to court. His claim was that all of these companies were using image processing and other devices which he already had rights to from earlier patents. Lemelson has also pursued U.S. automotive companies, but Ford Motors is going to court. In this instance, Ford Motor would likely prefer to see the doctrine of equivalents applied less broadly. At issue is that the scanning device in Ford factories is mobile (i.e. can be hand-held) whereas the drawings in Lemelson's patents show the scanner in a fixed position.

From a social welfare point of view, submarine patenting is an unproductive, rent-seeking activity. Submarine patents make "no real technological contribution."<sup>23</sup> Resources are diverted to an activity that transfers rents from the "intended" practitioner of new knowledge to the non-practitioner (rent-seeker). As Bruce Lehman, the U.S. Commissioner of Patents and Trademarks, remarks:

"I thought what the patent system was all about was coming here and getting a patent and going to some banker or venture capitalist ... and get money, and then you go out and start a company and put products out on the marketplace. And you go sue the people that infringe on you." -- Wysocki (1997), p. A8.

To the rent-seekers, patenting itself is a business.

<sup>&</sup>lt;sup>22</sup> For fuller details, see Wysocki (1997).
<sup>23</sup> See Stern (1993).

This is an example where the obstacle to trade (domestic and international) has its origins in private strategic behavior, not public. Moreover, this activity adds to the transactions costs of doing business for both domestic and foreign firms *non-discriminantly* - although a case could be made that foreign firms less familiar with the practise or less innovative (say from smaller APEC nations) may be more adversely affected.

While the patent laws here are not explicitly discriminatory to foreign interests, it would be useful to consider what patent reforms might reduce submarine patenting and its barriers to trade.<sup>24</sup> In the U.S., patent laws do not allow for the publication of a patent application until (and unless) it is granted. If instead they allowed for the publication after 18 months of the date of application, as in other parts of the world, there would be less of a chance that firms would be surprised by submarine patents. Secondly, it might be useful to include manufacturing as a requirement of patents that are granted. Some countries of course have working requirements (after 3 years). The U.S. does not, and it could consider having one within a longer period (say 5-7 years). This would cut down on the hoarding of patents. Alternatively, working could be required only as a condition for being able to sue for infringement.<sup>25</sup> Finally, another proposal for reducing submarine patenting is to limit *continuation-in-part* patent applications. These allow applicants continually to file slightly revised versions of their patent applications. Thus, strategically motivated firms could adjust their applications to incorporate claims that cover the technologies of their rivals. As long as the applicants were first to file or invent, any commercialized technology which "steps" on the revised claims can be found to infringe. The laws could therefore put an upper limit on the number of revisions allowed and some time limitations on which to make them. Another proposal is to begin patent protection from the date of filing rather than the date of grant. Applicants would therefore use up their own (duration) time in making those revisions.

**Blocking Patents**. Firms can also strategically patent to prevent others from entering their technology territory. This practise is known as *strategic* blocking. Firms invent around their own core patents, and as a "fence," the new patents prevent others from developing and patenting inventions near their core technology neighborhood. The incumbents are likely, but not always, to have the advantage in doing so since they have easier access to the original research records of their core technologies. These blocking patents may act as entry barriers if competitors know that those patents are pending or are granted. Competitors risk getting embroiled in litigation if they enter a market and infringe upon existing technologies. Research by Cohen et. al. (1996) report that 82% of respondents indicated that blocking was a motive for patenting. Seeking protection for their intellectual property rights was secondary.

**Portfolio Patenting**. In Schumpetarian competition, firms would study the patenting and R&D strategies of rivals. The rivals in turn would do the same. But patents, however, disclose new knowledge (in exchange for the protection) and possibly some key information about firm strategies. One way to make it difficult for rivals to keep track of one's R&D results, strategies, and priorities is to file multiple patents (i.e. a portfolio

<sup>&</sup>lt;sup>24</sup> The following policy suggestions are from Stern (1993).

<sup>&</sup>lt;sup>25</sup> In a 1992 case, Minolta (Japan) paid Honeywell (USA) royalties of \$127 million for using in Minolta Alpha 7000 cameras the SLR (single lens reflex) technology which Honeywell developed in the mid-1970s but never manufactured. Honeywell has also sought to enforce its rights against video camera producers which, Honeywell argues, use the SLR technology (see Shota (1992)).

of them), each carrying a piece of the puzzle. This makes it costly and time-consuming for rivals (or future innovators) to trace all the information. An external effect of this is that it taxes the patent system (in terms of examination time and the search for prior art). Such a practise works against the social objectives of technology creation and diffusion, but works to allow certain firms to maintain market share.

**Patent Flooding**. A popular Japanese corporate strategy is to surround a foreign company's (or in some cases domestic company's) core patent with numerous patent applications representing minor improvements. This time (in contrast to a previous example) the *rivals* invent around a company's core patent. It is as if the rivals take the core technology "hostage." These flooded patents come so close to "blocking" the core patent (that is, they are all so close to infringing upon each other in use) that all the firms are forced into cross-licensing (thus exchanging each other's technology).

Patent flooding has in the past enabled some Japanese firms to appropriate the technologies of foreign firms. For example, *Mitsubishi Electric Co.* filed several hundreds of utility models around the U.S.'s *Fusion System Corp*. Indeed, relative to foreign applicants, Japanese companies like Mitsubishi, Ricoh, Matsushita, and Sharp have numerous utility filings (i.e. for every three patent applications, they have at least one utility model application).<sup>26</sup>

A factor that contributes to patent flooding is the patentability of utility models; that is, for inventions that represent less of an inventive step required to qualify for an ordinary patent. Often, fringe technological ideas are the subject of utility models. With the publication of a rival's patent, competing firms can file applications for small changes in the design, shape, or structure of the rival's technology.<sup>27</sup> Again, the laws permitting patent flooding are not inherently discriminatory to foreigners. Patent flooding is something that foreigners can also practise on the Japanese firms. Indeed, Korean firms have started to flood applications around core Japanese technologies.

By clogging up the patent examination office, patent flooding also contributes to lengthy delays in patent granting. It also explains why Japan leads in domestic patenting (see Table 1). Patent flooding may also be seen as an unproductive use of time and resources. From a social welfare point of view, firms could better devote their time, energy, and resources to investing in more inventive projects rather than, essentially, to setting strategic traps for their competitors. One way to prevent patent flooding is to limit the number of utility filings, or make utility models require a larger inventive step. Another is to adopt the doctrine of equivalents so that patent claims can be more broadly interpreted, and thereby include or anticipate some of the patent and utility model applications that might be filed around the core patent.

**Narrow Scope**. When the scope of a patent granted is too narrow, it is easier for firms to "bump" into each other in technological space since firms can invent more closely to the central "core" of existing technologies. It also allows more inventors to participate in patenting: from producers of high quality inventions to low, from large inventive steps to small, or from great novelty to little. Hence it should not be surprising to see more infringement suits and invalidation challenges in regimes that reward narrower scope. (Offsetting this might be whatever technological benefits a narrower scope provides).

<sup>&</sup>lt;sup>26</sup> See Thorson and Fortkort (1993), p. 300.

<sup>&</sup>lt;sup>27</sup> For example, if someone has a patent for a plane, one could file utility models on the cockpit design, fuel injection process, or the landing gear.

For example, SanDisk (USA) has sued Samsung (Korea) for what the former sees is a slight modification of its flash technology; Grid Systems Corp. (USA), the developer of the basic structure of laptops, has sued *Toshiba* (Japan) for the latter's slight modification of the structure and display of the laptop; and Micron Technology (USA) has challenged Goldstar and Hyundai (Korea) for their modification of Micron's process for holding the structures of memory chips together. However, if patent harmonization should require that nations standardize "scope" and to do so at a fairly broad range, this might bias against the awarding of patents to the smaller APEC members. Their innovations - compared to those of the advanced industrial members of APEC - are likely to be of a relatively lower inventive step, quality, and novelty. At their stage of development, their innovations may largely consist of improvements which build upon existing knowledge bases.

**Pre-grant Opposition**. Pre-grant oppositions can be used by firms to frustrate rival patent seekers. Applicants facing such opposition must respond to each one individually and sequentially.

Recently, *Citibank* faced numerous oppositions against the patenting of its cyberbank technology.<sup>28</sup> Led by Sakura and Mitsubishi Banks, the oppositions argued that Citibank's claims were too broad and that a patent granted to Citibank would give the latter too much "territory" over cyberbank technologies. Another motive for the opposition was that the Japanese banks invested heavily in the British version of the technology (i.e. Mondex) developed by National Westminister. They would therefore have preferred the patent go to the British bank.

In some cases, the Japanese oppositions do not succeed. Recently, *Genentech* fairly easily withstood 38 oppositions (led by *Toyobo*) against the patenting of its TPA (a drug for treating heart attacks). Its patent in Japan was granted within 4 years of application, while it was turned down in Europe. One strategic reason Genentech received favourable treatment by the authorities might be that the market for TPA in Japan is small.

A key question whether is it is possible to eliminate unproductive oppositions (aimed solely at thwarting competitors' patenting applications) without eliminating the pre-grant opposition feature. As a model, Article 25 of Decision 313, Cartegena Agreement (1992), provides legislation to be used to penalize excessively tactical oppositions. Overall, however, only ten percent of applications are opposed in Japan.<sup>29</sup> Of these, the average application faces about two oppositions. Generally, the broader and more valuable inventions are opposed.

**Restrictions on Licensees.** Just as governments can impose licensing restrictions, private agents can also. In the case of Intel (USA) vs. Twinhead (Taiwan), the latter, a producer of notebook personal computers, had been obtaining supplies of microprocessor chips from both Intel and Intel's licensees. Intel requested Section 337 proceedings against Twinhead, arguing that Twinhead's sale of notebook PCs containing chips of Intel's licensees (who incidentally were also Intel's competitors) was tantamount to infringing upon Intel's patents. Intel sought to collect royalties from Twinhead for using chips supplied by Intel's licensees. Eventually Intel

<sup>&</sup>lt;sup>28</sup> See Bremmer et. al. (1996).
<sup>29</sup> See Thorson and Fortkort, p. 297.

lost, and was found to "misuse" its patent rights.<sup>30</sup> Intel's underlying objective appeared to be to discourage Twinhead and other PC firms from using non-Intel chips, and thus allow Intel to retain its dominant market share. It appeared not to be the case that Intel was harmed by a foreign infringer, but that Intel faced growing competition from other chip makers and was choosing a 'response' stategy.

#### IV. Conclusions: Should APEC Harmonize its Patent Systems?

This section provides a general assessment of whether patent harmonization in APEC will help constrain the use of patent-related trade barriers or strategic industrial policies. Stern (1987, p. 204), argues that:

"National intellectual property laws act like NTBs only where there is disharmony in the law of nations. If every nation had identical intellectual property laws, to pick an extreme case, intellectual property laws would not operate as NTBs."

The conclusion in this paper, in light of the examples and case studies considered in the previous section, is that the harmonization of patent laws would not alone eliminate or reduce patent-related barriers to trade. First, it is not the laws (or differences in laws) per se which give rise to NTBs or STPs, but the *practises* of governments and firms. Secondly, it is not only -or even mainly - the legal or public authorities that can create NTBs or engage in STPs to promote some national interest, but private agents as well. The latter, in pursuing their own private interests, may pursue practises which restrict domestic and/or foreign competition. To the extent that patent harmonization focuses only on binding government actions or on setting rules for government behavior, the effort will fail to reduce patent-related barriers to trade. Other laws, rules, or penalties governing private practises are needed; for example, unfair competition rules or other laws that reach areas outside the scope of patent laws.

Laws themselves are unlikely to eliminate strategic *motives* on the part of firms or governments. In the case of firms, one could argue that it is in the nature of most firms to be strategic in competition, and that this should be taken as a given in policy formation. In the case of governments, however, a case could be made that, as public institutions, they *should* be able to act in the social interest and commit, through international rules, not to use strategic patent policies which, if applied worldwide, reduce world trade and welfare.<sup>31</sup> This case, of course, is subject to opposing political economy pressures for governments to choose policies that benefit particular groups or sectors.

Nonetheless, to the extent that private strategic patenting and rent-seeking behavior continue to occur, tying public sector hands alone would not eliminate patent-related barriers to trade. International agreements, such as TRIPS, appear to concentrate predominantly on rules governing public sector behavior (with regard to the provision, administration, and enforcement of patent rights). More attention is needed to address barriers to trade resulting from private patenting behavior. While certain changes in patent laws may help to reduce abusive private strategic behavior, it is also important to address those abusive practises more directly.

<sup>&</sup>lt;sup>30</sup> See McDonell (1995) for details.

<sup>&</sup>lt;sup>31</sup> A major cost to the world would be the misallocation of patent protection to less efficient inventors.

In thinking about international patent harmonization, it is important to acknowledge what the *objectives* of harmonization are. For instance, it is possible to misinterpret the idea of a level playing field to mean the equal presence of domestic and foreign agents in the market. This is not the case. The idea behind a level playing field is to remove distortions - or to create equal "opportunities," not equal outcomes. The relevance of this is that harmonization or patent policy reform should seek not to ensure that foreign firms will play the same strategies that domestic firms have the advantage in playing, but should seek to remove the strategic practises which create the distortion or barriers to trade in the first place. This is subtle point that is often overlooked.<sup>32</sup>

It is also important to acknowledge the *costs* of patent harmonization as well as the *benefits* (say from reduced trade distortions). The harmonization of APEC patent laws (let alone those of the entire world) will be an ambitious and costly undertaking: the meetings and negotiations; the lobbying to get approval of the harmonized treaty from national legislative and executive bodies; the changing of individual country laws; and the transition process.

Another kind of harmonization cost is the cost of choosing the "wrong" standards - wrong, say, from an economic, ethical, or other view. In discussions of harmonization, it should not be assumed that choosing uniform standards will be distortion free. Unfortunately there is much disagreement about which particular patent system feature is best; for example, is post-grant opposition better, pre-grant, or none at all? Is a first-to-file or first-to-invent system fairer? Is a narrow scope or broad scope optimal? Should patent laws all apply the doctrine of equivalents? Not only is it not clear which of these various features is best for stimulating innovation and productivity, it is also unclear which reduces or increases barriers to trade and competition. The odds are that a given choice of uniform standards will be inefficient. Thus, the argument in favour of imposing APEC (or worldwide) uniform standards must rest on the idea that the elimination of transactions costs has such large global gains that they outweigh all the inefficiencies arising from standardizing along imperfectly chosen patent system features.<sup>33</sup>

One advantage of taking more seriously the *practises* of laws across patent systems is that if much of the NTBs or STPs can be reduced or eliminated by *penalizing* abusive patenting practises without having to change much, if any, of the laws, there would be less pressure to have to harmonize patent laws fully or even partially, and incur these costs of global harmonization.

Finally, the remainder of this section considers some issues that patent harmonization does not address, and that ought to be addressed in future debate. First, APEC consists of a diverse group of countries, at different stages of development. In some countries, patent systems are quite complex and evolved. In others, patent systems have just been created or are in the process of being created. In these countries, their high-tech or innovation sectors are also not as fully developed as those of the advanced

<sup>&</sup>lt;sup>32</sup> For example, policy recommendations in Thorson and Fortkort (1993) include the suggestion that U.S. firms be able to acquire the "skills" and opportunity to use pre-grant opposition, patent flooding, and utility models to compete on an equal footing with the Japanese firms in the Japanese market. From an economic point of view, this is much less efficient than setting policies to eliminate abusive practises on the part of *both* domestic and foreign firms. In principle, the focus of harmonization (or of the idea of a level playing field) should be not so much on the relative well-being of domestic and foreign firms but rather on the broader issue of whether the environment in which they operate is free of distortions.

<sup>&</sup>lt;sup>33</sup> A future work could test this proposition in a multi-country general, equilibrium simulation model.

members of APEC. It is unlikely to expect strategic private patenting behavior to be a major issue here. Their firms are unlikely to compete successfully against their counterparts from Japan or the U.S. at the game of strategic patenting. Thus rules governing strategic patenting are not likely to receive as high a priority as say getting technical cooperation from advanced APEC members, training examiners, and acquiring resources to develop their judicial infrastructure further. In other words, there are different priorities across APEC nations. This is not to say, however, that the experiences in Japan and the U.S. cannot be important lessons for the smaller APEC members to draw upon as their patent systems mature. Yet APEC may be too diverse a group to reach mutually interested agreements on patent harmonization.

Harmonization will also be inadequate in guaranteeing that patent rights are equally protected around the world. Clearly the enforcement infrastructure varies across countries, depending partly on the resources countries have. Poorer economies that say have the same laws as the rest of the world would likely have fewer resources to put into protecting and enforcing patent rights.

Likewise, another factor that varies internationally is the cost of patenting. Even if the laws are the same, as long as the cost of patenting remains uneven, there are still likely to remain significant transactions costs and impediments to international trade and patenting (see Meller (1997)).

In conclusion, there is scope for patent reform to improve APEC trade relations provided both public and private patent-related barriers to trade are addressed. However, patent law harmonization alone is not a sufficient response to international patenting conflicts and patent-related trade barriers. It is also necessary to (i) focus on the practises of the laws, (ii) complement patenting rules with other rules (concerning unfair competition), and (iii) address the costs of patenting, the limited resources for enforcement, the different priorities of different APEC members, and the desirability of different patenting features.

## **References:**

Bremmer, Brian (with Joan Warner and Jonathan Ford), (1996), "Hold it Right There, Citibank," <u>Business</u> <u>Week</u>, March 25, p. 176.

Cohen, Wesley, Nelson, Richard, and Walsh, John (1996), "Appropriability Conditions and Why Firms Patent and Why They Do Not in the American Manufacturing Sector," paper presented at the OECD Conference on New Indicators for the Knowledge-Based Economy.

Ginarte, Juan Carlos and Park, Walter G. (1997), "Determinants of Patent Rights: A Cross-National Study," <u>Research Policy</u>, Vol. 26, No. 3, pp. 283-301.

Laird, Sam and Yeats, Alexander (1990), <u>Quantitative Methods for Trade Barrier Analysis</u>, New York University Press.

Jacobs, Alan (ed.) (1996), <u>Patents Throughout the World</u>, 4th edition. New York: Clark Boardman Callaghan.

Kotabe, Masaaki (1992), "A Comparative Study of U.S. and Japanese Patent Systems," <u>Journal of International Business Studies</u>, Vol. 23, No. 1, pp. 147-168.

McDonell, Neil E. (1995), "International Trade Commission Sec. 337 Proceedings Are a Powerful Way to Block Infringing Imports at the Border But Can Backfire, as Intel Has Learned," <u>The National Law Journal</u>, February 6, p. B5, B8.

Maskus, Keith E. and Penubarti, Mohan (1995), "How Trade-Related are Intellectual Property Rights?" Journal of International Economics, Vol. 39, pp. 227-248.

Meller, Michael N. (1997), "Costs are Killing Patent Harmonization," Journal of the Patent and Trademark Office Society, Vol. 79, No. 3, pp. 211-225.

Moy, Carl R. (1992), "Essay: Patent Harmonization, Protectionism, and Legislation," Journal of the Patent and Trademark Office Society, Vol. 74, No. 11, pp. 777-810.

Olechowski, Andrzej (1987), "Nontariff Barriers to Trade," in <u>Uruguary Round: A Handbook on the</u> <u>Multilateral Trade Negotiations</u>, J. Michael Finger and Andrzej Olechowski (eds.), Washington, D.C.: The World Bank.

Oppenheimer, Michael F. and Tuths, Donna M. (1987), <u>Nontariff Barriers: The Effects of Corporate</u> <u>Strategy in High-Technology Sectors</u>, Boulder, CO: Westview Press.

Park, Walter G. (1997), "Issues in International Patenting," reported prepared for the OECD, Directorate for Science, Technology, and Industry.

Primo Braga, Carlos (1996), "Trade-Related Intellectual Property Issues: The Uruguay Round Agreement and its Economic Implications," in Will Martin and L. Alan Winters (eds.), <u>The Uruguay Round and the</u>

<u>Developing Economies</u>, Cambridge University Press, pp. 341-379. <u>Purchasing</u>, "SanDisk files patent complaint against Samsung," February 15, 1996, Vol. 120, No. 2, p. 99.

Rapp, Richard and Rozek, Richard (1990), "Benefits and Costs of Intellectual Property Protection in Developing Countries," National Economic Research Associates Working Paper No. 3, Washington, D.C.

Smith, Pamela J. (1996), "Are Weak Patent Rights a Barrier to U.S. Exports?" University of Delaware, Department of Economics Working Paper.

Stern, Richard (1987), "Intellectual Property," in <u>Uruguary Round: A Handbook on the Multilateral Trade</u> <u>Negotiations</u>, J. Michael Finger and Andrzej Olechowski (eds.), Washington, D.C.: The World Bank.

Stern, Richard H. (1993), "Patents and International Trade Issues," IEEE Micro, Vol. 13, pp. 89-92.

Thorson, Andrew H. and Fortkort, John A. (1995), "Japan's Patent System: An Analysis of Patent Protection Under Japan's First-to-File System," <u>Journal of the Patent and Trademark Office Society</u>, Part I in Vol. 77, No. 3, pp. 211-221; Part II in Vol. 77, No. 4, pp. 291-320.

Tussie, Diana (1993), "The Complexities of Policy Harmonization: The Case of Intellectual Property Rights," Inter-American Development Bank, WP-TWH-55, Washington, D.C.

Tyson, Laura (1993), <u>Who's Bashing Whom: Trade Conflict in High-Technology Industries</u>, Washington, D.C.: Institute for International Economics.

U.S. Government Accounting Office (1993), Intellectual Property Rights: U.S. Companies' Experiences in Japan, GAO/GGD-93-126, Washington, D.C.

Ushio, Shota (1992), "Patent Wars Heating Up," Tokyo Business Today, Vol. 60, No. 5, pp. 26-31.

Wiggs, Blake R. (1991), "Canada's First-to-File Experience - Should the U.S. Make the Move?" Journal of the Patent and Trademark Office Society, Vol. 73, No. 7, pp. 493-513.

Wineberg, Arthur (1988), "The Japanese Patent System: A Nontariff Barrier to Foreign Businesses?" Journal of World Trade, Vol. 22, No. 1, pp. 11-22.

World Intellectual Property Organization (1980), Industrial Property Statistics. WIPO: Geneva.

World Intellectual Property Organization (1990), Industrial Property Statistics. WIPO: Geneva.

Wysocki Jr., Bernard (1997), "How Patent Lawsuits Make a Quiet Engineer Rich and Controversial," <u>Wall</u> <u>Street Journal</u>, April 9, p. A1, A8.

#### **Comments by Carlos Alberto Braga on**

## Patent Systems in APEC: Role in Nontariff Trade Barriers and Strategic Trade Policies by Walter Park and Measuring Trade Impediments to Services within APEC by Malcom Bosworth, Christopher Findlay, Ray Trewin, and Tony Warren

# Let me start by saying that I enjoyed the papers, and I tried to measure the contribution based on one letter that I received that said that the USITC, when requesting these papers, was striving to get a critical assessment of the state of the literature. While reading the papers on the metro on my way here, my first role in the critical assessment of the literature was to see if I were quoted. I was quoted in your paper. I was not quoted in yours. So that was the first problem. We are still in a very initial stage in some of these issues, particularly when we try to talk about relevance, particularly from the perspective of developing countries. The paper on intellectual property rights is good not only on the strength of the intellectual property rights regimes, but also on how these regimes are implemented. I do not have any disagreement in terms of the issues that were raised. Those issues are particularly relevant for the industrialized countries that are the OECD level countries in the context of APEC negotiations. Most of

the papers give relevant examples about the U.S.-Japanese relations.

For developing countries, some other issues require attention even at the level of negotiations related not only to the issue of how the law is applied but also to how to put in place the commitments at different levels. For instance, some of these countries, as Professor Park mentioned, do not yet even have a full system of patent protection. Those that have made commitments that are WTO members probably will have something in place shortly. The question of enforcement is another dimension of negotiations. We already see enforcement in bilateral relations mentioned in passing, relative to a major economy like China, and relative to relations with the United States. The enforcement issue is going to be contentious in industrializing countries because enforcement is very resource-intensive. Many countries do not have experience in how to do it and will need technical assistance, especially where different practices can cause friction for the sake of friction.

The intellectual property rights paper is useful for defining two issues: implementation and enforcement. The other issues of private action and strategic behavior are interesting. In the end, however, the chief issue is what a nontariff barrier to trade is? Since the 1980s, we can say that intellectual property rights do affect trade. The literature has come to a consensus. Many models try to show this consensus. The dimensions of this impact of intellectual property rights, however, are open as in the question of private action, and in the effect of competition laws. We need to consider all this at the level of negotiations.

The paper on services poses the different alternatives to identify the implications of protection in the area of services for trade. The OECD has done a comprehensive study of the literature, and 3 years ago we did a study identifying the nontariff barriers to trade (still the most comprehensive review, with focus on developing countries). In terms of how to measure these, the seven steps from an economic perspective are right. I would add-that one more way to put some benchmarks in the area of telecommunications-that the FCC has just released for international phone calls.

To bring all this to a computer general equilibrium models, you mention some initial experiments of Drucilla Brown and others, published already in a book about the Uruguay Round. An issue of *Asia*-

*Pacific Economic Review*, with several pieces on this topic in a conference in Canberra, has among others, Joseph Francois advancing this discussion about how to model at the level of a general equilibrium model. This material needs attention for all the APEC countries in the content of the GATS.

We need to be careful not to give the wrong impression. The GATS is not a stand-still agreement. The offers made in Marrakesh in 1994 were tantamount to stand-still in the sense that the countries did not use the GATS to liberalize the regimes significantly. Their offers were status quo, but GATS is not stand-still. Major commitments in terms of liberalization of basic telecommunications agreement have been achieved. These commitments were the first big success of the GATS agreement.

## **Comments by Michael Ferrantino<sup>1</sup> on**

## "Patent Systems in APEC: Role in Nontariff Barriers and Strategic Trade Policy" by Walter Park

Firms which seek to patent abroad can be subjected to a variety of irritations and frustrations, of types not experienced under their home-country intellectual property laws. Walter Park has provided us with a very useful overview of these irritations, and asks whether they constitute nontariff barriers to trade (NTBs) or instruments of strategic trade policy. As David Richardson points out elsewhere in this symposium, the economic issues involved in constructing a socially optimal international regime for intellectual property rights (IPRs) are indeed murky. From the standpoint of economic theory, the question of whether any particular country's IPR practices are relatively close to the optimum, either from the standpoint of national or global welfare, is yet more difficult. Among policymakers, at least in "Washington consensus" circles, there is a good deal more confidence in the right direction to head. Strong IPRs are better than weak, including strong recognition of foreigners' rights, and it is sometimes implied that the difference between a "strong" and "weak" system can be determined by casual inspection. *A priori*, the likelihood of economic theorists neglecting practical considerations and of policymakers ignoring basic economics cannot easily be ranked. Thus, the present effort at detailing the practical effects of different national patent systems in their actual operation is particularly salutary.

It should be emphasized at the outset that Park's concern is primarily with international trade in intellectual property, rather than merchandise trade. The present paper does not take up the question of whether strong recognition of foreign intellectual property tends to promote merchandise trade (e.g. by preventing reverse engineering of goods post-shipment) or to substitute for merchandise trade (e.g. by facilitating tariff-hopping direct investment, which is more profitable if employees in the foreign subsidiary cannot leave and set up shop using technologies learned in their first employment).

The evidence on the international effects of strong IPRs is beginning to accumulate. Strong IPRs generally encourage more trade in technological information itself, whether measured by values of royalties and license fees or by cross-licensing of patents (Ferrantino (1993), Ginarte and Park (1996)). Exports from developed countries to developing countries increase with stronger IPRs (Maskus and Penabarti (1995)), particularly when the developing country involved has sufficient technological capacity to make imitation viable (Smith (1997)). Countries with weak IPRs receive less foreign direct investment, and what they do receive is heavily weighted toward sales, distribution, and rudimentary production with widely diffused technologies (Lee and Mansfield (1996). But strong IPRs do not necessarily stimulate all cross-border transactions. Cross-licensing of patents is reduced among countries with the highest level of IPR protection, since firms prefer not to share a truly effective patent monopoly (Ginarte and Park (1996)), and intrafirm exports of multinational firms may be stimulated by weaker IPRs, possibly to conceal steps of the production process (Ferrantino (1993)).

<sup>&</sup>lt;sup>1</sup> The author is with the Office of Economics of the U.S. International Trade Commission. These comments are solely meant to represent the opinions of individual authors. They are not meant to represent in any way the views of the U.S. International Trade Commission or any of its individual Commissioners or the U.S. government.

On the basis of the available evidence, it is reasonable to infer that strengthening of IPRs is complementary with trade and investment liberalization. This inference comes with a caveat; the complex effects of simultaneous liberalizations on the behavior of multinational firms are still not completely understood. By restricting his scope in the present paper to international patenting, Park is dealing in an area where the lines of argument are considerably clearer.

What people generally mean by a "strong" IPR regime is one in which inventors easily obtain recognition of their inventions, have reasonable prospects of discouraging imitators through the legal process, and thereby have greater incentives to invent. A strong global regime, by extension, is one in which inventors easily obtain worldwide recognition and can discourage imitators anywhere on the globe. APEC's Osaka Action Agenda of 1995 adheres fairly closely to this approach.

The TRIPS agreement, proof text for the APEC IPR goals, recognizes that countries might design their IPR systems for both "developmental and technological objectives" and that the least-developed countries need "flexibility ... in domestic implementation ... in order to enable them to create a sound and viable technological base." This implies that poorer countries, with weaker research capabilities, might find it in their interest to permit a good deal of domestic imitation of foreign intellectual property.

Park's analysis does not focus directly on differences between developed and developing countries, but rather on differences between the patent sytems of the United States and Japan, which he sees as paradigmatic of a greater divide within APEC. He gives Taiwan, Korea, and Singapore as examples of economies with relatively Japanese-style systems, and Canada, New Zealand, and Australia as examples of economies with systems similar to the United States.

Japan has a deep technological base and engages in a good deal of innovation, as reflected in the large number of Japanese patent applications outside of Japan. Some of the underlying tensions behind the institutional differences discussed in the paper can be highlighted by an analysis of Park's Table 1, which assigns equal weights to each patent authority's data to adjust for the problem of varying patent scope in different countries. In considering ten countries other than the "big four" patenters, one finds patent applications in the "typical" APEC country look as follows:

APEC Patents by Country of Filer in 10 Technology-Importing Economies, 1990 (percent of total)

United States	38.6
Japan	14.0
Domestic	10.7
Australia	2.2
Canada	0.9
Other foreign	33.6

Allowing for the fact that countries with relatively low levels of patenting probably do not seek many applications outside the domestic market, this probably gives a fairly good picture of the relative contribution of various countries to overall technological effort in the APEC region. If one considers that pirated technology from overseas is not always matched by a corresponding patent application from the inventor, then the share of foreign technological effort in general, and U.S.

technological effort in particular, in APEC's overall development is necessarily greater than that indicated. By the above indicator, total exportable U.S. technological output in 1990 was 2.76 times the size of exportable Japanese technological output. For comparison, U.S. population. GDP, and manufacturing GDP (the latter two valued on a World Bank Atlas basis) were 2.02, 1.73, and 1.07 times the Japanese level respectively. This reflects the higher level of research productivity in the U.S. economy, also manifested in the chronic surplus in the U.S.-Japan bilateral technology trade balance. In 1995, for example, U.S. receipts of royalties and license fees from Japan were about \$5.34 billion, versus U.S. payments to Japan of \$1.47 billion.

This surplus would be even greater if it were easier for U.S. firms to make direct investments in Japan - the share of U.S. technology receipts from Japan not accounted for by U.S. affiliates is a relatively high 28 percent, as compared to 16 percent for receipts from other countries.

By contrast, Park's data on the 1990 distribution of patent applications filed in each of the four major APEC technology sources reduces to the following:

Patents originating from (percent of total)								
Patents filed in	DomestidUSA	Japan	Austra	li <b>C</b> anad	a Other	foreign		
USA	52.1		21.9	0.8	2.2	24.8		
Japan	89.5	5.2		1.2	1.2	6.0		
Australia	26.2	32.7	7.2		2.0	31.9		
Canada	8.3	44.4	11.7	1.6		34.5		

In the United States, the share of patents filed by U.S. inventors is only modestly higher than the total share of U.S. patents in the technology-importing markets, reflecting a reasonable preference of U.S. inventors for patenting at home. In Japan, by contrast, it is particularly difficult for any foreigner to get a patent. Given the U.S. lead in the overall volume of patentable inventions, it is striking that the share of patent applications filed in Japan and of U.S. origin, is less than one-quarter the share of patent applications filed in the United States and of Japanese origin. One expects the reverse situation - the Japanese net importation of technology in value terms, as reflected in licenses and royalties, should be reflected in a large share of patents filed in Japan being of U.S. origin.

The data thus suggest that either Japanese patent laws, or the patenting behavior of Japanese firms, creates a non-tariff barrier to trade in disembodied technology, This reduces U.S. firms' technology rents in the Japanese market, and perhaps in similar markets with Japanese-style rules and behavior. Park's account of the Japanese patent system and practices outlines how this takes place in practice. One reasonable interpretation of this state of affairs is that while Japan has now graduated to the stage of being a net technology exporter relative to most of APEC, its institutions still reflect its historical position as a net technology importer relative to the United States, with a system designed to facilitate imitation of U.S. (and to a lesser extent, European) technology even at some potential cost to the ability of emerging Japanese inventors to secure enforceable rights on their own innovations.

In contrast with this institutional analysis, both the Ginarte/Park index of patent rights for 1995 and the older Rapp and Rozek index (which covers more countries) reflect a fairly clear demarcation between developed and developing countries in terms of overall strength of patent rights, with Japan looking like the former group. As Park notes, the tension between his numerical scoring of Japan as having strong IPRs and his institutional analysis of the Japanese system as potentially engendering NTBs is based on the reliance of the numerical scores on *de jure* features of the patent system, while the institutional analysis uncovers issues of *de facto* implementation.

The dichotomy between developed- and developing-economy APEC members is easily explained in economic terms. As Park recognizes, any patent regime must balance the gains of increased patent protection in terms of accelerated technical progress against the losses associated with the monopoly position of the patenter and the relative lack of competition. An MFN strengthening of IPRs in APEC's weak IPR countries will boost the incentives to research worldwide. By cutting off technological imitation, this will raise the price of some goods, with costs for consumers. Poorer countries are further down the product cycle, and can more readily produce imitative goods with mature technologies than engage in competitive innovation with the developed countries. Indeed, these countries already pay a substantial amount for international licenses and royalties (Evenson (1990)). Moreover, developing countries tend to be net importers of high-tech goods and in the short run may benefit from the option of buying cheaper imitation varieties of these goods. Thus, there tends to be a dichotomy between the interests of developed countries and developing countries, with the former desiring strong IPRs in order to earn greater rents from innovation with the latter disproportionately enjoying the benefits of imitation and competition (Chin and Grossman (1990), Deardorff (1992)).

In current APEC discussions, the developing members have elevated the issue of TRIPS implementation and technical assistance. They have argued, so far effectively, that the task of TRIPS implementation is so great as to preclude the taking up of new issues raised by the United States. These issues include the granting of rights for new technologies, particularly those based on information or biotechnology, which are still unpatentable in many countries.

The Japanese system is not "weak" in the same sense that the systems in developing APEC countries are said to be weak. The Japanese system maintains a substantial legal and administrative apparatus for processing both patents and patent disputes, and handles twice as many applications every year as the U.S. system. One main reason for this is the narrowness of scope of Japanese (and Korean) patents, which makes it easier for inventors to file claims for non-infringing close substitutes than in the U.S. system. Narrowness is partly induced by law and partly by the behavior of patent examiners, but it is essentially set by government. Under a narrow-scope system, the rents earned by any individual patenter are smaller than under a broad-scope system. Setting narrow scope leads to two of the private practices which Park discusses, patent flooding (in which competitors file numerous patents for minor modifications of the original invention to limit its scope) and patent blocking (the original inventor's defense against flooding, in which the inventor files the minor modifications simultaneously with the original).

Interestingly, when patent systems are operated on an MFN basis foreign firms may adopt the strategic practices in the local market. Park documents that Korean firms "flood" the Japanese patent authority with applications which surround valuable Japanese patents. U.S. firms seem not to do this very often. This may be attributable to the relative positions of the United States and Korea in the product cycle; it pays U.S. firms more to seek protection for their already existing inventions than to drain rents from Japanese inventions. Moreover, the barrier to entry imposed by the requirement that applications be filed in Japanese (the U.S. accepts foreign-language applications contingent on their eventual translation, which aids in establishing priority) and the non-recognition of foreign lawyers in

Japanese patent court are probably easier barriers for Korean than U.S. patenters to surmount, given historical circumstances.

Park's characterization of patent systems APEC-wide identifies several other features which, when contrasted with the U.S. system, either facilitate imitation or tend to reduce the rents obtainable from any patent eventually granted. About half of APEC, including the United States, publish patents upon grant, maintaining secrecy in the interim. The other half, including Japan, publish the application 18 months (or less) after application, making the information public. The United States, Australia, Canada, and China maintain the doctrine of equivalence, which effectively increases the scope of existing patents by permitting infringement suits against inventions which are substantially equivalent to the patented invention even if the equivalent inventions are not explicitly referenced in the patent. Many APEC countries, including Canada, Australia and Japan, provide for compulsory licensing, which forces patenters to share rents with local rivals. Compulsory licensing tends to transfer rents from technology-exporting to technology-importing countries, while in countries with a strong innovative base it may aid in facilitating collusion. Some non-U.S. APEC economies permit firms to legally oppose patent applications, in effect suing for infringement before the patent is even granted. This tends to favor incumbent firms over innovative entrants in general and domestic incumbents over foreign innovators in particular. While several countries permit opposition 2-6 months after the grant, Japan's system of pre-grant opposition provides the strongest protection for incumbent firms against innovators.

Measures which create barriers to entry for foreign innovators, or which transfer rents from innovators to imitators, tend to operate against the interest of U.S. producers, but may be understandable from the particularistic interest of developing countries wishing to benefit from low-cost imitation or to protect incumbent firms. Such measures make increasingly less sense as economies deepen their national technological capacities, and graduate from imitator to innovator status. It is striking how many provisions of the patent systems in Japan, Australia, and Canada tend to facilitate imitation at the expense of innovation, imposing costs not only on U.S. inventors but on the more innovative firms in those economies as well. Given the rapid expansion of technological capacity and education throughout the APEC region, the pool of potential innovators within each economy will grow ever larger, with those innovators probably benefiting under regimes converging toward the U.S. model with less dynamic incumbent firms preferring the status quo.

Given this set of facts, it makes sense for the United States to broaden the discussion of intellectual property in APEC, arguing that in the long run the development interests of the region are served by a mix of national systems which place progressively more weight on innovation while continuing to recognize some legitimate differences of national interest within the region. Patenting institutions which generate large numbers of applications relative to the economic value of those applications are inherently inefficient, generating rent-seeking behavior of primary benefit to lawyers and bureaucrats. The current bilateral barrier to services trade in patent law between the United States and Japan (the U.S. permits foreign patent lawyers only on a reciprocal basis) is an issue which links the APEC goal of reducing service-oriented barriers with IPRs; it would be interesting to know how many other APEC economies besides Japan maintain a similar barrier. Indeed, permitting APEC-wide free trade in patent lawyer services would represent a concession by the United States in terms of the services themselves, since Japan currently must hire U.S. lawyers to file tens of thousands of applications at the U.S. Patent and Trademark Office annually, and those lawyers' income would

decline under free trade in their services. But the increase in U.S. technology income which could result from permitting U.S. innovators to use their accustomed counsel in the Japanese system could well offset these losses.

#### REFERENCES

Chin, Judith and Gene Grossman, "Intellectual Property Rights and North-South Trade," in *The Political Economy of International Trade*, eds. Ronald W. Jones and Anne O. Krueger, Oxford: Basil Blackwell, 1990, pp. 90-107.

Deardorff, Alan V., "Welfare Effects of Global Patent Protection," *Economica*, vol. 59, 1992, pp. 33-51.

Evenson, Robert E., "Intellectual Property Rights, R&D, Inventions, Technology Purchace, and Piracy in Economic Development: An International Comparative Study," in Robert E. Evenson and Gustav Ranis, eds., *Science and Technology: Lessons for Development Policy*, Boulder, CO: Westview Press, 1990, pp. 325-356.

Ferrantino, Michael J., "The Effect of Intellectual Property Rights on International Trade and Investment," *Weltwirtschaftliches Archiv*, vol. 129 no. 2, 1993, pp. 300-331.

Ginarte, Juan Carlos and Walter Park, "International Technology Diffusion and Patent Protection," typescript, Washington, DC: American University, 1996.

Lee, Jeong-Yoon and Edwin Mansfield, "Intellectual Property Protection and U.S. Foreign Direct Investment," *Review of Economics and Statistics* vol. 78 no. 2, 1996, pp. 181-186.

Maskus, Keith E. and Mohan Penubarti, "How Trade-Related are Intellectual Property Rights?," *Journal of International Economics* vol. 39, 1995, pp. 227-248.

Smith, Pamela J., "Are Weak Patent Rights a Barrier to U.S. Exports?," typescript, Newark, DE: University of Delaware, 1997.