Do Stronger Intellectual Property Rights Encourage Technology Transfer?
Evidence from Foreign Patenting in the United States

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Irina Talis

Department of Economics
Stanford University
Stanford, CA 94305
italis@stanford.edu

Advisor: Petra Moser

ABSTRACT

This paper assesses the effects of strengthening intellectual property rights (IPRs) on international technology transfer. It examines the effects of a major shift towards stronger IPRs in U.S. history: the country’s accession to the Paris Convention on May 30, 1887. Specifically, the paper uses a newly-collected data set of foreign patenting rates in the United States to measure changes in technology transfer into the country in response to this landmark treaty. To control for other factors that may have influenced foreign patenting, the paper also examines the effects of changes in domestic patent law (of foreign countries) on patenting by foreigners in the United States, as well as the relationship between trade volume and foreign patenting. The data suggest that the effects of the Paris Convention on technology transfer were surprisingly small and inconsistent. There is, however, a strong and significant correlation between the volume of trade and foreign patenting, suggesting that interaction through trade is a primary determinant of international technology transfer.

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Since the 1880s, over 20 international agreements on intellectual property have been administered by the World Intellectual Property Organization (WIPO). These agreements have generally proceeded by strengthening intellectual property rights (IPRs) across borders, so that the trend over the past 150 years has been toward stronger global protection of intellectual property (Maskus 2000, p.1). Within the last decade, even China—a country notorious for its disregard of intellectual property—has taken considerable steps to strengthen enforcement of IPRs, opening up 50 courts that deal solely with intellectual-property cases (The Economist, April 10, 2008). Proponents of strong intellectual property rights maintain that increased protection promotes growth and welfare by accelerating innovation and encouraging the diffusion of technologies (Branstetter, Fisman and Foley 2004, p.1). This paper assesses the effects of stronger IPRs on the diffusion of technologies; it examines the effects of a major shift towards stronger IPRs in U.S. history, the country’s accession to the Paris Convention on May 30, 1887.

Theoretical predictions about the effects of IPRs on technology transfer are ambiguous. On the one hand, intellectual property rights spread technical knowledge across borders through patents, as patentees are required to disclose the details of their inventions in patent applications. On the other hand, stronger IPRs can slow the adoption of new technology by limiting opportunities for imitation of protected innovations (Maskus 2000, p.8). Growth theory yields varied predictions about the net effect of these conflicting mechanisms; the overall effect of IPRs on technology transfer and welfare depends on the model’s specifications. For example, Helpman (1993) and Glass and Saggi (1995) demonstrate that stronger IPRs reduce global welfare by reducing technology transfer through imitation. In contrast, Lai (1998) shows that stronger IPRs accelerate innovation and technology diffusion through foreign direct investment,
and Taylor (1994) shows that strong patent protection for foreign-made innovations is essential for technology transfer to occur across countries and increases worldwide growth.

Several recent studies have explored this subject empirically. Using firm-level data on U.S. multinational corporations as well as patent data, Branstetter, Fisman and Foley (2004) show that multinationals respond to changes in IPR regimes abroad by increasing technology transfers to reforming countries. Kortum and Lerner (1998) examine the effect of a change in the legal environment for patents in the United States on both domestic inventiveness and on the attractiveness of the United States as a destination for foreign patenting, finding that foreign patenting in the United States was not increased as a result of a more favorable legal environment for patents.\(^1\) In a study that offers evidence on the redistributive effects of strengthened IP policy, McCalman (2001) quantifies the income transfers across countries in response to the 1993 agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).\(^2\) Overall, while a number of studies exist that are relevant to the subject, few empirical studies explicitly measure the impact of changes in international IPR on technology transfers among countries.

This paper contributes to the current literature by measuring the effect of a landmark IP treaty on technological diffusion into the United States from six European countries and Japan. Specifically, it analyzes the effects of the 1883 Paris Convention for the Protection of Industrial Property on foreign patenting.

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\(^1\) Lerner (2002) also investigates the link between IPR policy and foreign patenting. Looking at the effects of changes in patent policy in 60 countries over a 150-year period, he finds that foreign patents, which can serve as a measure of technological diffusion into a country, go up when the IPR regime is strengthened. However, this study is primarily concerned with the impact of domestic policy changes on domestic inventiveness; the change in foreign patenting rates serves as a robustness check to confirm that “significant changes in IPR were properly identified.”

\(^2\) The TRIPS agreement took the first steps toward patent law harmonization with the imposition of minimum standards (TRIPS Agreement).
Like all international treaties on intellectual property rights, the Paris Convention was designed to address a fundamental problem in forming efficient IP policy: the fact that intellectual property rights are governed by individual nations, while competition and innovation occurs on an international scale (Hall 2001, p.2). On a national level, intellectual property rights involve a tradeoff between the consumer surplus resulting from increased innovation and the deadweight loss from granting inventors monopoly rights. This logic faces complications in the international arena, primarily because each country wants to maximize consumer surplus and profit to its own citizens, but optimal IP policy from the point of view of an individual country is almost always different than the IP policy that maximizes sum global benefits (Scotchmer 2006, p.346).

The Paris Convention was established the first fundamental rules for international patent protection and strengthened the rights of foreign inventors in all signatory countries. To this day, the Paris Convention is considered “the cornerstone of the international industrial property system” (www.wipo.int).

This paper examines the effect of this historic treaty on patenting by foreigners in the United States. If stronger patent protection increases technology transfers across borders, then the expansion of IPRs as a result of the Paris Convention should be reflected in an increase in foreign patenting in the United States. In other words, once a country enters the Paris Convention with the United States, inventors from that country should respond by taking out more U.S. patents.

To identify pre-existing trends, I examine changes in patenting activity approximately 50 years before and after the United States joined the Paris Convention. To control for the strength of a foreign country’s domestic patent law, which may also influence patenting, I compare a
country’s change in patenting following the Paris Convention with changes in patenting for all other countries. Additionally, I explore two other channels that can influence patenting by foreigners in the United States: changes to domestic patent law (of foreign countries) and variations in trade flows. It is widely assumed that knowledge between two countries are positively related to interaction through trade (Saggi 2002, p.192); to the extent that IPR policy changes fail to explain changes in technology transfers into the United States, fluctuations in the volume of trade offer an alternative explanation.

Data on foreign patents in the U.S. suggest that the real effects of the Paris Convention were surprisingly small. Foreign patenting rates in the United States did not change substantially in response to the Convention, and the Convention had no clear and consistent effect.

There is, however, a strong and significant correlation between the volume of trade between the foreign country and the United States, suggesting that the inconsistent response to the Paris Convention across countries can be explained by fluctuations in trade volume with the United States, and that interaction through trade is a primary determinant of technology transfer.

The remainder of this paper is structured as follows. Section I provides a more detailed look at how the Paris Convention strengthened IPRs for foreign inventors in the United States. Section II describes the empirical strategy. Section III describes my newly collected data on U.S. patents by foreign inventors. Section IV presents the results, and Section V concludes.

I. The Paris Convention

The Paris Convention offers a unique opportunity to measure the effect of strengthened IPRs on technology transfers. Before the treaty laid out basic rules for international patent policy in 1883, the patent protection provided to foreigners by most countries was almost always “short
and tenuous” (Penrose 1951, p. 44). In the United States, patent law did not explicitly guarantee equal patent rights to foreign nonresidents until the United States acceded to the Paris Convention in 1887 (Khan 2005, p.57).³

The central principle established by the Paris Convention is the policy of *National Treatment*. *National Treatment* guarantees that the same protection of intellectual property will be available to foreigners as to nationals in any signatory country, regardless of the nature of the foreigners’ domestic patent laws.⁴ Because the Convention explicitly rules out requirements for reciprocity (Article 4bis), a country with national laws that are favorable to patentees must grant equal patent rights to citizens of any signing country.

This implies that the United States is required to grant patents to foreigners from countries with weak patent laws or no patent laws at all. Upon its accession to the Paris Convention, the United States was obliged to grant patents to inventors from the Netherlands and Switzerland, even though neither country would offer any protection to U.S. nationals in their own country. The Netherlands had abolished its patent laws in 1869 and did not re-institute them until 1912, while Switzerland only began to adapt a rudimentary patent law in 1887, and did not adopt a functional patent system until 1907 (Schiff 1971, p.95).

³ A 1793 law limited patents to citizens of the United States. In 1800, patent rights were granted to foreigners who were living in the United States for two years and swore that the invention was not previously patented in other countries. The 1832 Patent Act extended patent rights to resident aliens who intended to become citizens, provided that they produced and marketed the invention in the United States within one year. In 1836, the limitations on residency and citizenship were removed, but discriminatory higher patent fees were introduced. After 1861, all patent laws discriminating against foreign nonresidents were repealed, but equal treatment of foreign inventors was not explicitly guaranteed until the United States joined the Convention in 1887 (Khan 2005, p.57).

⁴ The Paris Convention also established *Right of Priority*, a policy which strengthens *National Treatment*. The *Rights of Priority* grants the first inventor to file a patent in any member country the exclusive right to file in all remaining countries (www.wipo.int). Prior to the Paris Convention, the patent legislation of many countries prohibited the patenting of inventions that had previously been patented abroad; this severely limited the opportunity to obtain protection in foreign countries, even under a policy of *National Treatment* (Penrose 1951, p.68). The *Right of Priority* guaranteed the possibility of acquiring patents for the same invention in multiple countries in a short span of time.
By establishing a policy of equal patent protection without regard to the inventors’
nationality, it is possible that the Paris Convention increased inventors’ incentives to transfer
technology abroad. This paper tests this hypothesis by examining changes in the number of
patents granted to foreign nationals in the United States in response to the Paris Convention.

II. Empirical Strategy

A. Timing of the response to the Paris Convention

Depending on whether a foreign country joined the Paris Convention before or after the
United States, nationals from that country receive the right of National Treatment either directly
upon signing or several years later, when the United States signed in 1887. Until 1887, the
United States was not bound to the Convention (Machlup and Penrose 1950, p.68), but once the
United States signed, all standing members of the Convention were granted National Treatment.
On the other hand, those countries that joined the Convention after 1887 received National
Treatment directly upon signing, because the United States was already a member (Figure 1).

An increase in the growth and level of patenting following the granting of National
Treatment would suggest that the Paris Convention encouraged the transfer of technology into
the United States.

B. Magnitude of the response to the Paris Convention

While inventors of all nationalities should be encouraged to take out U.S. patents in
response to the Paris Convention, inventors from countries with weak domestic patent law—
particularly from the Netherlands and Switzerland—were “more oriented to the international
market” (Khan 2005, p.292) and thus may have been more responsive to changes in patent protection in the United States.

Five of the seven countries in my sample had relatively strong domestic patent laws when they signed the convention: Britain, France and Germany, which represent Europe’s major economic powers and the United States’ most important trading partners, and Belgium and Japan, which provide examples of smaller countries with modern patent protection at the time that they signed. The remaining two countries offered no patent protection at the time that they joined the Convention: Switzerland, which first established its modern patent system in 1907, and the Netherlands, which lacked patent protection until 1912 (Figure 1).

By comparing the change in patenting by Swiss and Dutch inventors to the change in patenting by inventors from countries with patent laws, I test the effect of domestic patent law strength on the decision to transfer technologies to the United States.

C. Alternative determinants of technology transfers: foreign trade and foreign patent laws

Other determinants of U.S. patenting by foreigners and technology transfers may confound potential effects of the Paris Convention. As a control, I look at two other major factors that may influence U.S. patenting by foreigners: changes in domestic patent laws (of foreign countries) and changes in trade flows.

1. Changes in domestic patent laws

Changes in the patent law of a foreign inventor’s country of origin affect his decision to produce and market his invention abroad. Theoretical predictions about the effect of such a change on patenting in the United States are ambiguous. Legislative changes that strengthen the home country’s patent regime increase the profitability of producing and marketing an invention
at home increases relative to the United States, which should lower the incentive to patent in the United States (Khan 2005 p.292). On the other hand, a strengthening of the foreign country’s patent law may increase inventive activity in that country, leading to more total inventions originating from that country, which would ultimately increase patenting in the United States. Which of these two effects dominates is ultimately an empirical question.

Three major legislative changes in Britain, the Netherlands, and Switzerland, respectively, allow me to test for this effect: the British Patent, Designs and Trademarks Act of 1883, the reinstatement of the Dutch patent system in 1912, and the establishment of the Swiss patent system in 1907.

In Britain, the procedure for obtaining a patent remained essentially unchanged between the middle of the sixteenth century and the early 1850s, by which time the patent system was “both enormously cumbersome and prohibitively costly” (Boehme 1967, p.19). The first major step toward reform came with the 1852 Patents Act, which made some progress in rationalizing the system, but was “not nearly radical enough to satisfy the critics” (Boehme 1967, p.29). It was not until 30 years later, with The Patent, Designs, and Trademarks Act of 1883, that Britain entered what scholars consider its modern era of patent administration. Most notably, the Act officially established patent examination and substantially reduced fees (Boehme 1967, p.31).

Dutch patent law also remained virtually unchanged from its initial creation (in 1817) until the middle of the 19th century. By the 1860s, the general consensus was that the system was riddled with problems, and the Netherlands completely abolished patent protection in 1869. Between 1869 and when patent law was reintroduced in 1912, neither Dutch nationals nor foreigners could obtain patent protection in the Netherlands. However, no retaliatory measures
were taken by the international community, and Dutch inventors were free to take out patents abroad (Schiff 1971, pp.19-24). A modernized, reformed patent law was adopted in 1912 (Schiff 1971, p.85).

Switzerland presents a unique case: it is the only industrialized country offered no patent protection whatsoever until late in the 19th century. In 1887, in response to political pressure from abroad, Switzerland introduced “the most incomplete and selective patent law ever enacted in modern times” (Schiff 1971, p.95). The revision of the patent law in 1907 marks the true beginning of the modern patent era in Switzerland: “the patentless period…came to a definitive end in Switzerland in 1907, as it did in the Netherlands with the enactment of the law of 1912” (Schiff 1971, p.95).

2. Changes in trade flows

Trade in goods is a well-known indirect channel of international technology transfer (Saggi 2002, p.191). By interacting through trade, two countries are able to imitate and learn from each other’s new technologies. This idea is so widely accepted that the majority of the literature assumes knowledge spillovers through trade to be automatic, often ignoring the process by which these spillovers take place (Hoppe 2005). Grossman and Helpman (1991), however, model the mechanics of knowledge spillovers through trade, confirming that scientific and technological knowledge flows from abroad are positively related to the extent of a country’s foreign trade.

To test for the effect of trade on patenting, I examine the correlation between U.S. import and export volume of each foreign country and changes in the number of annual patents by

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5 The Swiss law of 1887 restricted protection to inventions that could be represented by a model, excluding all processes and chemical substances. The revision of the patent law in 1907 included the removal of the model requirement.
inventors from that country in the United States. The following section presents the patent data for these tests.

### III. The Data

Foreign patent counts are a standard measure of technology transfer: an increase in the volume of technology transferred should be reflected in an increase in both the level and growth rate of total patents granted to foreigners (Branstetter, Fisman and Foley 2004). Because patenting abroad is very costly, foreigners generally take out patents in only a few countries: the countries in which they plan to produce and market their inventions. Therefore, foreign patenting rates provide a considerable amount of information on the direction and pattern of technology transfer in the world (Eaton and Kortum 1996).\(^6\)

Using the Google Patent Search Engine, I have collected a new data set on the number of U.S. patents granted to foreigners from twelve countries between 1840 and 1930.\(^7\)

#### A. Description of the patent data

In 2006, Google converted the entire image database of U.S. patents into an easily searchable electronic format. Similarly to Google Book Search, Google Patent Search uses Optical Character Recognition (OCR) technology to search the full text of the entire collection of patents made available by the USPTO. This collection includes all patents issued between the 1790s and the middle of 2006, about 7 million patents in total.

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\(^6\) Eaton and Kortum (1996) use patenting rates as a measure of technology diffusion to empirically test their model of technology diffusion and growth. (Their findings suggest that over 50% of the growth in the 19 OECD countries in their sample derives from innovation in the United States, Germany and Japan.)

\(^7\) While the USPTO offers statistics on the total number of foreign-held patents in the U.S. spanning the patent office’s entire history, such statistics are unavailable at the country level prior to 1963.
Google Patent Search allows users to search for patents by keyword and, like Google Web Search, ranks patent results according to their relevance to a given search query, according to a proprietary algorithm. The database is searchable by inventor’s name, assignee’s name, title, issue date, filing date, and patent number. Taking advantage of the specific syntax of early patents, it is possible to find close approximation of a country’s patenting rate in the U.S. in a given year.\(^8\)

**B. Potential sources of bias**

Patenting by foreigners has several notable limitations as a measure of technology transfer. Most importantly, patenting by foreigners can also reflect a change in the inventiveness of foreigners (assuming no change in propensity to transfer technology). In other words, a change in IPR policy of the destination country could affect the incentives of foreign inventors to invest in innovation, not just to transfer technology. This can create a bias in which the effect of expanded IPRs on technology transfers is overstated, if higher rates of U.S. patenting by foreigners is driven by higher rates of invention abroad, rather than a higher proportion of foreign inventions being patented in the United States.

However, even if changes in U.S. patent policy have an effect on foreign inventiveness, it is unlikely to be large enough to explain all of the variation in patenting. Aggregate patent data indicates that inventions are primarily protected in the inventor’s home country rather than in

\(^8\) Specifically, all patents prior to the 1940s have the inventor’s name and origin under the title in the following syntax: “Inventor’s name ‘of’ Origin.” Therefore, I search the words (for example): “‘of’Great Britain,” including the inner quotation marks. When entered into the search, this sequence of terms leaves out patents that mention Great Britain in the text but are not held by British citizens. I repeat the same search for the rest of the months in 1895, and add the total results to get a close estimate of the number of patents issued to citizens of Great Britain for the entire year 1895. The search is truncated at 600 results, so in the case of countries that have more than 600 patents issued in a given year, I limit the search to two-month intervals, and add together the results to get the number of patents issued to residents of that country in a given year. All of the data for Britain, Germany, France and Canada were constructed using two-month intervals.\([0]\)
foreign countries (Eaton and Kortum 1996, p.254). Moreover, empirical studies of patent data suggest that even a change in domestic IPR has a limited impact domestic inventiveness. On the other hand, U.S. patent policy directly affects the decision to produce or market an invention in the United States. Therefore, the substantial portion of variation in patenting likely reflects technology transfers.

A second important source of bias stems from the fact that not all inventions are protected by patents, and patenting rates vary across industries and over time (Moser 2007). Therefore, if a foreign country shifts its production from industries with low patenting rates to higher patenting rates, this can overstate the effect of the Paris Convention on technology transfers. Conversely, a shift of specialization to an industry with a lower patenting rate can understate the effect of the Paris Convention. Furthermore, an increase in patenting can reflect technological innovations that reduce the efficacy of alternative methods of IP protection, such as secrecy (Moser 2007, p.2). The broad sample of countries and long time span covered in this study minimizes these potentially confounding effects.

The following section presents the results.

IV. Results

Data on changes in the number of foreign patents in the United States reject the null hypothesis that increases in the strength of patent protection abroad through international treaties encourages foreign patenting. In addition, the Netherlands and Switzerland do not show a particularly strong response to the Paris Convention as compared to the other countries, rejecting the null hypothesis that countries which lacked domestic patent protection should show a

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stronger response to joining the treaty than the other countries. Major changes in domestic patent laws of foreign countries also show limited effects on patenting by foreigners in the United States.

On the other hand, it appears that foreign patenting in the United States is highly correlated with the volume of trade between the foreign country and the United States, suggesting that the inconsistent response to the Paris Convention across countries can be explained by fluctuations in trade volume with the United States.

A. The Paris Convention

Of the countries with patent law, Japan shows the most substantial increase in patenting in the United States subsequent to joining the Paris Convention. Prior to 1899, Japanese patenting rates in the United States are relatively stable; following 1899, the trend is a steady increase (Figure 2).

Patenting by British and French inventors in the United States shows a weaker response to the Paris Convention. British patenting increases after Britain becomes a member of the Convention with the United States, but British patents had been increasing quickly for 8 years before the United States signed the Convention. Furthermore, 1897, 1898, and 1899 also show spikes in patenting of similar magnitude to the spike in 1888, despite the lack of a major event in international patent law (Figure 3). Patents by French inventors in the United States decreases by 24 patents in 1888, but the rate of patenting by French nationals in the United States picks up substantially after this initial dip, more than doubling the rate of growth (Figure 4).

Patenting by German inventors and Belgian inventors does not appear to respond to the Paris Convention at all. Patenting by inventors from both countries in the United States
decreases directly after these countries join the Paris Convention with the United States, and the growth rate of patenting also declines (Figures 5 and 6).

The countries without patent laws also show mixed effects. Patenting by Dutch inventors increases sharply following 1887, but the growth rate of patenting by Swiss nationals does not deviate from its long-term trend. Although the growth of Dutch patents fluctuates substantially between 1887 and 1925, the general trend is a faster growth rate following 1887. On the other hand, the Paris Convention neither coincides with a short-term spike in Swiss patenting in the United States, nor with a change in the long-term trend (Figures 7 and 8).

B. Changes in domestic patent laws

The relationship between patenting in the United States and changes in domestic patent laws is equally as inconsistent as with the Paris Convention.

The effect of the Patents, Designs and Trademarks Act on British patenting in the United States is not obvious. The year directly following the Act, there is a small dip in patenting, and a then a long-term slowdown in the growth of patenting compared with the five years prior. However, the growth of British patenting in the United States fluctuates substantially between 1879 and 1925, so patenting rates following the Act are consistent with the long-term pattern (Figure 3).\textsuperscript{10}

In the Netherlands the reinstatement of patent law in 1912 does in fact coincide with an increase in the rate of patenting by Dutch inventors in the United States. The growth rate of

\textsuperscript{10} Between 1883 and 1884, domestic patents in Britain, as would be expected, experience a major spike. Total British design patents increase by 6,021 in a year, from 3962 in 1883 to 9,983 in 1884. The growth in domestic patenting had been 87.69 patents per year in the 43 years preceding this amendment. Following 1884 to the beginning of World War I, the growth rate in British domestic patents is 263.29 patents per year. There is both a clear spike in the year directly following the legislation, and a long-term increase in patent growth.
patenting by Dutch inventors triples between 1912 and 1930 compared to the 1871 to 1911 period (Figure 7).

In contrast, in Switzerland, there does not appear to be a substantial effect of the law of 1907 on Swiss patenting in the United States. In the five years following 1907, Swiss patenting in the United States fluctuates and the long term trend does not change substantially until after World War I (Figure 8).

The variable response of foreign patenting rates to changes in international and national IPR policies stands in stark contrast to the clear relationship between the volume of trade of a given country and that country’s patenting rate in the United States. This relationship is consistently positive: the more a country trades with the United States, the more the nationals of that country tend to take out U.S. patents.

C. The volume of trade and patenting

The growth of patenting in the United States by inventors from all foreign countries in the sample generally proceeds at the same rate as the growth of exports from the United States to that country over most of the 1840 to 1930 period. To the extent that imports (from the foreign country into the United States) tend to move with exports, patenting rates also follow import rates, but this relationship is not as strong as that with exports. There are only a few significant short-term deviations from this pattern, most notably during World War I. In addition, substantial cyclical peaks and troughs (in the generally upward trend) in exports tend to precede cyclical peaks and troughs in patenting with a one or two-year lag. This pattern holds for all countries except Japan, in which exports and patenting grow at similar rates, but cyclical upturns and downturns do not coincide for most of the 1840 to 1930 period (Figures 10 through 16).
The absence of domestic patent law does not appear to affect the correlation between trade and patenting, as the Netherlands and Switzerland present a pattern of patenting and trade volume that is similar to the countries with patent protection (Figures 15 and 16).

Conclusions

The data indicate that changes in U.S. IPR strength as a result of the Paris Convention did not have a strong and clear effect on patenting by foreigners in the United States: although the Paris Convention introduced a guarantee of equal patent protection to foreign inventors, the United States’ ascension to the treaty did not encourage foreign inventors to patent in the United States. The data further suggests that changes in the domestic IPR strength of foreign countries also had an insignificant effect on patenting by foreigners in the United States.

In contrast, the data shows that patenting by inventors from a given foreign country in the United States is highly correlated with that country’s volume of trade with the United States. It appears that the effect of changes in both U.S. and foreign domestic IPR strength on U.S. patenting by foreigners was superseded by the effect of changes in trade volume. This pattern of patenting by foreigners in the United States suggests that interaction through trade is a more significant determinant of technology transfers across borders relative to the specifics of IPR policies.

Ultimately, inventors implement and market their ideas where they find the best profit opportunities, and IPR strength is only one factor that determines the profit potential of a given market. Even though inadequate IPR protection may decrease an inventor’s return on an invention, it does not completely eliminate the possibility of profiting from a large integrated
market with a favorable business environment like the United States. Trade volume, on the other hand, directly reflects the spectrum of factors that affect profit opportunities.

It may be that the United States’ ascension to the Paris Convention may not have had a sufficient impact on the profit potential of a foreign inventor in the United States to change his decision about where to market his invention. The Paris Convention was a historic *de jure* change, marking a landmark shift in the ideology of international patent policy, but the *de facto* effect may have been less significant. With the most patentee-friendly IP system in the world, the United States may have offered adequate protection for foreign inventors, even if a certain degree of discrimination against foreign inventors was built into the system. In other words, even if foreign inventors did not enjoy exactly the same rights as nationals prior to the Paris Convention, the profit opportunities in the United States were great enough to supersede imperfect IPR protection.

The implication is that modifications to IPR law have a limited capacity to encourage technology transfers. The strength of intellectual property laws is just one factor that determines profit opportunities for foreigners; the effect of IPRs on technology transfers into a country will ultimately depend on patent rights in the context of the country’s overall business environment.
References


FIGURE 1 – TIMELINE OF RELEVANT EVENTS

1884: Britain, France, the Netherlands, Switzerland, and Belgium sign the Paris Convention

1883: Britain passes Patents, Trademarks and Designs Act

1869: Netherlands abolishes patent law

1869: Japan signs the Paris Convention

1907: Switzerland introduces modern patent law

1903: Germany signs the Paris Convention

1884: Britain, France, the Netherlands, Switzerland, and Belgium sign the Paris Convention

1887: United States signs the Paris Convention; (British, French, Dutch, Swiss and Belgian inventors receive National Treatment in the United States)

1883: Britain passes Patents, Trademarks and Designs Act

1869: Netherlands abolishes patent law

1899: Japan signs the Paris Convention

1912: Netherlands reinstates patent law

1899: Japan signs the Paris Convention

1912: Netherlands reinstates patent law

1907: Switzerland introduces modern patent law

1887: United States signs the Paris Convention; (British, French, Dutch, Swiss and Belgian inventors receive National Treatment in the United States)
Figure 2 - Total Number of Patents by Japanese Inventors in the United States, 1840-1930


Figure 3 - Total Number of Patents by British Inventors in the United States, 1840-1930

Figure 4 - Total Number of Patents by French Inventors in the United States, 1840-1930


Figure 5 - Total Number of Patents by German Inventors in the United States, 1840-1930

FIGURE 6 - TOTAL NUMBER OF PATENTS BY BELGIAN INVENTORS IN THE UNITED STATES, 1840-1930


FIGURE 7 - TOTAL NUMBER OF PATENTS BY DUTCH INVENTORS IN THE UNITED STATES, 1840-1930

**Figure 8 - Total Number of Patents by Swiss Inventors in the United States, 1840-1930**

- Switzerland signs Paris Convention
- U.S. signs Paris Convention
- Modern Swiss patent law enacted
- World War I


**Figure 9 - Total Number of Patents by All Foreign Inventors in the United States and Total US Patents, 1840-1930**

- Total patents by foreign inventors in the U.S.
- Total U.S. patents (divided by 10)
- U.S. signs Paris Convention
- World War I

FIGURE 10- TOTAL NUMBER OF PATENTS BY JAPANESE INVENTORS IN THE UNITED STATES AND TRADE VOLUME WITH THE UNITED STATES, 1830-1940


FIGURE 11- TOTAL NUMBER OF PATENTS BY BRITISH INVENTORS IN THE UNITED STATES AND TRADE VOLUME WITH THE UNITED STATES, 1830-1940

**Figure 12 - Total Number of Patents by French Inventors in the United States and Trade Volume with the United States, 1830-1940**


**Figure 13 - Total Number of Patents by German Inventors in the United States and Trade Volume with the United States, 1830-1940**

FIGURE 14- TOTAL NUMBER OF PATENTS BY BELGIAN INVENTORS IN THE UNITED STATES AND TRADE VOLUME WITH THE UNITED STATES, 1830-1940


FIGURE 15- TOTAL NUMBER OF PATENTS BY DUTCH INVENTORS IN THE UNITED STATES AND TRADE VOLUME WITH THE UNITED STATES, 1830-1940

**FIGURE 16- TOTAL NUMBER OF PATENTS BY SWISS INVENTORS IN THE UNITED STATES AND TRADE VOLUME WITH THE UNITED STATES, 1830-1940**

![Graph showing the total number of patents by Swiss inventors in the U.S. and trade volume with the U.S., 1830-1940.](image)