The Impact of the Madrid Protocol on International Trademark Transfers

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Abstract

This paper examines the effect of the Madrid Protocol on international trademark transfers by conducting an econometric analysis using the difference-in-difference method with the data of trademark applications over the period of 2004-2014. The Madrid Protocol was established in the aim of the reduction in transaction costs of international trademark applications. In order to conduct an empirical analysis on trademarks and the Madrid Protocol, we employ a concordance of Lybbert, Zolas and Bhattachayya (2014), which develop a mapping method for ISIC, SITC and NICE classifications. Our result suggests that the Madrid Protocol may reduce the transaction cost of TMs applications, although its impacts are observed only in manufacturing sectors. Also, it shows that inventors may use trademarks complementary as a protection of their patents.

JEL Classification: F13, F14, F23

Key Words: Trademarks, the Madrid Protocol, Patent, Innovation

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Introduction

Innovation and IP bundle has been one of the key issues in the field of multinational firms in recent years. IP bundle is the combined use of patents and trademarks (hereinafter TMs), and employed by firms in their branding strategies. Since the differentiation of goods in the competitive market is crucial for companies, they use TMs as signaling tools. Furthermore, the governments of each country understand that innovation activities are important for economic growth and try to attract Foreign Direct Investment (FDI) in R&D sectors. In order for countries to obtain large FDI flows, the protection of intellectual property rights is one of key factors (Dernis et al. 2015). In these situation, some firms face problems relating to patent and TMs.

In 2016, Yamazaki Biscuit, which is a Japanese firm that used to produce and sell "Bitz", terminated a license contract with Mondelez International. Because of the event, the firm needed to change the name of its product from "Bitz" to "Luvan". Toyo Keizai Online estimates the reduction in Yamazaki Biscuit's operating profits around 0.8 billion Japanese yen in 2016, although the company can use a similar technology of "Bitz" to produce "Luvan"[1]. Another example is the case of Meiji. In March 2016, Meiji's license contract with Indian company has finished and the company no longer can use the name "Isojin" for its product. In order to maintain the power of their brand, Meiji decided to register its character "Kaba-kun" as TMs. As a result, the Indian company was forced to change the design of its product because the firm did not file a trademark registration application of "Kaba-kun". These examples imply that branding strategies using TMs are important not only in domestic markets, but also in international markets.

Previous studies have been investigated mainly three fields; economic intuition of TMs, the connection between firm's performance and TMs as well as the complementarity relationship between patent and TMs (Nakamura 2014). Firstly, there is a discussion of the usage of TMs data as measure of innovation. Since the fact that economic impact of patents is ambiguous because patent registrations only protect inventions, some studies try to employ TMs data for understanding the degree of innovation (Millot 2009; Mendoça et al. 2004; Schmoch 2003). Secondly, the causal relationship between firm's performance and registration of TMs has been explored (Greenhalgh and Rogers 2012; Greenhalgh et al. 2011; Helmers and Rogers 2011; Greenhalgh and Longland 2005). Main consensus is that having TMs or higher number of TMs applications may improve outcomes such as productivity, sales, the number of employment, etc. Finally, a complementary effect of TMs applications has been

[1] http://toyokeizai.net/articles/-/131079

discussed by many studies (Dernis et al. 2015; Helmers and Schautschick 2013; Graham and Somaya 2006). The question here is whether or not TMs are complementary assets. The main results from previous analyses suggest that the combination use of patent and TMs tends to be effective and boost firm's growth. Unfortunately, only a few studies focus on international applications of TMs and policies related to them because of data availability (Lybbert, Zolas and Bhattachayya 2014).

To fill the gap, this paper aims to investigate the determinants of international transfers as well as the effect of the Madrid Protocol on TMs applications by using TMs data over the period of 2004-2014 and employing the Difference-in-Difference estimator (hereinafter DID). Section 1 introduces the definition of TMs and explains the system of the Madrid Protocol. Section 2 is about data issues and section 3 focuses on methodologies of our empirical analysis. Section 4 summarises the results from the DID estimation and the last section concludes.

1. Trademarks and the Madrid protocol

According to United States Patent and Trademark Office (herein USPTO), "A trademark is a word, phrase, symbol, and/or design that identifies and distinguishes the source of the goods of one party from those of others. A service mark is a word, phrase, symbol, and/or design that identifies and distinguishes the source of a service rather than goods" (USPTO's webpage)[2]. Similarly, European Union Intellectual Property Office (hereinafter EUIPO) use the following definitions:

> "An EU trade mark may consist of any signs, in particular words, including personal names, or designs, letters, numerals, colours, the shape of goods or of the packaging of goods, or sounds, provided that such signs are capable of: distinguishing the goods or services of one undertaking from those of other undertakings; and being represented on the Register of European Union trade marks in a manner which enables the competent authorities and the public to determine the clear and precise subject matter of the protection afforded to its proprietor." (EUIPO's webpage)[3].

As they define, there are two types of TMs, namely good TMs and service TMs. However

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[2] http://www.uspto.gov/trademarks-getting-started/trademark-basics/trademark-patent-or-copyright

[3] https://euipo.europa.eu/ohimportal/en/trade-mark-definition

this paper does not consider the difference between them, although our data include both of them.

To smooth international TMs applications, World International Property Organization (hereinafter WIPO) established the Madrid system for international TMs registration in 1981. In addition, for the purpose of the removal of difficulties in terms of TMs applications via the Madrid system, the Madrid Protocol was adopted in 1989[4]. The main difference is that applicants can submit the document to the office in origin country and the registration will be in force in member countries without any additional procedure. However, there are mainly two issues regarding the Madrid Protocol. Firstly, the fee of TMs registration may be higher than that of the Madrid system, though it depends on the agreement that each country signs. Secondly, "an international registration which is cancelled, at the request of the Office of origin, for example because the basic application has been refused or the basic registration has been invalidated within five years from the date of the international registration, may be transformed into national (or regional) applications in the respective Contracting Parties in which the international registration had effect, each benefiting from the date of the international registration and, where applicable, its priority date. This possibility does not exist under the Madrid Agreement." (WIPO 2016, p.A5).

As we mentioned in the last section, no empirical research has been conducted for testing the impact of the Madrid protocol on international TMs application. To check the relationship, by conducting an empirical analysis with international TMs application data, we test the following hypothesis:

Hypothesis: The Madrid Protocol reduces the transaction costs and increases the number of TMs applications among countries.

2. Data

The studies on innovation and TMs heavily depend on the data availability. Since there was no official concordance between TMs and economic data, researchers could not combine them in their studies. Nevertheless, Lybbert, Zolas and Bhattachayya (2014) develop a concordance between NICE and Standard International Trade Classification (hereinafter SITC) to speak each other. The NICE classification system is employed by European Union (hereinafter EU) for TMs applications in including TMs both for goods and services. The NICE classification is organised by two parts, 1 – 35 for goods and 36

[4] Member countries are reported in the table 2 in appendix.

– 45 for services[5]. SITC is used mainly for trade data and *Comtrade Database*, United Nations (UN) employs the system. SITC is divided into 5 levels, which are Section, Division, Group, Subgroup, Basic heading. In this paper, we use the concordance between NICE 2-digit level and SITC 2-digit level in order to convert them.

For the number of international TMs application, we use the data of WIPO IP Statistics Data Center. From the database, we extract variables in terms of TMs by origin, destination, NICE class and year. Table 1 reports the number of international TMs applications by income level, sector and year. Firstly, the average number of TMs application has been gradually increasing in totally, from 37.6 in 2004 to 54.3 in 2014. Secondly, overall, TMs applications from OECD countries seem fewer than that of non-OECD countries during the period. This may be because that OECD countries already have finished a large number of applications before 2004. Finally, OECD countries tend to register their TMs in service sector than in manufacturing sector whereas for non-OECD countries have an inverse relationship. So as to check the determinants of increased number of TMs application and test the hypothesis, we employ the DID estimator.

3. Methodology

A main part of our specifications is to use the DID method in order to check the causal relationship between participation in the Madrid Protocol and firm's TMs application. To do so, we can conduct the DID analysis with the pooled OLS regression using interaction terms. In this case, the analysis needs more than two time periods and two groups in our samples, which are treatment and control groups. The treatment group is samples, for instance people, firms and industries, which experience the event we are interested in. The control group is individuals who are not affected by the incident. To quantify the average effect of treatments, we can use the following equation:

$$y = \beta_0 + \beta_1 DP + \delta_0 D2 + \delta_1 DP \times D2 + u \tag{1}$$

where y is the outcome variable of main interest. In the two period model, DP=1 if a sample is in treatment group in the period two and 0 other wise. $D2$=1 in the second period and 0 in the first period. Let us suppose that $\bar{y}$ is the average value of the outcome and *T*, *C*, *1* and *2* denote treatment group, control group, period 1 and period 2 respectively. Now, $\widehat{\delta_1}$ from OLS estimation can be written as:

[5] See the following file for more details:
http://www.wipo.int/export/sites/www/classifications/nice/en/pdf/text_ncl_10_part_2.pdf

$$\hat{\delta}_1 = (\bar{y}_{T,2} - \bar{y}_{T,1}) - (\bar{y}_{C,2} - \bar{y}_{C,1}) \quad (2)$$

where the first term in the right hand side of equation (2) is the difference in the mean of outcome values between the period 1 and 2 for the treatment group and the second term is that for the control group. We can interpret $\widehat{\delta_1}$ as the average effect of the event or policy that we are interested in. In addition, we can add other covariates in the equation (1) but the interpretation of $\widehat{\delta_1}$ is unchanged (Wooldridge 2010: 146-148).

However, there has been a concern about a serial correlation in the DID estimation (Bertrand et al. 2004). According to Greene (2011), whether serial correlation causes serious bias in t-statistics and significance levels in the DID empirical works depends on three issues. The first one is the length of the time series used in the papers and the second one is the fact that the most commonly used dependent variables tend to be serially correlated. The last one is whether studies include any solutions (Greene 2011: 249-259).

In order to quantify the effect of the Madrid Protocol on international transfers of TMs, we use the DID estimation[6]. We estimate the following equations with Ordinary Least Squares (OLS) in our empirical analysis:

$$Y_{ijkt} - Y_{ijkt-1} = \beta_1 Madrid_{it} + \beta_2 X_{ijkt-1} + \varepsilon_{ijkt} \quad (3)$$

where *i, j, k* and *t* are origin country, destination country, industry and year respectively. Y is the number of TMs application and $Madrid_{it}$ is a dummy variable that takes a value of one if country i signs the Madrid Protocol in year *t*. *X* is a vector of variables controlling for decisions of TMs applications. Following Lybbert, Zolas and Bhattachayya (2014), we include variables such as change in the number of patent applications, value of exports, FDI and R&D investment as share of GDP[7]. The definition of each variables and descriptive statistics are reported in table 3 and 4 respectively.

In the equation (3), we investigate the impact of the Madrid Protocol on the trade in TMs. In other words, its effect on the change in TMs transfers between year t and year t-1 is explored. All coefficients are expected to be positive.

[6] Many studies employ the combination of the DID and Propensity Score Matching (PSM) methods for their empirical analyses to control for endogenous selections. However, we only use the DID method because of data issues.

[7] According to Lybbert, Zolas and Bhattachayya (2014), a higher protection level of intellectual property rights positively affects TMs transfers and it should be considered in an analysis. Nevertheless, we exclude the protection variable since it tends not to change over time, which means that its effect is controlled by country fixed effects.

4. The impact of the Madrid Protocol on international TMs transfers

Table 5 summarises the results from the DID estimation for all sectors. After controlling for variables that affect the number of TMs applications, the coefficient of Madrid is statistically significant and positive. This means that the Madrid Protocol ma increase the number of TMs applications among countries. For Patent and Exports, their coefficients are statistically significant and positive. These are consistent with the results of Lybbert, Zolas and Bhattachayya (2014). As Dernis et al. (2015) and Nakamura (2014) emphasise, there may be a complementary effect of TMs on patens. In other words, the combination usage of patent and TMs registrations may be important in order for companies to protect their invention and technology. The coefficient of FDI is not statistically significant and that of R&D is even negative. To check the robustness of these results, we divide our sample into two parts, namely manufacturing sectors and service sectors.

Table 6 and 7 show the results from estimations for manufacturing and service industries respectively. The main differences between them are twofold. Firstly, there might be heterogeneous impact of the Madrid Protocol on international TMs registrations between manufacturing and service fields. Its coefficient is statistically significant and positive for the results of manufacturing sector while its sign is not significant in the estimation of service industries. One of the reasons could be that new entry countries of the Madrid Protocol are mainly non-OECD countries and their strategies focus on manufacturing sector rather than service sectors, although we need additional estimations in order to discuss the different impacts of the Madrid Protocol. Secondly, the coefficient on FDI is positive and statistically significant for the estimation of service sector, which is not the case for manufacturing firms. This might be explained by the fact that service activities may enter the foreign markets through FDI than trade because of its characteristics. For instance, on the one hand, when a firm opens a restaurant in another country, they may carefully care about logo or name of their shop rather than those of exported ingredients or foods because they are cooked by chefs immediately. On the other hands, exported manufactured products can be easily copied by foreign companies if exporting firm do not register its patent and TMs. As a policy implication, it can be stated that the Madrid Protocol might have positive impact on international TMs applications, though its effect seems to be limited to manufacturing sectors.

It needs to be mentioned that this paper only uses industry-level data and cannot discuss firms' branding strategies overseas precisely. To conduct further studies, more detailed data of TMs among countries and firm-level TMs data should be developed.

Conclusion

This paper sheds light on the effect of the Madrid Protocol on international transfers of TMs using industry-level datasets over the period of 2004-2014. In firms' branding strategies, combination usage of patent and TMs registrations has become crucial in recent years. Additionally, for some companies, IP bundle is much more important in international markets.

The main finding from the DID estimation is threefold. Firstly, our result suggests that the Madrid Protocol may reduce the transaction cost of TMs applications and increase the number of TMs submissions. This result supports our hypothesis, which is positive relationship between the participation in the Madrid Protocol and international TMs applications. Secondly, the results from estimations for each sector show that the effect is limited to manufacturing industries. However, this paper cannot discuss this issues more deeply because we only use aggregated industry-level data and focus on the difference between two sectors. Finally, the result shows that inventors may use trademarks complementary as a protection of their patents. This finding is consistent with results of previous analyses and emphasises the importance of IP bundle mentioned by Dernis et al. (2015).

As policy implications, the Madrid Protocol should be accepted by more countries so as to reduce transaction costs, even though target may be mainly manufacturing industries.

It should be noted that there are several things to do relating to this paper. Firstly, further studies need to develop more disaggregated concordance in terms of patens and TMs since each NICE 2-digit code includes too many sectors. For instance, NICE classification has codes beyond 2-digit level. The mapping of product-level codes between different classifications may be helpful for future works. Secondly, empirical analyses on the topic using firm-level dataset should be conducted if it is possible.
Finally, mode suitable estimation method needs to be considered in order to control for the endogeneity and investigate causal relationship between the Madrid Protocol and TMs applications.

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Appendix

Table 1. The average number of industry-level TMs applications

Country	Industry	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	Total	37.6	38.1	35.6	37.0	37.0	38.1	41.8	46.5	49.9	51.6	54.3
	Manufacturing	37.2	37.9	34.7	35.8	35.6	37.4	41.0	45.6	49.0	50.3	52.5
	Service	38.9	39.2	38.8	41.5	42.3	40.3	45.0	49.9	53.1	56.4	61.3
OECD	Total	36.8	37.4	35.7	39.3	41.7	39.7	40.7	40.1	42.2	45.4	44.6
	Manufacturing	35.8	36.6	34.2	37.3	39.2	37.4	38.4	38.0	39.4	42.0	41.1
	Service	40.6	40.7	41.1	46.7	51.0	47.7	49.6	51.2	52.5	58.0	58.2
NonOECD	Total	39.4	39.5	35.4	33.4	30.4	35.5	43.3	54.5	60.2	59.5	66.6
	Manufacturing	40.5	40.4	35.6	33.6	30.5	37.4	44.6	56.1	61.9	60.9	67.0
	Service	34.6	36.1	34.5	32.9	29.9	28.9	38.0	48.1	54.0	54.1	65.3

Source: WIPO statistics database.

Table 2. Member countries of the Madrid Protocol

Entry year	Country
1995	United Kingdom, Sweden, Spain, China, Cuba□
1996	Denmark, Germany, Norway, Finland, Czech Republic, Monaco, Democratic People's Republic of Korea
1997	Poland, Portugal, Iceland, Switzerland, Russian Federation, Slovakia, Hungary, France, Lithuania, Republic of Moldova
1998	Serbia, Slovenia, Liechtenstein, Netherlands, Curacao, Sint Maarten, Bonaire, Saint Eustatius and Saba, Belgium, Luxembourg, Kenya, Romania, Georgia, Mozambique, Estonia, Swaziland
1999	Turkey, Lesotho, Austria, Turkmenistan, Morocco, Sierra Leone
2000	Latvia, Japan, Antigua and Barbuda, Italy, Bhutan, Greece, Armenia, Singapore, Ukraine
2001	Mongolia, Australia, Bulgaria, Ireland, Zambia□
2002	Belarus, The former Yugoslav Republic of Macedonia□
2003	Republic of Korea, Albania, United States of America, Cyprus, Islamic Republic of Iran
2004	**Republic of Croatia, Kyrgyzstan, Namibia, Syrian Arab Republic, European Union**
2005	**Bahrain**
2006	**Viet Nam, Botswana, Uzbekistan, Montenegro□**
2007	**Azerbaijan, San Marino, Oman□**
2008	**Madagascar, Ghana, Sao Tome and Principe□**
2009	**Bosnia and Herzegovina, Egypt, Liberia□**
2010	**Sudan, Israel, Kazakhstan, Curacao, Sint Maarten, Bonaire, Saint Eustatius and Saba**
2011	**Tajikistan**
2012	**Philippines , Colombia, New Zealand□**
2013	**Mexico, India, Rwanda, Tunisia□**
2014	
2015	African Intellectual Property Organization Zimbabwe, Cambodia, Algeria, Gambia
2016	Lao People's Democratic Republic

Table 3. The definition of variables

Variables	Definition	Classification	Source
TMs applications	The number of international TMs aplications	NICE 2 digit	WIPO
Madrid	Take value of 1 if a country join the Madrid Protocol in the year, 0 otherwise		METI
Patent	The number of international patent applications	IPC 4 digit	WIPO
Exports	Export value	SITC 2 digit	UN Comtrade
FDI	The share of outward FDI in GDP		WDI
R&D	The share of R&D investment in GDP		WDI

Table 4. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
TMs application	-0.025	0.759	-4.682	4.963
Madrid	0.005	0.072	0	1
Patent	0.079	0.212	-2.398	2.197
Exports	0.074	0.722	-15.797	15.644
FDI	0.182	18.499	-354.250	332.064
R&D	0.035	0.100	-0.462	0.493

Table 5. Estimation results for all sectors

VARIABLES	(1) TMs application	(2) TMs application	(3) TMs application
Madrid	**0.079****	**0.029**	**0.101****
	(0.021)	**(0.020)**	**(0.017)**
Patent	0.037**	0.074**	0.022**
	(0.008)	(0.006)	(0.007)
Exports	0.025**	0.027**	
	(0.002)	(0.002)	
FDI	0.000		0.000
	(0.000)		(0.000)
R&D	-0.037*	-0.110**	-0.017
	(0.018)	(0.016)	(0.016)
Constant	-0.029**	-0.006**	-0.020**
	(0.002)	(0.002)	(0.002)
Observations	212,205	311,613	265,454
R-squared	0.001	0.001	0.000

Note: The values of Patent, Exports, FDI, R&D are defined as the difference of the log of those variables. Robust standard errors in parentheses. ** p<0.01, * p<0.05, + p<0.1.

Table 6. Estimation results for manufacturing sectors

	Manufacturing		
	(1)	(2)	(3)
VARIABLES	TMs application	TMs application	TMs application
Madrid	**0.092****	**0.039+**	**0.111****
	(0.024)	**(0.023)**	**(0.019)**
Patent	0.024*	0.066**	0.011
	(0.009)	(0.007)	(0.008)
Exports	0.030**	0.031**	
	(0.003)	(0.002)	
FDI	-0.000		-0.000
	(0.000)		(0.000)
R&D	-0.052**	-0.119**	-0.036*
	(0.020)	(0.017)	(0.018)
Constant	-0.032**	-0.008**	-0.023**
	(0.002)	(0.002)	(0.002)
Observations	174,705	256,547	217,642
R-squared	0.001	0.001	0.000

Note: The values of Patent, Exports, FDI, R&D are defined as the difference of the log of those variables. Robust standard errors in parentheses. ** p<0.01, * p<0.05, + p<0.1.

Table 7. Estimation results for service sectors

	Service		
	(1)	(2)	(3
VARIABLES	TMs application	TMs application	TMs application
Madrid	**0.021**	**-0.018**	**0.064+**
	(0.044)	**(0.042)**	**(0.036)**
Patent	0.095**	0.106**	0.068**
	(0.020)	(0.015)	(0.016)
Exports	0.014**	0.015**	
	(0.005)	(0.004)	
FDI	0.001*		0.001**
	(0.000)		(0.000)
R&D	0.044	-0.060	0.079*
	(0.043)	(0.037)	(0.038)
Constant	-0.014**	0.002	-0.006
	(0.004)	(0.004)	(0.004)
Observations	37,500	55,066	47,812
R-squared	0.001	0.001	0.001

Note: The values of Patent, Exports, FDI, R&D are defined as the difference of the log of those variables. Robust standard errors in parentheses. ** p<0.01, * p<0.05, + p<0.1.