

**Intellectual Property and Foreign Direct
Investment: Improving Upon Mansfield's 1991 Survey**

Preliminary Report

John L. Turner

Assistant Professor, Economics
Terry College of Business

joint work with

Paul Heald

Allen Post Professor of Law
University of Georgia Law School

1. Introduction

Since the beginning of the Uruguay Round of the General Agreement on Tariffs and Trade, which eventually led to the creation of the World Trade Organization (WTO) and the Trade Related Aspects of Intellectual Property (TRIPs) agreement,ⁱ policy-makers and researchers have focused increased attention on the international economic consequences of strong intellectual property rights. Two key questions, the answers to which are crucial for promoting growth and development, have emerged.

1. Do stronger intellectual property rights tend to yield larger amounts of foreign direct investment (FDI)?
2. What institutional changes should a developing country implement to attract the greatest amount of FDI?

These questions have formed the basis for substantial research in both the economics and legal literatures. In perhaps the most influential work on the subject to date, the economist Edwin Mansfield surveyed 94 American businesses in 1991 extensively on the first of the two questions. In discussing his results, he concludes

"the strength or weakness of a country's system of intellectual property protection seems to have a substantial effect, particularly in high-technology industries, on the kinds of technology transferred by many U.S. firms to that country."ⁱⁱ

In a companion econometric paper written with Jeong-Yeon Lee, he further estimates that

"if the percentage of firms regarding protection in a particular country as inadequate falls by 10 points, US foreign direct investment there might increase by \$140 million per year."ⁱⁱⁱ

These results, which do provide evidence on question 1, have led many commentators to conclude, among other things, that strong patent protection is necessary to attract foreign direct investment (FDI). For instance, Keith Maskus, an economist, offered this assessment of Mansfield's work:

"the authors found that weak patents had a significantly negative impact on the location of American FDI."^{iv}

Ostensibly, this seems to suggest an answer to question 2 as well - to promote investment, developing countries should shift resources to bolstering their patent regimes. However, as Paul Heald (2003) points out,^v this conclusion is premature at best and may be wrong. Mansfield did not question his subjects about "patent protection," only the far broader "intellectual property protection," so Maskus' conclusion may be wrong. In fact, Mansfield did not investigate the comparative strength of investors concerns over enforcement of copyrights, patents, trademarks, and trade secrets at all. He also neglected to consider the importance of a country's willingness to enforce contracts. This is key, because a web of contracts can frequently duplicate, in great part, the protection afforded by intellectual property (particularly trade secrets).

Clearly, for leaders in developing countries seeking to promote foreign investment and growth by modernizing their intellectual property systems, Mansfield's

results fail to indicate a logical starting point for reform. In fact, a country can only guess which aspects of its legal system warrant its attention and its scarce resources. Thus, existing research is inadequate.

Interestingly, Lee and Mansfield (1996) seem to understand this, as they urge follow-up studies and discourage cavalier inferences from their results.

"The present study is only a beginning, and should be viewed with appropriate caution."^{vi}

Surprisingly, no survey has yet improved upon Mansfield's work in 1991. Our proposed survey will. In particular, we shall advance understanding by investigating the comparative strength of investors concerns over enforcement of copyrights, patents, trademarks and trade secrets. By addressing the different types of intellectual property in this way, we shall bring evidence to bear directly on the key (normative) question 2. We will also be able to address more precisely empirical patterns in FDI.

In the next section, we describe some of Mansfield's most important results and indicate how our work will extend and improve upon his work. We sketch the hypotheses that we will be interested in testing and offer some initial speculation about how we expect our results to differ. We conclude with a brief overview of the results of our work thus far.

2. The Importance of Intellectual Property Protection

As with any investment, the main fear associated with making a foreign direct investment is that it will not be recovered. As such, firms contemplating FDI must

consider numerous host-country characteristics that influence an investment's expected return. Clearly, many of these characteristics have nothing whatever to do with intellectual property. Examples include the cost and availability of labor, proximity to final product markets, completeness of financial markets, political stability, etc., of the host country. The uncertainty surrounding these characteristics is also crucial. Unlike many of the other host-country characteristics, the level of intellectual property protection is not likely to affect the firm's unit costs. Rather, it affects the likelihood that the returns generated by the firm's investments will be expropriated by rivals.

2.1 Mansfield's Results

In 1991, Edwin Mansfield sent surveys to 100 businesses in six industries. He received an astonishing 94% response rate. Because his sample was so small and his response rate was so high, we are a bit concerned that the respondents might not be representative. Thus, one goal of our survey is to study whether Mansfield's results are robust to alternative samples. Mansfield also failed to measure the importance of intellectual property protection relative to other factors, such as those discussed above. The first question in our survey addresses this issue.

Our main goal, however, is to assess the importance of particular types of intellectual property for foreign direct investment decisions. Mansfield's results demonstrate clearly that "intellectual property protection" is an important determinant of foreign direct investment. Consider Table 1, which presents an abridged version of his results. In all six industries, intellectual property protection is least important for sales and distribution outlets and most important for investments in research and development

facilities. Moreover, it is an important determinant of the decision to invest in a research and development facility for 80 percent of firms surveyed.

Insert Table 1 About Here

But which types of intellectual property are most important? We believe that commentators have generally overlooked the importance of trade secret protection. As we argue below, we believe that trade secret protection is *most* important for research and development investments. More than perhaps any other factor, this intuition motivates our study.

Like Mansfield, we are interested in understanding how a country's intellectual property laws and enforcement affect the willingness of firms both to locate facilities and to transfer technology there. Our survey questions, structurally similar in many ways to those described in Mansfield (1994), ask about the importance of types of intellectual property on the decision to locate the following types of facilities:

- sales and/or distribution outlets.
- manufacturing facilities
- research and development facilities.

and on the following related decisions:

- investing in a joint venture.
- transferring new and/or effective technologies to a wholly-owned subsidiary.
- licensing new and effective technologies to an unrelated firm.

For each bulleted item above, our survey first asks (yes or no) whether each type of IP protection (copyrights, patents, trademarks, trade secrets) strongly affects the decision. Then, it asks the respondent to assess the relative importance of each type of IP protection by assigning 100 points among the four categories. So, for example, if only patent protection matters, the respondent will assign 100 points to patents and 0 points to all other categories. Again, following Mansfield, we seek businesses in six manufacturing industries: chemicals including drugs (SIC 28), transportation equipment (SIC 37), electrical equipment (SIC 36), machinery (SIC 35), food (SIC 20) and metals (SIC 34). To further illustrate our ideas, we discuss briefly the different types of intellectual property and how the strength of protection is likely to affect foreign direct investment.

2.2 Copyrights

Copyrights protect written work, music, video, and a variety of other forms of human expression from direct copying and, most importantly, selling. When copyright protection is strong, as it is in the United States, it is difficult to distribute large quantities of (illegal) pirated work without facing severe legal penalties. As a result, sellers of copyrighted material retain large market shares in the sales of their own work. Hence, if there are investments that will improve the value delivered by the product (e.g. development, promotion, complementary products, etc.), owners of copyrighted material may make these investments without fear that sellers of pirated work will "free ride" off of the investments.

Pirated materials are substantially more common outside the United States. In countries where copyrights are not strongly enforced, investments that increase the value of copyrighted materials are riskier. Thus, to the extent that a firm sells copyrighted materials, we expect that the level of copyright protection will affect the decision to invest in manufacturing, sales and distribution and research and development in foreign countries. We also expect the strength of copyrights to be important in licensing decisions, because strong copyright protection affords the owner of copyrighted material some recourse if its licensee breaches an agreement. Given that the industries we target in this survey do not primarily sell copyrighted material, however, copyrights are likely to be less important than the other types of intellectual property for the firms we survey.

2.3 Patents

Patents are awarded for inventions and protection typically lasts 20 years from the application date. They may cover products or processes and may be very broad or very narrow. Invention requires research and development expenditure, so just as with copyrights, strong patent protection increases the incentives for research and development.

To earn patent protection for an invention, an inventor must apply for a patent and prove the invention is novel, useful and non-obvious. In addition, protection must be actively sought in each country where the inventor wants protection.^{vii} This is in contrast to copyrights, where all original work is protected and registration is generally not necessary.

Patents are often sought for new "technology." Where a patent is earned, the inventor has the exclusive right to exploit the invention. However, he must clearly disclose the invention in order to get the patent. The documents accompanying a patent include descriptions of the invention, its novelty, its preferred embodiment and drawings. Thus, by reading a patent, it is possible to learn how to duplicate the invention.

This disclosure has important international implications. Namely, if a US company owns a US patent but no foreign patents for the same invention, then foreign companies are free to exploit that invention abroad. Moreover, those same foreign companies may learn how to duplicate the invention from the US patent documents themselves. In today's world, this involves little more than an internet search of the United States Patent and Trademark Office website (www.uspto.gov).

Because of this, it is very unclear how and why patent protection in a foreign country would influence foreign direct investment in that country. Just as with copyrights, investments made to promote patented products or sell complementary products are at risk of "free riding" by copycat firms if patents are weak. However, weak patent laws will not necessarily lead to additional copying of patented technology, because the technology is already easily obtained from US patent documents. If a technology is not yet patented, then patent laws are meaningless. Secrecy laws would be relevant.

As a result, it is not clear how the incentives to undertake research and development in a foreign country depend on the level of patent protection in that country. It is clear that patent protection is generally important, but if research and development is undertaken for products geared toward the US market, then the level of patent protection

in the US is crucial regardless of where the research and development facility is located, while the level of local protection is less important. Strong patent protection clearly makes importing into a foreign country more attractive. Thus, it is likely to make firms more willing to license their best technologies. It is not clear how it would affect other forms of technology transfer. Direct transfer, by increasing exposure of the technology, may increase copying, but it is difficult to assess the risks of this sort of copying.

One of the main reasons we are performing this survey is because we simply do not know how important patent protection is for foreign direct investment. There are several reasons why it may be important, but other reasons to think it is unimportant. Given that many argue that patent protection is crucial to attracting FDI, this part of our survey may be the most important.

2.4 Trademarks

A trademark is a word, phrase, symbol, design, etc. that distinguishes one company's product(s) from other products. To get protection for a trademark, one generally must register the mark in each country where protection is sought. Unlike patents, however, trademark protection is not usually time-limited and the trademark must only be unique.

Trademarks, which may cover a large number of products (e.g the Nike swoosh), signal quality. Thus, pirates may "free ride" off of the implied quality of a company's products by simply copying that company's trademark. Such free riding not only reduces the firm's market share, it may lower the perception of the quality implied by the mark (if the pirated goods are of inferior quality). As a result, in countries where trademark

protection is weak, investments in the development and promotion of trademarked products may be expropriated or otherwise be unproductive.

As with copyrights and patents, strong trademark protection makes importing more attractive, and should positively affect a firm's willingness to sell and/or distribute their products in those countries. It is less clear how it would affect the incentives to establish manufacturing and/or research and development facilities. More than patents, trademarks are easily copied, and it has not been established whether copying is made easier or more likely by the mere presence of a company's facilities. If a company builds a manufacturing facility in a country mostly to take advantage of cheap, abundant labor, and intends to sell primarily in countries with strong trademark protection, we would not expect trademark protection in the host country to matter very much.

2.5 Trade Secrets

In our survey, we define "trade secret" protection to encompass a variety of contracts and laws, such as enforcement of non-disclosure and non-compete agreements and prohibitions on theft, espionage, computer hacking, wiretapping, etc. In attempting to keep secret its operating procedures, formulas, know-how, etc., a firm depends on all of these forms of protection. Once a secret is lost, trade secret protection is no longer available anywhere. This risk sharply distinguishes trade secret protection from copyright, patent and trademark protection.

In general, we expect copyright, patent and trademark protection to matter relatively more for horizontal investments (such as sales and distribution outlets) than for vertical investments (such as research and development). We expect trade secret

protection to matter relatively more for vertical investments because expropriated secrets affect the firm's profit in all markets. A firm whose manufacturing relies on key trade secrets cannot simply shop for the cheapest, most abundant labor in vertically expanding into a developing country. However, trade secret protection is also likely to matter for horizontal investments for the same reasons.

2.6 Summary

Recall Mansfield's results in Table 1. They illustrate that intellectual property protection is most important for vertical investments (i.e. research and development facilities). As discussed above, there are numerous reasons to expect that copyrights, patents and trademarks are relatively more important for horizontal investments. Thus, we suspect that trade secret protection, not patent protection, may be driving Mansfield's results. Our survey will address this question directly.

3. Results Thus Far

We have sent approximately 2,400 surveys. The surveys were mailed the week of October 25. We await the response and plan to follow this up with a second mailing and phone calls if necessary. Although we do not yet have any empirical results, we can report substantial progress in three areas: (1) the securing of an additional \$4,650 in funding; (2) the construction of a novel data set of target companies, including the identification of appropriate contact persons and (3) useful and favorable feedback from one presentation of our project at Bournemouth University in July. I discuss each in turn then comment on the future of the project.

3.1 Additional Funding

We applied for and received an additional \$4,650 from the University of Georgia's President's Venture Fund in April 2004. This money was necessary to pay for both research assistants' work on our list of companies and for expected expenses related to phone follow-up of our mailed survey. There was also money in this grant for expenses related to the printing and mailing of the survey. Our plan is to exhaust all funding in maximizing the response rate to our survey.

3.2 A Novel Data Set

Our ideal target company is one that has some experience (e.g., at least one foreign subsidiary) and our ideal contact person is an executive involved in making foreign investment decisions (e.g., a VP of global operations). Unfortunately, no existing data set of companies and contact persons fits these criteria, so we could not buy our contact list "off the shelf." Thus, we were forced to spend considerable time researching two companies that offer potentially useful lists of companies, Dun and Bradstreet (DNB) and the Port Import-Export Reporting Service (PIERS). We ultimately purchased a database of approximately 2,400 companies from DNB in June. Of interest to our project, each company has at least one foreign subsidiary.

This summer, we augmented the DNB data with contact information gathered from other sources (e.g. Hoovers). We sought contacts with clear exposure to either international investment decisions (e.g., VP of global operations), intellectual property decisions (e.g. Chief Intellectual Property Counsel) or to both types of decisions.

Ultimately, we were able to secure alternative contact names for over 70% of our list (in absence of such a contact, we sent our survey to the company's Chief Executive Officer). This part of the data set, which required research assistance, was completed in late August.

3.3 Refinements to the Project and Prospects for Promoting the Results

Paul Heald gave a discussion of our project in a July 6 talk, "Foreign Direct Investment and IP Enforcement: A critique of Mansfield's 1994 study," at Bournemouth University Law School in south England. The talk was part of a workshop entitled "Researching Trade Aspects of Intellectual Property" held by Bournemouth's Centre for Intellectual Property Policy & Management (CIPPM). The workshop included seven speakers studying the relationship between trade and intellectual property.^{viii}

This talk yielded important refinements to the survey and promising outlets for promoting the survey's results. For example, those commenting insisted that our survey include a question about the importance of intellectual property protection among other factors that influence international investment decisions (now question 1 on the survey). Pending the results of our survey, we have been invited to several events in Europe next year.

3.4 Future Work

Our plan for the next year is to maximize our response rate with our remaining funds, write up the results, then take the results on the road and use them to pursue additional funding to expand the project. We would like to study how companies'

perceptions of intellectual property protection in particular countries are associated, statistically, with empirical measures of international investment. Unfortunately, to have included questions about this on the current survey would have changed its focus and made it prohibitively long. Thus, we believe it is important to study whether the general results of this first survey (e.g. on the comparative importance of patents vs. trade secrets) can explain empirical patterns of foreign direct investment, but additional survey work will be necessary. We look forward to pursuing this.

Table 1

**Percent of US Firms in Six Industries Where
Strength or Weakness of Intellectual Property Rights Protection
Has Strong Effect on Whether Direct Investments Will Be Made**

Industry	Sales and Distribution Outlets	Rudimentary Production and Assembly Facilities	Research and Development Facilities	Mean
Chemicals	19	46	100	65
Transportation Equipment	17	17	80	36
Electrical Equipment	15	40	80	53
Food	29	29	60	37
Metals	20	40	80	48
Machinery	23	23	77	48
Mean	20	32	80	48

Source: Mansfield (1994).

ⁱ This round lasted from 1986 to 1994. The Trade Related Aspects of Intellectual Property Rights (TRIPs) agreement codified the requirements that WTO member countries have in developing and enforcing intellectual property regimes.

ⁱⁱ Mansfield, Edwin. "Intellectual Property Protection, Foreign Direct Investment, and Technology Transfer," International Finance Corporation Discussion Paper No. 19 (1994, p. 1).

ⁱⁱⁱ Lee, Jeong-Yeon and Edwin Mansfield. "Intellectual Property Protection and US Foreign Direct Investment," The Review of Economics and Statistics 58 : 2 (1996, p. 185).

^{iv} Maskus, Keith. "Lessons from Studying the International Economics of Intellectual Property Rights," Vanderbilt Law Review 53 (2000, p. 2219).

^v Heald, Paul. "Misreading a Canonical Work: An Analysis of Mansfield's 1994 Study," Journal of Intellectual Property Law 10 : 2 (2003).

^{vi} Lee and Mansfield (1996, p. 186).

^{vii} There are some exceptions. The European Patent Office grants patents that give protection in multiple European countries, for instance.

^{viii} See <http://www.cippm.org.uk/html/symposium2004.html>.