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# Globalization, Patent Reform, and Patent Professional Services

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*Abstract:* This paper studies the potential impact of patent reform and globalization of trade in services on the patent profession. Patent agents and attorneys play an important intermediary role between the inventor and the patent office. However, international reform measures will change the way patent professionals practice. These measures aim to streamline the work of patent professionals (e.g. eliminate the need for legal representation for routine work) and to liberalize regulations affecting cross-border services (e.g. local presence and nationality requirements, and access to local practice by foreign professionals). How will these institutional changes affect the profession? Will they lead to overall gains or losses in patent professional incomes in various countries? The purpose of this study is to provide some analysis in this rather unexplored area.

The study compares data on patenting, fees, research and development (R&D), production, and trade, to assess the effects of globalization on the size and distribution of patent professional revenues among 35 developed and emerging market economies. On the whole, the study finds that: (i) in a majority of countries, the local patent professionals will face revenue declines and possible losses in business; (ii) an increased stimulus to R&D, productivity, and trade may not generate sufficient increases in world patenting to compensate for the losses in patent professional business in those countries. The main significance of this study lies in contributing to the general debate about how far globalization can or should proceed.

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## 1. INTRODUCTION

Will 'globalization' hurt the patent professional industry? In recent years, questions have been raised as to whether globalization

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efforts go too far. Even among advocates of free trade, there are suggestions that globalization efforts should not proceed without some checks on liberalization or some 'safety nets' for those who fall behind.<sup>1</sup> Initially the focus of attention had been on commodity trade and the effects of globalization on production workers (particularly those less skilled). As globalization efforts have expanded into the service sector (that is, beyond manufacturing and agricultural production activities), similar concerns can be raised about the effects of globalization on professional workers (for example, accountants, architects, lawyers, consultants, and so forth) who form an important part of the services trade.

This paper focuses on patent professional services and examines the *distributional* and *efficiency* effects of internationally liberalizing the patent profession. Distributional effects refer to situations where some countries gain from globalization while others lose (or where some groups within countries gain while other groups lose). However, international trade theory generally suggests that world economic efficiency would be enhanced by trade liberalization (because resources would be reallocated to where they can be most productively put to use) and that these efficiency effects would outweigh the distributional effects (that is, net gains for each country would result). This paper examines whether this prediction extends to the globalization of patent professional services. Will globalization produce net gains for the patent profession in each country or will *local* patent professional businesses in certain regions be crowded out?

The paper is organized as follows: the next section reviews recent institutional developments affecting the patent profession and discusses the potential implications. Section 3 lays out a model and methodology for analyzing the effects of globalization on patent professional revenues. Section 4 discusses the data to be used, and section 5 presents the results of the analysis. Two main conclusions are drawn: the first is that globalization will lead to large transfers of income from patent professionals in typically smaller patenting nations to those in larger patenting nations. Secondly, the efficiency effects of liberalizing patent professional services, if any, may not outweigh the distributive effects; that is, any stimulus to trade, research and development, and productivity resulting from liberalization may not be enough to generate sufficient patenting business to compensate those who lose revenues. Finally, section 6 contains concluding remarks.

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<sup>1</sup> See Dani Rodrik (1997), *Has Globalization Gone Too Far?* Institute for International Economics, Washington, D.C.

## 2. BACKGROUND AND MOTIVATION FOR STUDY

### (A) *Recent Institutional Developments*

Patent professional services will be affected by recent international patent reform proposals to eliminate redundant and unnecessary patenting procedures, and by globalization efforts to enhance trade liberalization, particularly in services, of which the patent profession is a part. For example, the draft Patent Law Treaty (PLT) of the *World Intellectual Property Office (WIPO)*, Article 7(2), and the draft Community Patent Convention (CPC) of the *European Community* contain provisions for rationalization—such as eliminating the need for legal representation for certain formalities (such as the payment of fees). These agreements also seek to harmonize regulations governing the patent profession (for example, mutual recognition of professional qualifications, and addresses for service and choice of domicile) and to streamline patent professional services.

As another example of the institutional changes to come, the European Patent Office (EPO), as part of its move towards greater centralization, is considering allowing ‘extensive legal representation’—that is, allowing a patent agent or attorney to represent her client before several (member) patent offices. It is costly for patent applicants to have to deal with different local representatives in each of the countries in which they seek patent protection. Currently the EPO permits centralized legal representation only for routine, procedural tasks (such as the filing of patent applications, payment of renewal fees, and filing of translations and validations).

These developments at the EPO, WIPO, and the European Community are neither unexpected nor independent, but are part of a growing trend towards the global liberalization of trade in services. The General Agreement on Trade in Services (GATS), for instance, seeks to promote the free movement of professionals as part of the general effort to make world trade more liberal. Already, some major law firms have begun to merge with firms in other countries or are sharing work with foreign agents, thereby enjoying some international movement of legal professional services.<sup>2</sup>

### (B) *Implications for the Patent Profession and the Local Markets*

What is the significance of these developments? First, there is a concern that these developments will essentially cut out revenues for

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<sup>2</sup> See Economist (2000), “Lawyers Go Global,” 26th February, pp. 47–81.

local agents, and drive them out of business. For many local representatives (particularly in developing countries), it is precisely the routine work (filing applications and translations, paying maintenance fees, and so forth) that is the core of their business and main source of income. These firms may not generate other business, let alone international business, to compensate. In developing countries, low revenues or returns to the profession may reduce the incentive to establish a profession. Thus, would small local professionals wither away and would only large globally based professionals survive? To the extent that the industry becomes dominated by large global players, would there be less competition and a rise in patenting fees?

A second concern is that local representatives have been vital spokespersons for intellectual property reform in their respective countries, helping to lobby for critical pro-patent legislation. The loss of this local force may have adverse repercussions for the global effort to strengthen patent regimes. From a political-economy point of view, the local agents may end up lobbying against patent harmonization if their livelihoods are threatened. The public may be less supportive of patent reform if foreign patent agents are the ones pushing for reform.

A third concern is that the loss of local representation may have adverse effects on the quality of patent service. The argument is that foreign professionals may be less accountable. For this reason, governments impose local presence and nationality requirements so that clients (i.e. inventors or patent applicants) may more easily seek redress in the event of malpractice. Another argument is that foreign agents have less command of local rules, language, customs, policies, and market conditions. For these reasons, there is concern that if globalization drives local agents out of business, local industries, local inventors, and foreign inventors filing locally may be harmed.

Of course, counter-arguments can be made against all of these concerns. For example, small, inefficient patent agents that do nothing but routine work should be encouraged to exit the business, as they might just burden patent applicants. As for the efficient (surviving) firms, to the extent that they generate more business by representing clients globally, they will be advocates for patent reform. Local industries may be able to draw upon the expertise of foreign legal experts, particularly if those industries seek to connect with global markets. On the issue of quality of service, there are alternative ways to ensure accountability, other than through local presence; for example, the provision of professional liability insurance on a cross-border basis. Lastly, nationality is not necessarily a reliable indicator of local knowledge.

Nonetheless these issues do need to be explored further. The focus of the preceding discussion should not be so much whether one argument or another is valid. Rather it should be that there exists very little research to date to sort these issues out. What are the social costs and benefits of global versus local agent representation (to take two extreme cases)? Is there a case for limiting the globalization or liberalization of patent professional services? What principles should guide policy? As a first step, this paper focuses on the welfare of patent professionals. An extension to this paper would be to explore the implications for the welfare of societies *as a whole*.

### 3. MODEL AND METHODOLOGY

Patent statistics (on fees and on the volume of patent filings) can be used to make some estimates of the impact of liberalization on the international distribution of patent professional revenues. The volume of patent filings can be used as a measure of patent agents' business (i.e. quantity), and average patent agent/attorney fees can be used as a measure of 'price'. Hence patent professional revenues can be roughly approximated as the product of fees and filings.

The object of the following analysis will be to compare two regimes: the first regime is where the patent agents and attorneys of the *destination* country (where patents go) handle the patent filings of residents and nonresidents in that country. This is a destination-based system of legal representation, and corresponds approximately to the current system of local agent representation. The second regime is where the patent agents and attorneys of the *source* country (where patents come from) handle the patent filings of that country's residents at home and abroad. This is a source-based system of legal representation, and corresponds approximately to the global system of agent representation, which GATS-type measures aim to achieve with the liberalization of professional services. Neither regime matches perfectly what actually takes place in practice nor what policymakers have in mind. However, they should help provide a basis for comparing existing practice and proposed regimes, upon which future, more complex scenarios can build.

A comparison of the revenue implications under each regime should indicate whether the patent profession of a particular source country will gain (or lose) revenues under global liberalization measures. For example, for every \$1 of business lost by local patent agents to foreign agents, do the local agents gain more than a \$1 of business abroad by being able themselves to represent clients abroad?

The best way to discuss the model and methodology is by illustration. The analysis does depend on a number of assumptions, however, and they will be mentioned shortly. Assume a three country world. Box 1 below is a matrix describing the flows of patent filings among them. Each entry in the box represents patenting by the 'row' country in the 'column' country. The diagonal entries represent domestic patenting. For example, country A files 10 patents at home, 5 in country B, and 3 in C.

<b>Box 1: International Patenting Matrix</b>				
From:	To:	Country A	Country B	Country C
Country A		10	5	3
Country B		1	10	6
Country C		5	2	10

Next, assume that agent fees per patent application are \$1 in Country A, \$2 in Country B, and \$3 in Country C. For this comparison to be meaningful, it is important to *control* the type of patent (for example, a certain invention with x claims, x pages, x drawings, and so forth). Given these fees and the distribution of patenting given in Box 1, the distribution of patent agent revenues are as follows:

<b>Box 2: Patent Agent Revenues</b>				
	<i>Agent Fees in A: \$1</i>	<i>Agent Fees in B: \$2</i>	<i>Agent Fees in C: \$3</i>	
	Country A	Country B	Country C	<b>Total Row</b>
Country A	$10 \times \$1 = \$10$	$5 \times \$2 = \$10$	$3 \times \$3 = \$9$	<b>\$29</b>
Country B	$1 \times \$1 = \$1$	$10 \times \$2 = \$20$	$6 \times \$3 = \$18$	<b>\$39</b>
Country C	$5 \times \$1 = \$5$	$2 \times \$2 = \$4$	$10 \times \$3 = \$30$	<b>\$39</b>
<b>Total Column</b>	<b>\$16</b>	<b>\$34</b>	<b>\$57</b>	

For example, patent agents in country A (who charge \$1 per application) earn \$10 from handling ten domestic patent applications and earn \$5 from handling five (foreign) applications from country C.<sup>3</sup> Under Regime 1, where local agents handle all national patent filings (by residents and nonresidents), the local patent agents of Country A would earn total revenues of \$16, those of Country B would earn \$34, and those of Country C would earn \$57. Under Regime 2, where local agents handle all the domestic and foreign filings of local residents, the patent agents of Country A would earn total revenues of \$29, those of Country B would earn \$39, and those of Country C would also earn \$39. Thus patent agents in Countries A and B would gain from the move to Regime 2, while those in C would be worse off (in terms of revenues).

It is also possible to look at the break down of gains and losses (to see how each pair of countries is affected by the move from Regime 1 to Regime 2). The following box shows the changes in 'agent fees' between countries:

<b>Box 3: Changes in Agent Fee Revenues</b>			
	Country A	Country B	Country C
Country A	$\$10 - \$10 = 0$	$\$1 - \$10 = -\$9$	$\$5 - \$9 = -\$4$
Country B	$\$10 - \$1 = \$9$	$\$20 - \$20 = 0$	$\$4 - \$18 = -\$14$
Country C	$\$9 - \$5 = \$4$	$\$18 - \$4 = \$14$	$\$30 - \$30 = 0$
<b>Net Gain to Country in Column</b>	<b>\$13</b>	<b>\$5</b>	<b>-\$18</b>

Each entry represents the transfer in revenue from the row country to the column country in moving from Regime 1 to Regime 2. (Technically speaking, the above matrix is obtained by subtracting the matrix in Box 2 from its 'transpose'.) In the case of domestic patent filings, there is no revenue gain or loss, since it is assumed that residential patent filings are handled by local patent agents under either regime—hence the zeros

<sup>3</sup> Note that local agents may not charge as much for handling foreign patent applications if there is no need to draft applications from 'scratch'. It would be straightforward to allow for such differential pricing schemes, but it would only complicate the analysis below without substantially changing the qualitative conclusions.

along the diagonal of the above matrix.<sup>4</sup> The off-diagonal elements indicate the net 'business' lost or gained. For example, \$9 of patent agent revenues is diverted from Country B to Country A, while \$4 is transferred from C to A. While B loses revenue to A, it gains \$14 from Country C. Thus on net, Country A is the major beneficiary, which receives \$13, followed by Country B which receives \$5. Country C loses \$18 overall.

Clearly these are zero sum games of redistribution. That is, the net gain to the world as a whole is zero. All that occurs in switching regimes is that \$18 of revenues is diverted from Country C to Countries A and B. The reason that this is a zero-sum game is that no change in the overall volume of patenting activity is allowed for. To the extent that moving from Regime 1 to Regime 2 creates greater world trade and investment activity, the end result might be that all countries gain (i.e. end in a positive sum game). Possibilities for this are discussed in section 5.

The derivation of revenues from translation work also follows the same procedure. Suppose translation costs are as given in Box 4. In this hypothetical illustration, it is assumed that it costs \$1 to translate a certain patent application from the language of Country A into the language of Country B (and vice versa). The cost of translating the same document is \$2 between Countries A and C, and \$1.50 between B and C. Note that it is cheaper to translate between B and C directly than to translate indirectly say from B to A, and then from A to C. The cost of doing so would be \$3. Note that there are no translation burdens for domestic patent applications (hence the diagonal elements are \$0).

Box 4: Translation Costs				
From:	To:	Country A	Country B	Country C
Country A		\$0	\$1	\$2
Country B		\$1	\$0	\$1.50
Country C		\$2	\$1.50	\$0

<sup>4</sup> This would not necessarily be the case in practice since some residential patents are filed by non-nationals, say by subsidiaries of foreign firms listing their address of residence as the nation in which they filed those applications. Under regime 2, their applications may be handled by their own national patent agents.

Box 5 below shows the distribution of the translation revenues and Box 6 shows the net transfers of translation revenues from one country to another (resulting from a switch to Regime 2). Note that Box 5 is obtained by multiplying the matrices in Boxes 1 and 4 element-by-element, and that Box 6 is obtained by subtracting the matrix in Box 5 from its transpose. Overall, Countries A and C lose revenues to Country B. Summing the matrices in Boxes 3 and 6 (element by element) would give the overall patent professional revenues (from filing and translation work) gained or lost.

<b>Box 5: Revenues from Translation Work</b>				
	Country A	Country B	Country C	Total Row
Country A	$\$0 \times 10 = \$0$	$\$1 \times 5 = \$5$	$\$2 \times 3 = \$6$	<b>\$11</b>
Country B	$\$1 \times 1 = \$5$	$\$0 \times 10 = \$0$	$\$1.50 \times 6 = \$9$	<b>\$14</b>
Country C	$\$2 \times 5 = \$10$	$\$1.50 \times 2 = \$3$	$\$0 \times 10 = \$0$	<b>\$13</b>
Total Column	<b>\$15</b>	<b>\$8</b>	<b>\$15</b>	

<b>Box 6: Changes in Translation Fee Revenues</b>			
	Country A	Country B	Country C
Country A	\$0	$\$5 - \$5 = \$0$	$\$10 - \$6 = \$4$
Country B	$\$5 - \$5 = \$0$	\$0	$\$3 - \$9 = -\$6$
Country C	$\$6 - \$10 = -\$4$	$\$9 - \$3 = \$6$	\$0
Net Gain to Country in Column	<b>-\$4</b>	<b>\$6</b>	<b>-\$2</b>

As usual with 'model-building', there are several important underlying assumptions:

First, as stated above, no change in the overall volume of patenting is assumed (and thus no change in world patent agent revenues).

Secondly, there are no changes in fees. Predicting changes in fees will prove to be somewhat difficult. To the extent that patent law reforms and liberalization measures increase competition in patent professional services, fees could fall; on the other hand, to the extent that liberalization results in mergers of patent professional firms or in the exit of smaller firms from the industry, fees could rise, as there would be greater market concentration. Since fees could rise or fall, it is convenient in the analysis to assume that they do not change, and acknowledge that the results are conditional on this assumption. (An important limitation of ignoring fee changes is that the fees themselves are an important influence on the demand for patenting and thus on the pattern and volume of patenting.)

A third assumption concerns the fees that local patent agents would charge for filing residents' patents abroad. The patent agents could either charge the same fees for legal representation abroad as they charge at home or charge the fees prevailing in markets abroad. In the analysis it is assumed that they do the latter. This is based on the assumption that agents will charge fees competitively according to the markets in which they serve.

A fourth assumption, of course, is that extreme cases are being considered: either Regime 1 or Regime 2. A more realistic case would be a hybrid of the two where local patent agents can be in the business of both filing residents' patents abroad as well as filing nonresidents' patents locally. Furthermore, under globalization, foreign patent agents may also legally represent domestic patent applicants. The analysis here assumes that domestic patent agents handle domestic patent applications under either regime.

Smaller patent representatives or representatives from smaller countries may not be able to capture patent business opportunities abroad as well as say the 'bigger players'. Hence the results will overestimate the gains in foreign business acquired by smaller firms or smaller countries under Regime 2.

Finally, the analysis above ignores the fact that patent filing and translation work are just two areas of the patent profession's business (though they are a major activity for many small firms). Other prospective areas for patent legal services include patent prosecution, enforcement, and work generated by technology licensing and joint venture activities.

#### 4. DATA

A sample of 35 countries is chosen, among which are both developed and emerging market economies. Table 1 lists the countries in the sample.

TABLE 1  
PATENT FEES AND APPLICATIONS: SAMPLE STATISTICS

	Resident	Non-Resident	Resident Patents	Agent	EPO Agent	Translation Fees:	
						English-	All-
Patents	2681	105572	16227	513	769	927	913
Patents	8605	37970	35307	665	595	0	978
Abroad	1687	82434	19102	1035		891	834
Fees	400	26847	449	360		660	876
Fees	4192	48926	45102	311		0	978
Speakers	12786	47304	6369	500		1080	1122
Speakers	601	29178	1571	400	643	880	1005
Austria	2658	103453	28246	791	1027	1596	1424
Australia	4061	102451	36395	666	1027	1294	1247
Belgium	18669	87724	116398	678	702	1193	1128
Bulgaria	62052	110090	302699	588	581	1186	1053
Canada	53	80163	1356	505	830	900	1016
China	774	28526	3372	550		1200	1192
Czech Republic	2025	6016	10310	500		0	978
Denmark	946	80116	4922	656	591	0	978
Finland	1796	27782	19071	643		0	978
France	2574	96180	53363	1090	710	1440	1333
Germany	351487	64068	269534	1780		2918	2198
Greece	192	103392	2194	359	365	934	886
	429	34492	1061	798		880	973

## NOTES:

Patent agent and translation fees are in current U.S. dollars (as of March 2000). Patent Application Data are from the World Intellectual Property Office and Fee Data from Computer Software Associates.

TABLE 1 Continued  
PATENT FEES AND APPLICATIONS: SAMPLE STATISTICS

	Resident	Non-Resident	Resident Patents	Agent	EPO Agent	Translation Fees:	
						English-	All-
Netherlands	5227	82488	62023	364	433	1184	1153
New Zealand	1735	30434	9005	411		0	978
Norway	1518	32118	16952	753		1541	1392
Poland	2401	29328	789	525		1400	1309
Portugal	92	103682	438	965	1135	1620	1438
Republic of Korea	76724	50597	23869	850		1760	1520
Romania	1709	26588	379	385		600	841
Russian Federation	15277	31642	11695	675		1300	1251
Slovakia	234	27210	532	385		880	1005
Spain	2856	107939	13080	970	760	1342	1243
Sweden	7893	104128	77792	539	813	1628	1443
Switzerland	5814	104068	63400	751	668	1623	1291
Turkey	233	27217	1065	529		1380	1297
U.K.	26591	117671	164458	560	465	0	978
U.S.A.	125808	103315	862582	700		0	978
Mean	22062	63986	66614	654	688	980	1156
Std. Dev.	62847	34264	155524	281	201	672	263
Min	53	6016	379	311	365	0	834
Max	351487	117671	862582	1780	1135	2918	2198

## NOTES:

Patent agent and translation fees are in current U.S. dollars (as of March 2000). Patent Application Data are from the World Intellectual Property Office and Fee Data from Computer Software Associates.

A number of these countries are members of the PCT and/or EPO. The table presents sample statistics concerning patenting behavior and the cost of patenting. International patenting data are from WIPO's *Industrial Property Statistics* (Geneva), and data on Patent Agent and Translation Fees are from the Computer Software Associates' *Global IP Estimator* (Oakland, CA). Though there are important differences between patent attorneys and patent agents, the term 'agents' is used broadly to incorporate both types of professionals. Since the focus is on revenues from patent filing activities, this should be a relatively small simplification.

First, some comments on the data. The number of patents is the *sum* of national filings, PCT filings, EPO filings, and EPO (via PCT) filings, where applicable. The fees are in current U.S. dollars (measured as of March 2000), and depend on the type of patent (for example, on the number of pages, drawings, and independent claims). The analysis below assumes that the average patent application is 20 pages in length, has 2 drawings and 10 claims. This appears to be more or less the 'standard model' in previous studies on patenting costs.<sup>5</sup>

The translation fees from the *Global IP Estimator* are from the point of view of a U.S. inventor—or more accurately, from the point of view of an English speaking inventor or patent applicant. Thus, while a U.S. inventor has no translation burden in Australia, a Chinese inventor would. There are a number of ways to derive translation costs between pairs of countries that do not involve an English speaking applicant (other than to conduct another worldwide survey, which of course would be ideal)—for instance, Park (2000) uses an index of linguistic similarity to predict translation costs between countries.<sup>6</sup> However, a simpler approach is adopted here, namely an 'average cost' approach. Under this approach, suppose the objective is to estimate the translation burden between countries X and Y, neither of which is English-speaking (officially). In that case, the translation cost is assumed to be the average cost of translating X into English, and of translating English into Y. This approach is not exact but it incorporates the idea that the shortest distance between two points is a straight line. Direct translations are likely to be more economical than indirect translations (using English as the intermediary language). Thus with this approach, this study was able to generate

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<sup>5</sup> See, for example, Helfgott, S. (1992), "Patent Costs Around the World," *Journal of the Patent and Trademark Office Society*, Vol. 75, pp. 567–581; Chartered Institute for Patent Agents (1997), "Reducing Patent Costs," mimeo; and European Patent Office (1995), "EPO Study on the Cost of Patenting in Europe," SACEPO 2/95.

<sup>6</sup> Park, W. G. (2000), "International Patenting, Patent Rights, and Technology Gaps," American University, Department of Economics Working Paper.

translation costs between every pair of countries among the 35 in the sample. The study also assumes symmetry—that is, the cost of translating from X into Y is equal to the cost of translating from Y into X.

The last column of Table 1 shows the average cost of translating patents in each country (averaging across all 34 partner countries' translation burdens). For example, for Australia the average cost of translation for all speakers is \$978 (U.S.). This is the resulting of averaging \$0 for the U.S., U.K., and other English speaking countries and some larger cost for Korea, Japan, Slovakia, and so forth. Overall the translation cost is highest in Japan (for all speakers in general and for English-speakers in particular). The least expensive place to translate a patent is in Belgium, followed by Luxembourg due to the multiplicity of official languages spoken in those regions.

## 5. RESULTS AND ANALYSIS

### (A) *Distributional Effects*

The methodology illustrated in the 3-country model will now be applied to *real world* data from 35 countries. The international patenting data are presented in Table 2, which corresponds to Box 1 shown earlier. Table 2 is a 35 by 35 matrix showing (bilateral) patenting flows between countries. The diagonal entries represent domestic patenting. The data show international patent filing patterns as of 1997. This is the latest year for which comparable data are available. Although the overall volume of world patenting has increased over time (in some cases exponentially, as in the case of PCT filings), the distribution of patenting has remained fairly stable during the past 15 years. It is still the case that most of the world's patenting is conducted by the U.S., Japan, U.K., Germany, and France, and that they are also the most popular destinations for patenting. However, there have been some major changes in the patent filing and receiving behavior of Korea, Mexico, and Eastern Europe. Aside from these exceptions, the snapshot of (patenting behavior) taken as of 1997 should be fairly representative.

The revenue redistribution results are contained in Tables 3-5. Table 3 focuses on 'agent fee' revenues, and corresponds to Box 3. Table 4 focuses on 'translation fee' revenues, and corresponds to Box 6. Table 5 provides for a summary analysis. The revenues are in current U.S. dollars and are derived from the fee data in Table 1 and patenting data in Table 2.<sup>7</sup> Again, two regimes are considered. Under Regime 1, the

<sup>7</sup> Note that for EPO patents at the regional phase, the EPO agent fees were applied (see column 5 of Table 1).

destination country's agents receive the revenues from domestic patent filings and patent filings by foreigners. Under Regime 2, the source country's agents receive the revenues from filing their residents' patent applications at home and abroad.

The entries in Table 3 show the revenue transfers from the 'row country' to the 'column country'. A negative value indicates that the transfer is actually the reverse (that revenue is redistributed from the column country to the row country). For example, in the first column, last row of Table 3, the U.S. is seen to transfer -\$27.248 million to Austria, meaning that the U.S. receives \$27.248 million from Austria. (Note that the matrix in Table 3 is symmetric, but opposite in sign, about the diagonal.)

Revenue is also diverted from Austria to Australia, Belgium, Canada, Sweden, and so forth, while revenue is diverted to Austria from places such as Bulgaria, Czech Republic, Hungary, Mexico, Slovakia, and so forth. Overall, Austria's patent agents lose \$64.13 million to agents in other countries. They lose the most to the U.S., but even without the U.S. included in the sample, Austrian agents would still lose on net \$36.88 million (= \$64.13 million-\$27.248 million).

The bottom row in Table 3 (in bold) summarizes the net gains (or losses) to each country. Only 8 out of 35 countries are net gainers. In order, they are the U.S., Germany, Japan, U.K., France, Canada, India, and the Netherlands. Of the 27 nations whose patent professionals lose revenues under Regime 2, the largest losses are suffered not by those in emerging markets (such as Eastern Europe, Mexico, and China), but by those in the EPO. Agents in Portugal incur the largest loss, followed by those in Spain, Finland, Greece, Austria, Denmark, Ireland, Luxembourg, Belgium, Italy, and Switzerland. The smallest losses are incurred by agents in Australia, Israel, and New Zealand. Thus, under Regime 2, a major transfer of business from the EPO to the U.S., Japan, and the economically stronger EPO states like Germany, U.K., and France, takes place. This suggests that patent agents in the smaller EPO economies do derive much of their revenues from representing patent applicants from the major patenting nations like the U.S. and Japan, and that Regime 2 allows agents from the U.S., Japan, U.K., France, and Germany to represent those clients instead. Agents from Canada and India gain because patent applicants from those countries conduct as much foreign patenting as foreigners conduct in their markets, so that the share of business for Canadian and Indian agents does not diminish under a system of global representation. Essentially the 'gainers' are those countries whose residents patent abroad more

*TABLE 2*  
*INTERNATIONAL FLOWS OF PATENTS*

	Austria	Australia	Belgium	Bulgaria	Canada	Switzer	China	Czech
Austria	2681	248	649	154	303	863	260	280
Australia	1592	8605	875	732	866	1595	781	729
Belgium	954	233	1687	204	267	956	227	213
Bulgaria	22	10	13	400	9	21	9	9
Canada	1920	932	1170	765	4192	1919	864	772
Switzer.	3286	928	2683	589	1158	5814	1144	756
China	289	139	162	125	160	289	12786	125
Czech Rep.	72	28	47	22	34	73	29	601
Germany	16049	2843	14627	1823	4313	16208	4485	2945
Denmark	1345	611	749	605	626	1348	620	601
Spain	657	210	538	149	262	652	212	159
Finland	1735	757	1049	680	834	1729	764	690
France	5699	1561	5269	948	2605	5819	1859	1087
UK	8035	3275	5504	2721	3469	8068	3078	2750
Greece	57	35	54	24	35	57	33	22
Hungary	150	81	91	72	80	152	82	85
Ireland	220	108	144	86	108	224	89	89
Israel	831	410	472	365	425	841	405	371
India	27	20	30	0	8	26	13	2
Italy	2780	630	2403	471	850	2798	742	519
Japan	10610	2631	10315	759	3507	10954	8671	828
Rep. Of Korea	588	217	506	94	244	596	2065	96
Luxembourg	111	36	86	31	45	111	30	29
Mexico	43	19	34	12	40	41	24	15
Netherlands	3177	864	2673	694	993	3184	915	729
Norway	724	344	403	323	355	725	331	331
New Zealand	335	288	176	157	169	335	162	158
Poland	37	10	29	8	13	35	13	20
Portugal	20	9	19	5	12	22	7	6
Romania	14	8	13	7	10	14	12	7
Russian Fed.	526	213	369	191	282	526	290	211
Sweden	3726	1635	2359	1403	1730	3752	1623	1454
Slovakia	27	11	14	11	10	24	10	25
Turkey	49	25	25	25	24	49	24	24
USA	39856	18601	28884	12592	25080	40062	17431	13041

## NOTE:

Each entry represents total patent applications from ROW country to COLUMN country. Total refers to the sum of national and regional patents (were applicable).

*TABLE 2 Continued*  
*INTERNATIONAL FLOWS OF PATENTS*

Germany	Denmark	Spain	Finland	France	UK	Greece	Hungary	Ireland
1276	759	39777	50	48	25	51	25	25
1630	1593	808	40435	39684	31310	45856	28293	13033
1154	942	1598	771	723	862	614	220	610
22	20	976	1592	882	1719	870	733	868
2021	1912	21	934	950	1202	787	204	786
4408	3126	1919	21	13	21	13	10	13
298	288	3215	1916	1206	2354	1158	767	1157
86	71	295	3059	2939	3724	2560	698	2566
62052	15093	71	290	164	303	162	124	162
1429	2658	16204	72	47	72	46	33	46
746	649	1349	14853	16567	18351	13591	2487	13611
1903	1727	2856	1355	761	1434	740	594	737
7194	5551	1734	636	564	743	517	154	510
8605	8029	6274	4061	1132	1939	1039	685	1040
62	57	8190	5485	18669	6677	4844	1117	4840
158	148	62	7938	5819	26591	5380	2731	5405
247	213	148	58	57	62	53	21	53
880	829	224	148	91	149	91	774	91
37	0	842	210	155	405	139	87	946
3351	2655	26	827	490	907	468	368	467
18480	10589	3031	26	33	36	26	0	26
1542	591	10977	2602	2783	3229	2263	501	2220
136	109	657	10587	14221	16450	10009	879	9993
47	42	110	594	624	1477	504	103	501
3549	3183	47	108	90	130	81	29	82
756	732	3213	44	35	46	34	13	34
340	336	723	3100	2847	3619	2557	730	2562
51	35	339	723	406	900	397	327	395
25	20	37	331	180	360	176	158	176
15	14	25	36	29	41	29	19	29
588	525	16	18	20	22	19	6	18
4021	3766	530	16	13	14	13	9	13
29	24	3769	556	368	547	366	208	366
50	48	24	3789	2166	3945	2338	1443	2342
44954			24	14	24	14	10	14

## NOTE:

Each entry represents total patent applications from ROW country to COLUMN country. Total refers to the sum of national and regional patents (where applicable).

*TABLE 2 Continued*  
*INTERNATIONAL FLOWS OF PATENTS*

	Israel	India	Italy	Japan	Korea	Luxem	Mexico	Netherl
Austria	158	56	727	383	252	747	185	668
Australia	735	150	881	848	769	1591	747	875
Belgium	198	62	854	432	240	950	216	853
Bulgaria	10	0	13	11	10	20	9	13
Canada	764	89	1183	1085	843	1896	868	1174
Switzer.	642	257	2898	1716	1094	3031	788	2770
China	126	49	164	203	143	286	129	164
Czech Rep.	23	6	47	36	26	67	27	46
Germany	1786	725	16135	9817	4945	14719	2654	15010
Denmark	598	95	759	660	611	1322	601	754
Spain	160	43	567	296	181	630	239	537
Finland	680	44	1077	945	764	1702	688	1062
France	1061	267	5842	3387	1761	5505	1384	5277
UK	2734	423	5678	4064	3097	7954	2845	5570
Greece	23	1	57	36	29	57	26	55
Hungary	69	1	91	85	81	146	69	92
Ireland	94	27	152	104	90	212	88	145
Israel	1796	52	483	454	420	827	376	476
India	1	2025	9695	23	1	26	1	27
Italy	474	124	2574	1133	663	2578	606	2395
Japan	815	422	11802	351487	11829	10486	1179	11025
Rep. Of Korea	111	249	569	3366	76724	580	210	553
Luxembourg	31	21	90	45	34	192	30	88
Mexico	13	2	35	28	18	42	429	34
Netherlands	704	168	2728	1353	946	3099	790	5227
Norway	320	15	404	353	328	715	324	403
New Zealand	158	13	180	173	160	333	161	177
Poland	8	1	29	17	10	34	9	29
Portugal	7	1	18	10	6	20	8	20
Romania	8	0	13	11	9	14	8	13
Russian Fed.	173	4	370	340	277	516	201	369
Sweden	1429	93	2405	2142	1589	3709	1468	2393
Slovakia	9	0	14	13	10	24	10	14
Turkey	20	0	25	25	26	48	24	24
USA	13640	2554	30195	30474	19334	39506	17524	29383

## NOTE:

Each entry represents total patent applications from ROW country to COLUMN country. Total refers to the sum of national and regional patents (where applicable).

*TABLE 2 Continued*  
*INTERNATIONAL FLOWS OF PATENTS*

Norway	New Zea	Poland	Portugal	Romania	Russia	Sweden	Slovakia	Turkey	USA
184	173	222	744	152	248	807	214	174	733
959	784	734	1590	729	761	1599	729	729	1442
232	206	217	939	189	213	954	197	196	964
8	8	10	20	8	9	20	9	10	14
837	794	774	1895	756	835	1948	758	760	5091
767	731	735	3049	572	796	3257	626	665	2167
131	126	129	286	126	147	289	127	128	241
25	23	42	69	20	38	71	70	24	62
2291	2060	2775	14728	1729	3111	15797	2061	2042	16265
623	608	612	1330	591	675	1367	592	594	950
169	160	172	676	146	191	664	151	154	586
748	724	712	1711	677	794	1886	682	677	1385
1122	1156	1214	5560	944	1227	5807	966	1032	6057
3099	2839	2763	7968	2669	3014	8172	2677	2710	7185
21	19	20	59	24	16	59	17	25	63
74	69	85	146	75	71	148	77	65	110
96	94	90	213	82	94	217	82	85	209
384	374	376	827	364	408	834	367	372	1478
4	0	0	28	0	3	26	2	0	137
519	490	556	2660	471	588	2779	472	525	2501
1045	1002	834	10494	757	938	11175	755	739	43777
99	109	112	583	93	367	608	90	104	5068
39	29	29	108	28	31	112	29	29	67
14	13	15	43	13	11	43	12	15	140
773	774	751	3108	690	728	3223	691	712	2195
1518	1516	344	716	319	391	769	326	319	496
1733	1735	160	336	157	161	336	157	159	275
11	9	2401	34	9	18	38	19	6	37
8	7	6	92	5	3	20	5	5	16
6	8	9	14	1709	8	14	8	8	20
198	183	215	520	187	15277	541	190	185	564
1711	1529	1493	3714	1406	1651	7893	1421	1406	2972
10	10	11	24	10	14	25	234	11	14
24	24	25	49	25	27	50	24	233	34
14154	13783	13086	39441	12565	14055	40473	12607	12552	12588

## NOTE:

Each entry represents total patent applications from ROW country to COLUMN country. Total refers to the sum of national and regional patents (where applicable).

**TABLE 3**  
**CHANGES IN AGENT FEE REVENUES (IN MILLIONS OF**  
**CURRENT U.S. DOLLARS)**

	Austria	Austral	Bel	Bulg	Can	Swit	China	Czech
Austria	0	0.875	0.311	-0.041	1.191	1.792	0.060	-0.063
Australia	-0.875	0	-0.366	-0.257	0.350	-0.508	-0.298	-0.273
Belgium	-0.311	0.366	0	-0.066	0.613	0.945	-0.017	-0.057
Bulgaria	0.041	0.257	0.066	0	0.273	0.197	0.041	0.004
Canada	-1.191	-0.350	-0.613	-0.273	0	-0.984	-0.382	-0.298
Switzer.	-1.792	0.508	-0.945	-0.197	0.984	0	-0.368	-0.251
China	-0.060	0.298	0.017	-0.041	0.382	0.368	0	-0.036
Czech Rep	0.063	0.273	0.057	-0.004	0.298	0.251	0.036	0
Germany	-11.278	-0.938	-8.031	-0.643	-0.161	-8.365	-2.068	-1.128
Denmark	-0.375	0.725	0.181	-0.204	1.145	1.131	-0.106	-0.191
Spain	0.170	1.226	0.452	-0.036	1.534	2.101	0.146	-0.005
Finland	-0.420	0.870	0.282	-0.226	1.434	1.755	-0.130	-0.211
France	-3.716	-0.419	-2.468	-0.332	0.036	-1.878	-0.814	-0.402
UK	-5.099	-1.299	-2.692	-0.969	0.125	-3.799	-1.385	-1.064
Greece	0.467	0.699	0.621	0.002	0.950	2.086	0.118	0.029
Hungary	0.020	0.349	0.058	-0.020	0.397	0.277	0.027	-0.016
Ireland	0.211	0.441	0.379	-0.023	0.650	1.360	0.051	-0.008
Israel	-0.445	0.200	-0.154	-0.125	0.359	-0.179	-0.121	-0.134
India	0.008	0.062	0.013	0.000	0.042	0.111	0.018	0.002
Italy	-1.523	0.207	-0.823	-0.160	0.576	0.155	-0.255	-0.174
Japan	-7.354	-0.240	-5.368	-0.254	0.841	-4.306	-3.974	-0.267
Korea	-0.217	0.510	-0.097	-0.025	0.641	0.524	-0.911	-0.016
Luxem	0.193	0.552	0.295	-0.004	0.674	1.027	0.089	0.013
Mexico	0.117	0.583	0.152	0.003	0.680	0.601	0.091	0.016
Netherl	-2.014	-0.196	-1.221	-0.244	0.200	-0.973	-0.386	-0.272
Norway	-0.336	0.493	-0.065	-0.110	0.520	0.067	-0.067	-0.114
NZealand	-0.146	0.131	-0.020	-0.053	0.274	0.063	-0.029	-0.054
Poland	0.090	0.379	0.097	0.002	0.402	0.362	0.061	0.014
Portugal	0.807	1.676	1.030	0.020	2.022	3.365	0.300	0.072
Romania	0.048	0.275	0.065	0.001	0.288	0.211	0.043	0.005
Russia	-0.197	0.372	-0.076	-0.063	0.476	0.173	-0.046	-0.059
Sweden	-1.897	0.015	-0.669	-0.491	0.837	-0.124	-0.611	-0.531
Slovakia	0.065	0.273	0.068	-0.000	0.289	0.224	0.044	0.017
Turkey	0.061	0.369	0.089	-0.004	0.395	0.317	0.056	0.003
USA	-27.248	-11.260	-16.511	-4.532	-4.236	-26.186	-8.547	-5.173
<b>Net Gain</b>	<b>-64.130</b>	<b>-1.819</b>	<b>-35.888</b>	<b>-9.362</b>	<b>15.479</b>	<b>-27.837</b>	<b>-19.338</b>	<b>-10.621</b>

## NOTES:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

*TABLE 3 Continued*  
**CHANGES IN AGENT FEE REVENUES (IN MILLIONS OF  
 CURRENT U.S. DOLLARS)**

Ger	Den	Spa	Fin	Fra	UK	Gree	Hung	Ire
11.278	0.375	-0.170	0.420	3.716	5.099	-0.467	-0.020	-0.211
0.938	-0.725	-1.226	-0.870	0.419	1.299	-0.699	-0.349	-0.441
8.031	-0.181	-0.452	-0.282	2.468	2.692	-0.621	-0.058	-0.379
0.643	0.204	0.036	0.226	0.332	0.969	-0.002	0.020	0.023
0.161	-1.145	-1.534	-1.434	-0.036	-0.125	-0.950	-0.397	-0.650
8.365	-1.131	-2.101	-1.755	1.878	3.799	-2.086	-0.277	-1.360
2.068	0.106	-0.146	0.130	0.814	1.385	-0.118	-0.027	-0.051
1.128	0.191	0.005	0.211	0.402	1.064	-0.029	0.016	0.008
0	-9.026	-12.124	-13.740	-7.442	-3.705	-11.244	-1.276	-7.900
9.026	0	-0.713	0.044	3.127	4.817	-0.577	-0.223	-0.288
12.124	0.713	0	0.855	4.519	6.410	-0.381	0.040	-0.115
13.740	-0.044	-0.855	0	4.610	6.235	-0.804	-0.245	-0.426
7.442	-3.127	-4.519	-4.610	0	0.902	-3.981	-0.550	-2.752
3.705	-4.817	-6.410	-6.235	-0.902	0	-4.436	-1.427	-2.982
11.244	0.577	0.381	0.804	3.981	4.436	0	0.064	0.084
1.276	0.223	-0.040	0.245	0.550	1.427	-0.064	0	-0.006
7.900	0.288	0.115	0.426	2.752	2.982	-0.084	0.006	0
0.634	-0.202	-0.614	-0.281	0.338	1.297	-0.374	-0.158	-0.216
0.341	0.048	0.002	-0.005	0.110	0.195	-0.021	0.001	-0.002
9.505	-1.224	-1.987	-1.767	2.194	2.482	-1.838	-0.211	-1.204
6.710	-5.706	-7.929	-8.996	-3.954	-0.620	-8.243	-0.332	-5.721
3.301	0.127	-0.371	0.072	1.058	1.865	-0.394	0.013	-0.219
5.287	0.405	0.140	0.515	1.942	2.823	-0.046	0.037	0.028
2.091	0.451	0.152	0.507	1.080	2.248	-0.007	0.048	0.050
4.433	-1.802	-2.325	-2.524	0.286	0.659	-2.098	-0.362	-1.451
1.283	-0.051	-0.490	-0.060	0.560	1.868	-0.314	-0.124	-0.161
0.648	0.010	-0.225	0.016	0.349	0.982	-0.138	-0.059	-0.065
1.427	0.298	0.061	0.339	0.617	1.430	-0.014	0.034	0.030
16.526	1.395	0.723	1.810	6.190	8.593	0.050	0.153	0.219
0.657	0.218	0.043	0.245	0.354	1.021	-0.002	0.024	0.024
1.757	0.095	-0.308	0.033	0.570	1.763	-0.293	-0.066	-0.153
10.177	-1.685	-2.652	-2.055	3.027	3.938	-1.894	-0.689	-1.228
0.777	0.211	0.038	0.242	0.362	1.019	-0.005	0.024	0.023
1.051	0.280	0.038	0.318	0.528	1.407	-0.008	0.021	0.031
-14.824	-26.584	-32.701	-35.601	-17.740	-17.671	-23.439	-7.091	-16.614
<b>150.847</b>	<b>-51.235</b>	<b>-78.157</b>	<b>-72.756</b>	<b>19.060</b>	<b>54.986</b>	<b>-65.621</b>	<b>-13.443</b>	<b>-44.074</b>

## NOTES:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

*TABLE 3 Continued*  
**CHANGES IN AGENT FEE REVENUES (IN MILLIONS OF  
 CURRENT U.S. DOLLARS)**

	Isr	India	Ita	Jpn	Kor	Lux	Mex	Neth
Austria	0.445	-0.008	1.523	7.354	0.217	-0.193	-0.117	2.014
Australia	-0.200	-0.062	-0.207	0.240	-0.510	-0.552	-0.583	0.196
Belgium	0.154	-0.013	0.823	5.368	0.097	-0.295	-0.152	1.221
Bulgaria	0.125	0.000	0.160	0.254	0.025	0.004	-0.003	0.244
Canada	-0.359	-0.042	-0.576	-0.841	-0.641	-0.674	-0.680	-0.200
Switzer.	0.179	-0.111	-0.155	4.306	-0.524	-1.027	-0.601	0.973
China	0.121	-0.018	0.255	3.974	0.911	-0.089	-0.091	0.386
Czech Rep	0.134	-0.002	0.174	0.267	0.016	-0.013	-0.016	0.272
Germany	-0.634	-0.341	-9.505	-6.710	-3.301	-5.287	-2.091	-4.433
Denmark	0.202	-0.048	1.224	5.706	-0.127	-0.405	-0.451	1.802
Spain	0.614	-0.002	1.987	7.929	0.371	-0.140	-0.152	2.325
Finland	0.281	0.005	1.767	8.996	-0.072	-0.515	-0.507	2.524
France	-0.338	-0.110	-2.194	3.954	-1.058	-1.942	-1.080	-0.286
UK	-1.297	-0.195	-2.482	0.620	-1.865	-2.823	-2.248	-0.659
Greece	0.374	0.021	1.838	8.243	0.394	0.046	0.007	2.098
Hungary	0.158	-0.001	0.211	0.332	-0.013	-0.037	-0.048	0.362
Ireland	0.216	0.002	1.204	5.721	-2.19	-0.028	-0.050	1.451
Israel	0	-0.026	-0.038	-0.284	-0.286	-0.280	-0.292	0.247
India	0.026	0	-10.495	0.170	0.123	0.001	0.000	0.072
Italy	0.038	10.495	0	6.363	-0.160	-0.875	-0.459	0.900
Japan	0.284	-0.170	-6.363	0	-4.063	-3.744	-0.891	-2.365
Korea	0.286	-0.123	0.160	4.063	0	-0.182	-0.152	0.565
Luxem	0.280	-0.001	0.875	3.744	0.182	0	-0.009	1.090
Mexico	0.292	-0.000	0.459	0.891	0.152	0.009	0	0.616
Netherl	-0.247	-0.072	-0.900	2.365	-0.565	-1.090	-0.616	0
Norway	0.083	-0.004	0.104	0.159	-0.204	-0.230	-0.248	0.408
NZealand	0.052	-0.007	0.074	0.104	-0.091	-0.109	-0.123	0.241
Poland	0.192	-0.001	0.271	0.408	0.050	0.003	0.001	0.382
Portugal	0.873	0.031	2.941	11.811	0.643	0.111	0.041	3.426
Romania	0.135	0.000	0.172	0.272	0.028	0.006	-0.001	0.260
Russia	0.164	0.000	0.134	0.028	0.012	-0.167	-0.153	0.332
Sweden	-0.341	-0.025	0.448	5.106	-0.883	-1.261	-1.139	1.428
Slovakia	0.136	0.001	0.172	0.268	0.026	0.002	-0.003	0.260
Turkey	0.184	0.000	0.260	0.346	0.033	-0.002	-0.011	0.366
USA	-7.736	-1.181	-19.688	-23.600	-12.886	-14.306	-13.886	-11.186
<b>Net Gain</b>	<b>-5.125</b>	<b>7.991</b>	<b>-35.367</b>	<b>67.927</b>	<b>-23.749</b>	<b>-36.084</b>	<b>-26.804</b>	<b>7.331</b>

## NOTES:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

*TABLE 3 Continued*  
**CHANGES IN AGENT FEE REVENUES (IN MILLIONS OF  
 CURRENT U.S. DOLLARS)**

Nor	NZeal	Pol	Port	Rom	Rus	Swe	Slov	Tur	USA
0.336	0.146	-0.090	-0.807	-0.048	0.197	1.897	-0.065	-0.061	27.248
-0.493	-0.131	-0.379	-1.676	-0.275	-0.372	-0.015	-0.273	-0.369	11.360
0.065	0.020	-0.097	-1.030	-0.065	0.076	0.669	-0.068	-0.089	16.511
0.110	0.053	-0.002	-0.020	-0.001	0.063	0.491	0.000	0.004	4.523
-0.520	-0.274	-0.402	-2.022	-0.288	-0.476	-0.837	-0.289	-0.395	4.236
-0.067	-0.063	-0.362	-3.365	-0.211	-0.173	0.124	-0.224	-0.317	26.186
0.067	0.029	-0.061	-0.300	-0.043	0.046	0.611	-0.044	-0.056	8.547
0.114	0.054	-0.014	-0.072	-0.005	0.059	0.531	-0.017	-0.003	5.173
-1.283	-0.648	-1.427	-16.526	-0.657	-1.757	-10.177	-0.777	-1.051	14.827
0.051	-0.010	-0.298	-1.395	-0.218	-0.095	1.685	-0.211	-0.280	26.584
0.490	0.225	-0.061	-0.723	-0.043	0.308	2.652	-0.038	-0.038	32.701
0.060	-0.016	-0.339	-1.810	-0.245	-0.033	2.055	-0.242	-0.318	35.601
-0.560	-0.349	-0.617	-6.190	-0.354	-0.570	-3.027	-0.362	-0.528	17.740
-1.868	-0.982	-1.430	-8.593	-1.021	-1.763	-3.938	-1.019	-1.407	17.671
0.314	0.138	0.014	-0.050	0.002	0.293	1.894	0.005	0.008	23.439
0.124	0.059	-0.034	-0.153	-0.024	0.066	0.689	-0.024	-0.021	7.091
0.161	0.065	-0.030	-0.219	-0.024	0.153	1.228	-0.023	-0.031	16.614
-0.083	-0.052	-0.192	-0.873	-0.135	-0.164	0.341	-0.136	-0.184	7.736
0.004	0.007	0.001	-0.031	0.000	-0.000	0.025	-0.001	0.000	1.181
-0.104	-0.074	-0.271	-2.941	-0.172	-0.134	-0.448	-0.172	-0.260	19.688
-0.159	-0.104	-0.408	-11.811	-0.272	-0.028	-5.106	-0.268	-0.346	23.600
0.204	0.091	-0.050	-0.643	-0.028	-0.012	0.883	-0.026	-0.033	12.886
0.230	0.109	-0.003	-0.111	-0.006	0.167	1.261	-0.002	0.002	14.306
0.248	0.123	-0.001	-0.041	0.001	0.153	1.139	0.003	0.011	13.886
-0.408	-0.241	-0.382	-3.426	-0.260	-0.332	-1.428	-0.260	-0.366	11.186
0	0.682	-0.172	-0.752	-0.118	-0.115	0.763	-0.118	-0.151	10.311
-0.682	0	-0.080	-0.351	-0.057	-0.033	0.399	-0.056	-0.074	5.472
0.172	0.080	0	-0.035	0.001	0.101	0.755	-0.002	0.010	6.844
0.752	0.351	0.035	0	0.014	0.563	3.966	0.024	0.049	42.847
0.118	0.057	-0.001	-0.014	0	0.067	0.530	0.001	0.005	4.824
0.115	0.033	-0.101	-0.563	-0.067	0	0.721	-0.064	-0.080	9.092
-0.763	-0.399	-0.755	-3.966	-0.530	-0.721	0	-0.530	-0.710	27.679
0.118	0.056	0.002	-0.024	-0.001	0.064	0.530	0	0.003	4.844
0.151	0.074	-0.010	-0.049	-0.005	0.080	0.710	-0.003	0	6.616
-10.311	-5.472	-6.844	-42.847	-4.824	-9.092	-27.679	-4.844	-6.616	0
<b>-13.297</b>	<b>-6.361</b>	<b>-14.865</b>	<b>-113.43</b>	<b>-9.979</b>	<b>-13.418</b>	<b>-26.105</b>	<b>-10.122</b>	<b>-13.691</b>	<b>519.051</b>

## NOTES:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

**TABLE 4**  
**CHANGES IN TRANSLATION FEE REVENUES (IN MILLIONS OF**  
**CURRENT U.S. DOLLARS)**

	Austria	Austral	Bel	Bulg	Can	Swit	China	Czech
Austria	0.000	1.246	0.000	-0.105	1.499	0.000	0.029	-0.188
Australia	-1.246	0.000	-0.572	-0.477	0.000	-1.083	-0.693	-0.617
Belgium	0.000	0.572	0.000	-0.148	0.805	0.000	-0.064	-0.147
Bulgaria	0.105	0.477	0.148	0.000	0.499	0.648	0.101	0.010
Canada	-1.499	0.000	-0.805	-0.499	0.000	-1.235	-0.760	-0.649
Switzer.	0.000	1.083	0.000	-0.648	1.235	0.000	-1.156	-0.855
China	-0.029	0.693	0.064	-0.101	0.760	1.156	0.000	-0.094
Czech Rep	0.188	0.617	0.147	-0.010	0.649	0.855	0.094	0.000
Germany	0.000	-1.439	0.000	-1.662	-2.718	0.000	-4.744	-2.953
Denmark	-0.740	1.567	0.240	-0.660	2.052	2.862	-0.444	-0.656
Spain	0.171	1.863	0.489	-0.128	2.224	3.800	0.101	-0.098
Finland	-1.071	1.080	-0.126	-0.644	1.400	1.940	-0.563	-0.672
France	-5.275	-0.810	0.000	-0.866	-1.669	-4.055	-1.926	-1.078
UK	-6.649	0.000	-3.833	-1.782	0.000	-7.050	-2.997	-2.357
Greece	0.509	0.752	0.657	-0.009	1.011	3.158	0.128	0.021
Hungary	0.074	0.782	0.118	-0.058	0.824	0.771	0.048	-0.054
Ireland	0.362	0.000	0.572	-0.048	0.000	3.801	0.079	-0.038
Israel	-0.624	0.000	-0.244	-0.234	0.000	-0.323	-0.301	-0.306
India	0.027	0.000	0.029	0.000	0.000	0.376	0.039	0.004
Italy	-2.431	0.361	-1.806	-0.481	0.480	0.153	-0.728	-0.548
Japan	-19.667	-5.203	-18.827	-1.338	-7.067	-20.975	-16.928	-1.504
Korea	-0.452	0.972	-0.352	-0.102	1.054	0.842	-2.729	-0.092
Luxem	0.000	1.452	0.000	-0.009	1.729	0.000	0.258	0.034
Mexico	0.128	0.641	0.161	-0.002	0.729	0.935	0.103	0.011
Netherl	-2.650	0.013	0.000	-0.628	0.214	-0.581	-0.850	-0.705
Norway	-0.666	0.948	-0.208	-0.347	0.743	0.066	-0.262	-0.370
NZealand	-0.150	0.000	0.027	-0.098	0.000	0.643	-0.039	-0.119
Poland	0.215	1.014	0.215	0.002	1.065	1.058	0.144	0.025
Portugal	0.922	2.561	1.155	0.017	3.050	4.908	0.377	0.079
Romania	0.105	0.433	0.131	0.001	0.448	0.620	0.096	0.010
Russia	-0.310	0.712	-0.171	-0.178	0.719	0.395	-0.170	-0.189
Sweden	-3.730	-0.059	-1.770	-1.582	0.355	-0.805	-1.806	-1.734
Slovakia	0.169	0.632	0.162	-0.002	0.658	0.753	0.115	0.040
Turkey	0.144	0.972	0.194	-0.015	1.016	0.925	0.128	0.000
USA	-36.275	0.000	-24.877	-8.301	0.000	-61.504	-18.565	-11.422
<b>Net Gain</b>	<b>-80.342</b>	<b>13.932</b>	<b>-49.080</b>	<b>-21.143</b>	<b>13.763</b>	<b>-66.947</b>	<b>-53.889</b>	<b>-27.211</b>

## NOTE:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

*TABLE 4 Continued*  
**CHANGES IN TRANSLATION FEE REVENUES (IN MILLIONS OF  
 CURRENT U.S. DOLLARS)**

Ger	Den	Spa	Fin	Fra	UK	Gree	Hung	Ire
0.000	0.740	-0.171	1.071	5.275	6.649	-0.509	-0.074	-0.362
1.439	-1.567	-1.863	-1.080	0.810	0.000	-0.752	-0.782	0.000
0.000	-0.240	-0.489	0.126	0.000	3.833	-0.657	-0.118	-0.572
1.662	0.660	0.128	0.644	0.866	1.782	0.009	0.058	0.048
2.718	-2.052	-2.224	-1.400	1.669	0.000	-1.011	-0.824	0.000
0.000	-2.862	-3.800	-1.940	4.055	7.050	-3.158	-0.771	-3.801
4.744	0.444	-0.101	0.563	1.926	2.997	-0.128	-0.048	-0.079
2.953	0.656	0.098	0.672	1.078	2.357	-0.021	0.054	0.038
0.000	-19.007	-19.539	-16.058	-11.149	-11.559	-14.111	-2.778	-15.850
19.007	0.000	-1.028	0.538	6.680	10.526	-0.852	-0.624	-0.836
19.539	1.028	0.000	1.447	7.237	9.994	-0.510	-0.008	-0.384
16.058	-0.538	-1.447	0.000	5.413	7.763	-1.076	-0.670	-1.074
11.149	-6.680	-7.237	-5.413	0.000	-1.024	-5.010	-1.228	-5.589
11.559	-10.526	-9.994	-7.763	1.024	0.000	-4.786	-3.098	0.000
14.111	0.852	0.510	1.076	5.010	4.786	0.000	0.074	0.077
2.778	0.624	0.008	0.670	1.228	3.098	-0.074	0.000	-0.005
15.850	0.836	0.384	1.074	5.589	0.000	-0.077	0.005	0.000
1.075	-0.369	-0.915	-0.190	0.681	0.000	-0.401	-0.359	0.000
0.816	0.152	0.022	0.023	0.279	0.000	-0.022	0.001	0.000
16.785	-2.878	-3.427	-2.085	4.027	3.527	-2.581	-0.541	-2.978
-17.776	-22.410	-22.751	-20.306	-22.269	-36.142	-19.038	-1.635	-28.856
5.012	0.033	-0.738	0.259	1.678	2.850	-0.632	-0.032	-0.723
0.000	1.534	0.592	1.776	0.000	7.308	-0.022	0.125	0.121
2.693	0.692	0.000	0.700	1.398	2.463	-0.007	0.058	0.048
13.581	-3.376	-3.380	-2.525	2.888	2.310	-2.607	-0.760	-2.862
2.093	-0.171	-0.799	0.035	0.979	3.389	-0.459	-0.347	-0.461
2.040	0.434	-0.240	0.509	1.164	0.000	-0.141	-0.107	0.000
3.522	0.864	0.185	0.911	1.536	3.811	-0.010	0.086	0.085
20.628	2.106	0.964	2.467	7.792	12.873	0.050	0.197	0.316
1.531	0.634	0.126	0.626	0.835	1.593	0.008	0.059	0.041
3.136	0.217	-0.448	0.309	1.071	3.207	-0.385	-0.171	-0.354
16.569	-3.867	-4.611	-2.780	5.136	6.882	-2.881	-1.831	-3.460
2.099	0.703	0.141	0.715	0.987	2.335	0.003	0.070	0.060
2.556	0.812	0.142	0.841	1.296	3.669	0.000	0.052	0.084
-34.025	-61.968	-53.477	-49.559	-30.127	0.000	-25.407	-15.508	0.000
<b>165.901</b>	<b>-124.49</b>	<b>-135.38</b>	<b>-94.049</b>	<b>16.061</b>	<b>68.326</b>	<b>-87.254</b>	<b>-31.476</b>	<b>-67.325</b>

## NOTE:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

*TABLE 4 Continued*  
**CHANGES IN TRANSLATION FEE REVENUES (IN MILLIONS OF  
 CURRENT U.S. DOLLARS)**

	Isr	India	Ita	Jpn	Kor	Lux	Mex	Neth
Austria	0.624	-0.027	2.431	19.667	0.452	0.000	-0.128	2.650
Australia	0.000	0.000	-0.361	5.203	-0.972	-1.452	-0.641	-0.013
Belgium	0.244	-0.029	1.806	18.827	0.352	0.000	-0.161	0.000
Bulgaria	0.234	0.000	0.481	1.338	0.102	0.009	0.002	0.628
Canada	0.000	0.000	-0.480	7.067	-1.054	-1.729	-0.729	-0.214
Switzer.	0.323	-0.376	-0.153	20.975	-0.842	0.000	-0.935	0.581
China	0.301	-0.039	0.728	16.928	2.729	-0.258	-0.103	0.850
Czech Rep	0.306	-0.004	0.548	1.504	0.092	-0.034	-0.011	0.705
Germany	-1.075	-0.816	-16.785	17.776	-5.012	0.000	-2.693	-13.581
Denmark	0.369	-0.152	2.878	22.410	-0.033	-1.534	-0.692	3.376
Spain	0.915	-0.022	3.427	22.751	0.738	-0.592	0.000	3.380
Finland	0.190	-0.023	2.085	20.306	-0.259	-1.776	-0.700	2.525
France	-0.681	-0.279	-4.027	22.269	-1.678	0.000	-1.398	-2.888
UK	0.000	0.000	-3.527	36.142	-2.850	-7.308	-2.463	-2.310
Greece	0.401	0.022	2.581	19.038	0.632	0.022	0.007	2.607
Hungary	0.359	-0.001	0.541	1.635	0.032	-0.125	-0.058	0.760
Ireland	0.000	0.000	2.978	28.856	0.723	-0.121	-0.048	2.862
Israel	0.000	0.000	-0.013	1.053	-0.545	-0.743	-0.319	0.270
India	0.000	0.000	-13.782	1.165	0.436	-0.005	0.001	0.167
Italy	0.013	13.782	0.000	23.248	-0.151	-2.953	-0.662	0.437
Japan	-1.053	-1.165	-23.248	0.000	-19.795	-20.109	-2.186	-19.837
Korea	0.545	-0.436	0.151	19.795	0.000	-0.735	-0.253	0.579
Luxem	0.743	0.005	2.953	20.190	0.735	0.000	0.011	3.189
Mexico	0.319	-0.001	0.662	2.186	0.253	-0.011	0.000	0.780
Netherl	-0.270	-0.167	-0.437	19.837	-0.579	-3.189	-0.780	0.000
Norway	0.099	-0.016	0.171	1.543	-0.378	-0.837	-0.375	0.504
NZealand	0.000	0.000	0.446	2.419	-0.090	-0.284	-0.130	0.707
Poland	0.515	-0.002	0.748	1.764	0.161	-0.006	0.007	0.933
Portugal	1.328	0.043	4.042	23.788	0.975	0.112	0.044	4.329
Romania	0.214	0.000	0.467	1.312	0.099	0.011	0.004	0.604
Russia	0.306	-0.001	0.299	1.261	0.137	-0.542	-0.207	0.446
Sweden	-0.969	-0.109	0.574	20.532	-1.662	-4.608	-1.787	1.167
Slovakia	0.315	0.002	0.531	1.409	0.106	0.005	0.002	0.699
Turkey	0.486	0.000	0.705	1.534	0.122	-0.022	-0.010	0.882
USA	0.000	0.000	-39.879	38.818	-25.108	-36.836	-15.298	-32.191
<b>Net Gain</b>	<b>5.101</b>	<b>10.190</b>	<b>-70.457</b>	<b>464.467</b>	<b>-52.132</b>	<b>-85.650</b>	<b>-32.691</b>	<b>-34.418</b>

## NOTE:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

*TABLE 4 Continued*  
**CHANGES IN TRANSLATION FEE REVENUES (IN MILLIONS OF  
 CURRENT U.S. DOLLARS)**

Nor	NZeal	Pol	Port	Rom	Rus	Swe	Slov	Tur	USA
0.666	0.150	-0.215	-0.922	-0.105	0.310	3.730	-0.169	-0.144	36.275
-0.948	0.000	-1.014	-2.561	-0.433	-0.712	0.059	-0.632	-0.972	0.000
0.208	-0.027	-0.215	-1.155	-0.131	0.171	1.770	-0.162	-0.194	24.877
0.347	0.098	-0.002	-0.017	-0.001	0.178	1.582	0.002	0.015	8.301
-0.743	0.000	-1.065	-3.050	-0.448	-0.719	-0.355	-0.658	-1.016	0.000
-0.066	-0.643	-1.058	-4.908	-0.620	-0.395	0.805	-0.753	-0.925	61.504
0.262	0.039	-0.144	-0.377	-0.096	0.170	1.806	-0.115	-0.128	18.565
0.370	0.119	-0.025	-0.079	-0.010	0.189	1.734	-0.040	0.000	11.422
-2.093	-2.040	-3.522	-20.628	-1.531	-3.136	-16.569	-2.099	-2.556	34.025
0.171	-0.434	-0.864	-2.106	-0.634	-0.217	3.867	-0.703	-0.812	61.968
0.799	0.240	-0.185	-0.964	-0.126	0.448	4.611	-0.141	-0.142	53.477
-0.035	-0.509	-0.911	-2.467	-0.626	-0.309	2.780	-0.715	-0.841	49.559
-0.979	-1.164	-1.536	-7.792	-0.835	-1.071	-5.136	-0.987	-1.296	30.127
-3.389	0.000	-3.811	-12.873	-1.593	-3.207	-6.882	-2.335	-3.669	0.000
0.459	0.141	0.010	-0.050	-0.008	0.385	2.881	-0.003	0.000	25.407
0.347	0.107	-0.086	-0.197	-0.059	0.171	1.831	-0.070	-0.052	15.508
0.461	0.000	-0.085	-0.316	-0.041	0.354	3.460	-0.060	-0.084	0.000
-0.099	0.000	-0.515	-1.328	-0.214	-0.306	0.969	-0.315	-0.486	0.000
0.016	0.000	0.002	-0.043	0.000	0.001	0.109	-0.002	0.000	0.000
-0.171	-0.446	-0.748	-4.042	-0.467	-0.299	-0.574	-0.531	-0.705	39.879
-1.543	-2.419	-1.764	-23.788	-1.312	-1.261	-20.532	-1.409	-1.534	-38.818
0.378	0.090	-0.161	-0.975	-0.099	-0.137	1.662	-0.106	-0.122	25.108
0.837	0.284	0.006	-0.112	-0.011	0.542	4.608	-0.005	0.022	36.836
0.375	0.130	-0.007	-0.044	-0.004	0.207	1.787	-0.002	0.010	15.298
-0.504	-0.707	-0.933	-4.329	-0.604	-0.446	-1.167	-0.699	-0.882	32.191
0.000	0.334	-0.490	-1.119	-0.335	-0.274	1.493	-0.383	-0.431	21.047
-0.334	0.000	-0.211	-0.533	-0.089	0.029	1.942	-0.129	-0.186	0.000
0.490	0.211	0.000	-0.042	0.000	0.266	2.203	-0.009	0.026	18.269
1.119	0.533	0.042	0.000	0.010	0.755	5.999	0.024	0.066	63.869
0.335	0.089	0.000	-0.010	0.000	0.170	1.551	0.001	0.017	7.527
0.274	-0.029	-0.266	-0.755	-0.170	0.000	1.625	-0.192	-0.212	17.538
-1.493	-1.942	-2.203	-5.999	-1.551	-1.625	0.000	-1.751	-2.039	61.052
0.383	0.129	0.009	-0.024	-0.001	0.192	1.751	0.000	0.015	11.082
0.431	0.186	-0.026	-0.066	-0.017	0.212	2.039	-0.15	0.000	17.275
-21.047	0.000	-18.269	-63.869	-7.527	-17.538	-61.052	-11.082	-17.275	0.000
-24.717	-7.477	-40.263	-167.54	-19.687	-26.904	-53.613	-26.242	-36.531	759.16

## NOTE:

Each entry represents the revenue distributed from the row country to the column country. A positive (negative) entry indicates a gain (loss) to the column country.

**TABLE 5**  
**REVENUE COMPARISONS AND BREAK-EVEN PERCENTAGE**  
**CHANGES IN PATENTING**

	<i>Agent Fee Revenues</i>		<i>Ratio of After to Before:</i>	<i>Break-Even per 100%</i>	<i>Translation Fee Revenues</i>	
	<i>Before:</i>	<i>After:</i>			<i>Before:</i>	<i>After:</i>
Austria	76.701	12.571	0.164	5.10	94.245	13.903
Australia	30.972	29.153	0.941	0.06	23.310	37.242
Belgium	50.400	14.513	0.288	2.47	64.015	14.935
Bulgaria	9.809	0.447	0.046	20.93	21.557	0.414
Canada	16.520	31.998	1.937	-0.48	30.343	44.106
Switzer.	75.585	47.748	0.632	0.58	143.683	76.736
China	30.045	10.707	0.356	1.81	61.371	7.482
Czech Rep	11.912	1.290	0.108	8.23	28.859	1.648
Germany	100.556	251.404	2.500	-0.60	140.656	306.557
Denmark	71.899	20.664	0.287	2.48	165.926	41.440
Spain	89.678	11.521	0.128	6.78	152.421	17.042
Finland	99.862	27.106	0.271	2.68	141.262	47.213
France	74.369	93.430	1.250	-0.20	132.397	148.458
UK	71.888	126.874	1.765	-0.43	112.489	180.815
Greece	66.579	0.958	0.014	68.47	88.694	1.440
Hungary	16.115	2.672	0.166	5.03	35.647	4.171
Ireland	47.959	3.885	0.081	11.34	73.111	5.787
Israel	19.019	13.894	0.731	0.37	14.302	19.403
India	4.021	12.012	2.988	-0.67	4.282	14.471
Italy	73.789	38.422	0.521	0.92	144.095	73.638
Japan	739.688	807.615	1.092	-0.08	165.819	630.286
Korea	108.223	84.474	0.781	0.28	92.710	40.578
Luxem	37.668	1.584	0.042	22.77	87.471	1.821
Mexico	27.867	1.063	0.038	25.22	33.737	1.047
Netherl	37.816	45.147	1.190	-0.16	110.841	76.423
Norway	25.328	12.031	0.474	1.11	50.879	26.162
NZealand	13.221	6.860	0.518	0.93	19.184	11.706
Poland	16.658	1.793	0.108	8.29	41.330	1.067
Portugal	113.808	0.381	0.003	297.68	168.193	0.650
Romania	10.894	0.915	0.084	10.90	20.020	0.333
Russia	31.670	18.252	0.576	0.74	42.147	15.243
Sweden	83.299	57.194	0.687	0.46	169.591	115.977
Slovakia	10.566	0.444	0.042	22.80	26.800	0.558
Turkey	14.521	0.830	0.057	16.49	37.961	1.430
USA	160.386	679.437	4.236	-0.76	185.711	944.877

**NOTES:**

Revenues are in millions of current dollars. Breakeven '%' is the percentage change in source country external patenting that would make 'before' and 'after' revenues equal. The figures under the 'Breakeven Growth' column are multiples of 100%.

*TABLE 5 Continued*  
**REVENUE COMPARISONS AND BREAK-EVEN PERCENTAGE  
 CHANGES IN PATENTING**

Ratio of After to Before:	Break- Even per 100%	<i>Total Revenues (Agent + Transl)</i>		Ratio of After to Before	Break- Even per 100%
		Before:	After:		
0.148	5.78	170.946	26.474	0.155	5.46
1.598	-0.37	54.283	66.395	1.223	-0.18
0.233	3.29	114.416	29.448	0.257	2.89
0.019	51.03	31.366	0.862	0.027	35.41
1.454	-0.31	46.862	76.104	1.624	-0.38
0.534	0.87	219.268	124.484	0.568	0.76
0.122	7.20	91.416	18.189	0.199	4.03
0.057	16.51	40.771	2.938	0.072	12.88
2.179	-0.54	241.213	557.961	2.313	-0.57
0.250	3.00	237.826	62.104	0.261	2.83
0.112	7.94	242.099	28.563	0.118	7.48
0.334	1.99	241.124	74.319	0.308	2.24
1.124	-0.11	206.767	241.888	1.176	-0.15
1.607	-0.38	184.376	307.689	1.669	-0.40
0.016	60.60	155.273	2.398	0.015	63.75
0.117	7.55	51.762	6.844	0.132	6.56
0.079	11.63	121.071	9.672	0.090	11.52
1.357	-0.26	33.320	33.297	0.999	0.00
3.380	-0.70	8.302	26.483	3.190	-0.69
0.511	0.96	217.884	112.060	0.514	0.94
3.801	-0.74	905.507	1437.901	1.588	-0.37
0.438	1.28	200.933	125.052	0.622	0.61
0.021	47.03	125.139	3.405	0.027	35.75
0.031	31.23	61.604	2.109	0.034	28.20
0.689	0.45	148.657	121.570	0.819	0.22
0.515	0.94	76.207	38.193	0.500	1.00
0.609	0.64	32.405	18.567	0.571	0.75
0.026	37.75	57.987	2.860	0.049	19.28
0.004	257.80	282.001	1.031	0.004	272.54
0.017	- 59.18	30.914	1.248	0.040	23.77
0.362	1.76	73.817	33.495	0.454	1.20
0.684	0.46	252.890	173.171	0.685	0.46
0.021	47.02	37.366	1.002	0.027	36.29
0.038	25.54	52.482	2.261	0.043	22.22
5.088	-0.80	346.097	1624.314	4.693	-0.79

**NOTES:**

Revenues are in millions of current dollars. Breakeven '%' is the percentage change in source country external patenting that would make 'before' and 'after' revenues equal. The figures under the 'Breakeven Growth' column are multiples of 100%.

than nonresidents patent in their (home) countries, and/or whose patent agent fees are lower than those abroad.

Note importantly that revenues from the first stage of EPO applications were not included in the analysis—only those from the regional stage. The patenting data here do not indicate which member states' patent practitioners, from among the list of eligible representatives, acted before the EPO. Consequently it is not possible to determine to which member states' patent profession the EPO filing fee revenues should be apportioned (say under Regime 1). In any event, the EPO may, even under a system like Regime 2, still limit who can practice before the EPO or require special qualifications and training, given the unique institutional features of the EPO. In that case, including agent revenues from EPO prosecution would add little, if any, variability to the results. Alternatively, assuming that EPO rules requiring prosecution in one of its three official languages (English, French, and German) will still be maintained (in Regime 2), and given that most EPO patent applications designate the U.K., France, and Germany, it may be the case that patent applicants will mostly seek legal representation from agents in the U.K., France, and Germany. In that case, the results above *underestimate* the potential inequality in the distribution of patent professional revenues among EPO member states.

Table 4 reports the changes in translation revenues (or the translation revenues that are transferred from the row country to the column country). Under Regime 1, translation work is undertaken by local professionals; under Regime 2, it is undertaken by foreign professionals. Again, the countries whose professionals lose revenues are the smaller EPO member states (for example, Portugal, Spain, Denmark). The countries whose professionals gain revenue are in the minority (for example, the U.S., Japan, Germany, Canada, Australia). Australia gains translation revenue (but loses agent fee revenue). It appears that Australia was able to replace its low translation fee business at home with higher translation fee businesses abroad. Netherlands loses translation revenues for precisely the opposite reason (it loses its lucrative domestic translation business to foreign agents handling nonresidents' filings in the Netherlands).

Table 5 provides a summary of the relative gains and losses in agent fees, translation fees, and total (agent plus translation) fees. For each revenue source, the first column shows the total revenues to the country under Regime 1, the second column shows the total revenues under Regime 2, and the third column shows the ratio of revenues under the new and previous regimes. For countries that break even, this ratio would equal one. Finally, the fourth column shows the *break-even*

*growth rate of patenting*—that is, the rate by which national patenting (at home and abroad) must increase, holding fees constant, for revenues under Regime 2 to be the same as revenues under Regime 1.<sup>8</sup> These growth rates are in multiples of 100%; for example, Austria's domestic and external patenting must increase by 510% ( $=5.10 \times 100$ ) in order for patent professionals in Austria to be as well off under Regime 2 as they were under Regime 1. For those few countries that gain revenues on net under Regime 2, the break-even growth rates are negative. This is to be expected since their revenues rise; only a decline in patenting could result in their losing revenues (so as to break even).

(It is important to clarify that the break-even growth must apply across-the-board; for example, if the break-even growth rate for a country is found to be 100%, its domestic patenting and its patenting abroad in *each* of its foreign destinations must double in order for revenues to stay the same. However, since domestic patent agents continue to handle domestic patent applications under Regime 2, the focus below will be on the growth rate of external patenting.)

According to the very last column of Table 5, in order for countries to gain revenues overall (in both translation and patent agent services), international patenting activities must grow at quite a significant rate. The break-even growth rate for Switzerland, for example, is 76% and for Russia 120%. For many other countries the growth rates needed to break even are much higher (e.g. 3,541% for Bulgaria, 6,375% for Greece, 28,200% for Mexico, and 27,254% for Portugal.) In the case of Portugal, the large decrease in revenues from \$113.808 million (under Regime 1) to \$0.381 million (under Regime 2) suggests the virtual disappearance of the patent profession in that country. Many practitioners are likely to exit the profession under those circumstances.

These break-even figures seem high, but in what particular sense? To put them in perspective, it would be useful to compare these break-even or *required* rates of growth to the *actual* growth rates of patenting in the past. The first two columns of Table 6 report the percentage growth rate in domestic patenting and external patenting between 1980 and 1995. The actual (historical) growth rates in patenting can help indicate whether break-even growth rates are attainable naturally (without any policy or other special stimulus).

As the table shows, the growth in patenting abroad has well exceed that for patenting at home. This reflects the increased internationalization

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<sup>8</sup> The rates are calculated as the percentage by which revenues under Regime 2 must increase in order to equal revenues under Regime 1.

**TABLE 6**  
**GROWTH RATES OF PATENTING, TRADE, AND RESEARCH**  
**1980-95**

	Domestic Patents	External Abroad	Mdse. Export	Service Export	GDP per capita	R&D/ GDP
Austria	7.4%	159.5%	94.9%	91.4%	25.0%	30.4%
Australia	30.7%	271.0%	87.8%	139.4%	21.5%	36.3%
Belgium	45.0%	193.1%	75.2%	109.6%	23.0%	13.2%
Bulgaria			-71.3%	15.9%	14.3%	
Canada	61.9%	220.3%	104.3%	108.2%	11.0%	32.6%
China			210.7%	203.0%	121.6%	
Czech Rep.						
Denmark	93.4%	263.5%	107.7%	96.6%	30.9%	30.5%
Finland	87.8%	273.0%	102.5%	105.5%	9.5%	27.4%
France	44.1%	158.8%	90.5%	81.0%	18.7%	4.3%
Germany	68.2%	152.7%	99.8%	95.6%		29.5%
Greece	-110.3%	202.6%	60.0%	88.9%	20.3%	
Hungary			36.9%	190.9%	1.5%	
India	31.9%	193.9%	127.6%	84.9%	45.4%	75.2%
Ireland	85.3%	275.9%	166.0%	124.6%	35.7%	79.4%
Israel	71.2%	268.9%	123.5%	104.5%	23.7%	56.9%
Italy	33.0%	136.6%	108.6%	122.1%	25.3%	
Japan	72.1%	153.9%	122.3%	117.0%	42.7%	34.9%
Luxembourg	46.2%				49.3%	
Mexico	-53.6%	81.5%	162.9%	80.6%	-1.5%	
Netherlands	98.4%	184.6%	97.4%	103.7%	22.7%	-4.7%
New Zealand	21.3%	237.2%	93.0%	144.9%	4.2%	4.7%
Norway	77.2%	285.7%	80.8%	41.9%	41.4%	29.5%
Poland			47.8%	145.2%	5.0%	
Portugal	13.2%		158.4%	140.5%	40.1%	59.8%
Rep. Of Korea	401.0%		196.7%	171.8%	107.8%	146.0%
Romania			-39.5%	34.0%	-11.1%	
Russian Fed.						
Slovakia						
Spain	36.0%	210.2%	148.9%	123.9%	31.7%	78.6%
Sweden	54.4%	214.5%	95.0%	72.4%	7.6%	61.1%
Switzerland	-40.6%	122.3%	96.4%	133.2%	9.5%	6.9%
Turkey	100.8%		200.5%	302.3%	34.3%	48.3%
U.K.	25.3%	180.5%	78.9%	67.2%	24.6%	-1.3%
U.S.A.	58.9%	224.9%	95.1%	147.8%	20.4%	-2.6%

## NOTES:

—Each figure represents the percentage growth between 1980 and 1995.

—A blank entry indicates insufficient data to make calculation.

—Domestic Patents refer to resident patenting and External Patents to patenting abroad.

GDP denotes Gross Domestic Product and R&amp;D research and development (both in real 1990 U.S. dollars).

—Patenting Data are from the World Intellectual Property Office (1980, 1995) "Industrial Property Statistics"; R&amp;D data from UNESCO (1998) "Statistical Yearbook"; and Merchandise (Mdse.) and Service Exports, Gross Domestic Product (GDP), and Population data from the World Bank (1998) "World Development Indicators", CD-Rom.

of patenting activity. However, it is also clear that this growth trend in external patenting, should it be sustained, is much lower than is needed for the revenue-losing countries to break even (under Regime 2). For example, Austria requires its external patenting business to grow by 546% (see last column in Table 5) in order for its patent professionals to be as well off under Regime 2 as they were under Regime 1. But as Table 6 indicates, Austria's actual external patenting grew by 159.5%—and that is over a 15 year period. For some countries, though, the actual historical growth rate does exceed the break-even growth rate; for example, Sweden needs external patenting to grow by 46%, but it actually experienced a growth in external patenting of 214.5%. However, since the actual growth rate refers to a 15 year period, in annual terms Sweden's external patenting grew 14.3% per year on average ( $= 214.5\% \div 15$ ). This means that Sweden (along with other revenue-losing countries) will sustain short term losses if its external patenting business cannot grow to adequate levels except in the long run.

Thus for most countries the break-even rates of growth in patenting are quite large compared to actual rates of growth (whether from a short term or long term perspective). The question is whether globalization has the capacity to stimulate sufficient growth in world patenting activity (above break-even standards). This is the subject of the next subsection.

#### (B) *Efficiency Effects*

To recap, in order for patent professionals in a country to be better off under globalization, globalization must result in (or be accompanied by) a rise in that country's external patenting at a rate that exceeds its break-even growth rate. Will globalization and patent professional liberalization produce such a rise in world patenting activity? According to advocates of liberalization, trade liberalization (whether in goods or services) works to enhance economic efficiency.<sup>9</sup> The reason is that liberalization opens and expands markets. Larger, more open markets imply greater potential demand for producers, and provides opportunities for producers to exploit economies of scale and thereby specialize. In addition, increased competition pressures firms to be more productive and cost efficient. The drive to meet greater demand and achieve cost reductions in turn increases incentives for firms to innovate and engage in research and development (R&D).

<sup>9</sup> See, for example, Feketekey, G. (1988) *International Trade in Services: An Overview and Blueprint for Negotiations*, MA: Ballinger Publishers; OECD (1997) *International Trade in Professional Services: Advancing Liberalization through Regulatory Reform*, Paris, France; and Sauve, P. and Stern, R. M. (2000) *Gats 2000: New Directions in Services Trade Liberalization*, D.C.: Brookings Institution.

The relevance of increased efficiency or productivity, trade, and R&D is that they in turn are important determinants of patenting activity (i.e. create business for patent professionals). Increased trade works to stimulate the demand for patent applications as producers seek global patent protection. Increased productivity and R&D work to generate inventions and thereby stimulate the demand for patent applications indirectly (i.e. by increasing the supply of 'ideas' available for patenting).

Thus whether patent professional liberalization will increase the world volume of patenting depends on two underlying links: first, the link between liberalization and economic efficiency (in the form of increased productivity, trade, and R&D); secondly, the link between economic efficiency and patenting. However, at present, there exist no empirical studies of the economic effects of liberalizing patent professional services. Because liberalization has not happened (yet), no data exist to allow any before and after comparisons.

Hence, given the lack of direct evidence of efficiency effects, the paper pursues the following *indirect* strategy: first, it examines the second link above (namely, the relationship between patenting and R&D, productivity, and trade). In particular, estimates are provided of how much external patenting can grow for a given change in R&D, productivity, or trade. Knowing these magnitudes, one can then determine how much growth in national R&D, productivity, and trade is required to stimulate a country's external patenting to grow at the break-even rate. The *required* rates of growth in national R&D, productivity, and trade are then compared to the *past* rates of growth in R&D, productivity, and trade. The comparison should shed light on whether the required rates of growth are too high (relative to the recent past) *and* whether the difference between the required and actual past rates of growth might be something that can be attributed to the liberalization of patent professional services. That is, if liberalization does have economic efficiency effects, one would expect growth rates of R&D, productivity, and trade to exceed past performance. However, if the gap between required and actual past growth rates is too wide, one would have to cast doubt on the capacity for liberalization to generate those large efficiency effects. And of course, if liberalization cannot stimulate a nation's R&D, productivity, and trade to grow at the required rates of growth, then one cannot expect that country's external patenting to grow at the break-even rate. Thus patent professionals in that particular country would be expected to be worse off under globalization.

Table 7 reports on the link between external patenting and measures of trade, productivity, and R&D. The estimates are obtained by regression

**TABLE 7**  
**STATISTICAL ESTIMATES OF INFLUENCES ON EXTERNAL**  
**PATENTING**

A 1% Change in:	% change in <i>Patenting Abroad</i> due to:
<i>Merchandise Exports</i>	0.58
<i>Service Exports</i>	0.29
<i>GDP per capita</i>	0.65
<i>Ratio of R&amp;D to GDP</i>	1.38
Percent of Data Explained	93%
Number of Observations	100

**Technical Notes:**

The above estimates are obtained by 'fitting an equation' to data from 25 countries and four time periods (1980, 1985, 1990, and 1995); hence the number of observations is 100.

The *dependent* variable of this equation is the total number of patents filed abroad by a country, and the *independent* (or explanatory) variables are a constant, time trend, the country's GDP per capita, its ratio of R&D to GDP, and its Merchandise and Service Exports. All variables (except for the constant and time trend) are in 'logarithms'. The method of estimation is (ordinary) Least Squares Regression. All of the explanatory variables are statistically significant at better than the 1 percent confidence level.

R&D denotes research and development. Exports (merchandise and service), R&D, and GDP are in real 1990 U.S. dollars.

The percentage of data explained (i.e., the adjusted R<sup>2</sup>) refers to how well the variation in the fitted (or predicted) values of *patenting abroad* matches up to the actual variation in patenting abroad.

Data Sources: See Notes to Table 6.

analysis using data from 25 countries and four time periods.<sup>10,11</sup> The statistical measurements indicate that holding everything else constant, a one percent increase in a country's *merchandise exports* would increase its patenting abroad by 0.58%. Likewise, holding everything else constant, a one percent increase in a country's *service exports* would increase its patenting abroad by 0.29%. Finally, a 1% increase in *Gross Domestic Product (GDP) per capita* and a 1% increase in the *R&D to GDP* ratio would increase the country's patenting abroad by 0.65% and 1.38% respectively, holding everything else constant. Here merchandise and service exports are used to measure the role of trade. GDP per capita (in real U.S. dollars) is a measure of a nation's total output per person and is thus used to reflect a country's level of productivity (which is a

<sup>10</sup> Complete data were not available for all 35 countries (particularly those from Eastern Europe and China); hence the sample consists of 25 nations. The data used in this study are available from the author upon request.

<sup>11</sup> Regression analysis essentially involves finding an equation that best 'fits' the data. The resulting equation quantifies the extent to which patenting is affected by its underlying determinants (e.g. trade, productivity, and R&D). More technical details are in the notes to Table 7 and in G. S. Maddala (1992) *Introduction to Econometrics*, Macmillan Press.

standard practice in international economic studies). The R&D to GDP ratio is used as a measure of research intensity.

These numbers can now be put to use to calculate the growth rates in national trade, R&D, and productivity that are required for a nation's external patenting to grow at the target break-even rate. First, some simplifications. Rather than analyze each variable (trade, R&D, etc.) individually, assume that all of the variables change at once. (This allows for maximum effect on external patenting.) Moreover, assume that all of the variables grow at some *common* rate. (This is strictly for analytical convenience and has no serious effect on the conclusions.) Note that the *sum* effect of all the variables is 2.9% ( $= 0.58\% + 0.29\% + 0.65\% + 1.38\%$ ). Thus for every 1% increase in *all* of the variables simultaneously, the country's external patenting is predicted to grow by 2.9%.

Consider Austria as an example. According to Table 5 (last column), Austria's break-even external patenting growth rate is 540%. Thus if Austria's R&D/GDP ratio, merchandise exports, service exports, and GDP per capita *each* increases by 186.2% ( $= 540\% \div 2.9\%$ ), Austria's patent professionals will be able to break even under globalization. However, this common required growth rate of 186.2% is much too high relative to Austria's past rates of growth in trade, productivity, and R&D. Table 6 reports on the rates of growth in merchandise exports, service exports, GDP per capita, and R&D/GDP during the 15 year period between 1980 and 1995. For Austria, merchandise and service exports grew by less than 100% over that period; GDP per capita grew by 25% and R&D to GDP by 30.4%. For Austria actually to break even, liberalization must result in a near doubling of Austria's export growth rate and in a near six-fold increase in its growth rates of R&D/GDP and of GDP per capita—and this is over a 15 year period. Thus even if these changes could occur over this time horizon, Austria's patent professionals will incur large revenues losses in the short run.

The same qualitative conclusions can be drawn for the rest of the sample. Belgium, for example, needs external patenting to grow by 289% (again see Table 5). This in turn requires Belgian R&D activity, trade, and productivity to grow at a common rate of 99.6% ( $= 289\% \div 2.9\%$ ). Again, actual rates of growth in these variables for Belgium in the immediate past have never been this high. While Belgium's services exports grew 109.6%, this is over a 15 year period (or an average of 7.3% per annum). Sweden's break-even patenting growth rate is 46%, requiring a common growth rate in its R&D activity, trade, and productivity of 15.8% ( $= 46\% \div 2.9\%$ ). However, in Sweden's recent past, R&D/GDP grew by 61.6% over 15 years (or 4.07% per year on average) and

merchandise exports by 95% over 15 years (or 6.33% per year on average). Thus not only is there uncertainty as to whether liberalization can deliver the required rates of growth in national economic performance, there is also uncertainty as to whether it can do so within a reasonable period of time. Presumably, revenue losses (if any) would occur earlier than it would take sufficient efficiency effects to arise.

The implication then is that, for revenue-losing nations, the break-even growth rates of external patenting (shown in Table 5) are not feasible to achieve. The reason is that, to generate them, those nations require large increases in their rates of growth in trade, productivity, and R&D. (Trade, production, and R&D are important determinants of patenting activity so that stimulating them would help generate more business for patent professionals.) But because the required rates of growth in trade, productivity, and R&D are so large in comparison to past rates of growth (as shown in Table 6), doubts arise as to whether liberalization can produce that much economic efficiency (whether in the short run or long run). Thus it does not appear that the efficiency effects, if any, could outweigh the distributional effects. To take a simple analogy, the analysis suggests that globalization primarily redistributes the 'pie' among patent agents in different countries, and that globalization is not likely to increase the 'pie' sufficiently for there to be more for everyone.

## 6. CONCLUDING REMARKS

This paper has argued that the international liberalization of patent professional services will result in asymmetric gains across countries. It has also inquired whether overall *efficiency gains* might overwhelm these *distributional effects*. That is, can a sufficient rise in world patenting business occur to compensate the revenue-losing nations? The evidence is not very supportive. For there to be mutual gains from liberalization, seemingly drastic expansions in world trade, production, and innovative activities must occur. The required expansions seem to be out of line with past performance or with current potential. This is not to rule out the possibility that liberalization can produce these large efficiency gains, but at present the likelihood of that occurring seems low.

In closing, some areas for future research can be suggested. A first suggestion is methodological—namely to study the potential effects of globalization on patent professionals via a *survey* of patent practitioners and users. The survey data could shed better light on specific issues at the individual firm level. Other improvements include (i) better estimating the extent to which patent professional liberalization might enhance economic efficiency (possibly by drawing upon research on

other professional services), and (ii) incorporating other sources of business (or income) for patent professionals; for example, licensing, joint ventures, and patent enforcement.

Another area for consideration is the future of the patent profession under globalization. In light of potential revenue changes, what structural adjustments might occur in the patent professional industry? Would globalization ignite merger activity among law firms or encourage partnerships to form across national borders or across professional lines (e.g. accounting and law, consulting and law)?

Finally, a policy-related research would be to investigate the costs and benefits of local representation. How important is it for nations to have local professionals? To the extent that they are vital—and to the extent that globalization has much benefits to offer—what policy measures could best enable locals to exploit those benefits while limiting their risks of being undermined by globalization?