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Abstract

This paper provides econometric estimates of the fee elasticity of demand for international trademarks. The analysis focuses on monthly trademark applications submitted to the World Intellectual Property Organization (WIPO). The elasticity ranges from -0.31 to -0.42, which is in a similar range to the fee elasticity of demand for patents.

Keywords: fee; price elasticity; trademark
JEL Codes: O34, O38, O50, M38

Introduction

Estimates of the fee elasticity of demand for trademarks contribute to research on the economics of intellectual property (IP) by providing novel insights on the value of trademarks. The value of trademarks is typically assessed using a firm market value equation, but this stream of research has produced mixed results (e.g., Bosworth and Rogers 2001; Sandner and Block 2011). Elasticity estimates are also relevant for policy makers, who are becoming aware that fees can be used as a policy tool to affect the behavior of IP owners. Finally, estimates are important for budgeting departments at patent offices, as they allow for more accurate forecasting.

Research on the role of fees in IP systems has made considerable progress recently, although most of the effort has been devoted to patents. This literature is reviewed in de Rassenfosse and van Pottelsberghe (2013). Regarding trademarks, a recent study in the grey literature by Herz and Mejer (2015) estimates the fee elasticity of demand for trademarks using data from 20 national offices in Europe. The benchmark estimate is -1.05, meaning that a 10% increase in fees leads to a 10.5% reduction in the number of trademark applications. This figure is significantly larger than the -0.30 benchmark figure typically considered for patent applications (de Rassenfosse and van Pottelsberghe 2012). Another study by Landes and Posner (2003) focuses on the fee elasticity of the decision to renew a U.S. trademark for the period 1935–1999. The authors find that the renewal decision is highly inelastic, with a point estimate at -0.06.

The present paper estimates the fee elasticity of demand for trademark applications filed through the Madrid system. The Madrid system is the primary international system for facilitating the registration of trademarks in multiple jurisdictions (so-called international trademarks). A key specificity of the Madrid system is that the application fee must be paid in Swiss francs to WIPO, which is based in Geneva. Hence, the effective fee paid by applicants in the various member states of the Madrid protocol fluctuates with the exchange rate relative to the Swiss franc. The empirical analysis takes advantage of this source of heterogeneity.

Econometric Model

We use a partial adjustment model à la Nerlove (1958). The basic model of trademark filings by applicants from country *i* in month *t* is given by

$$T_{it}^{*} = f(Y_{it}, F_{it})e^{\nu_{it}}$$

where T_{it}^{*} denotes the steady-state level of trademark applications, Y_{it} is the gross domestic product, F_{it} is the filing fee, and ν_{it} is the error term. We allow for the possibility that the number of trademark filings does not immediately adjust to its steady-state level with the use of a dynamic process. The 'distance' between T_{it}^{*} and the actual T_{it} is closed partially in each period

$$\frac{T_{it}}{T_{it-1}} = \left(\frac{T_{it}^{*}}{T_{it-1}}\right)^{\lambda}$$

with $0 < \lambda \leq 1$ as the speed of adjustment. Combining these two equations and taking natural logs yields

$$\ln T_{it} = \lambda \ln f(Y_{it}, F_{it}) + (1-\lambda) \ln T_{it-1} + \epsilon_{it}$$

where ϵ_{it} is a rescaling of ν_{it} by a factor λ. The parameterization of the trademark production function $f(Y_{it}, F_{it})$ is a Cobb-Douglas of the form $\phi_i Y_{it}^{\alpha_1} F_{it}^{\alpha_2}$ where α_1 and α_2 capture long-term elasticities. The empirical equation is

$$\ln T_{it} = \beta_{0i} + \beta_i \ln Y_{it} + \beta_2 \ln F_{it} + (1-\lambda) \ln T_{it-1} + \epsilon_{it} \quad (1)$$

where $\beta_2 = \lambda\alpha_2$ is the short-term fee elasticity and β_{0i} is the country fixed effect.

We briefly discuss four econometric issues. First, we need to address the possibility of spurious results if the series are not stationary. We test for the presence of unit roots using a Fisher-type test. This test is well suited to an unbalanced panel with a large time dimension. The results suggest that the trademark filings series are stationary (not reported). Second, the presence of the lagged dependent variable is a source of endogeneity if the series exhibit serial correlation (Nickell 1981). Although the problem is especially acute when the time dimensionality is small, we nevertheless correct for dynamic panel bias using Bruno (2005). Another potential pitfall is the simultaneity bias typically associated with price elasticity estimates (price affects demand and vice-versa). There is no such concern in this set-up: the application fee has not been adjusted over a 10-year period although the worldwide demand for international trademarks grew at an annual rate of 4.75% during the study period (not reported). Finally, the result may be driven by unobserved heterogeneity: changes in the exchange rate may also signal changes in local economic conditions, which may affect the demand for trademarks. We include an indicator of monthly industrial production to proxy local economic conditions.

Data

The dependent variable is the number of international trademark applications (T_{it}) and is obtained directly from WIPO. The sample includes 42 countries with an average of more than five applications per month in the period 01/2004–12/2013.[1]

The key independent variable is the filing fee (F_{it}). The basic fee for filing a trademark (where any reproduction of the mark is in color) is 903 CHF. The fee is to be paid in CHF and has not changed since 1996. The fee is converted into nominal local currency using monthly exchange rate series obtained from the

[1] The Benelux countries have a common trademark office and we do not have individual country figures on trademark filings. Country figures have been estimated on the prorata of each country's GDP. Results are robust to the exclusion of Benelux countries from the sample.

foreign exchange trading platform Oanda.com. The fee values are then converted in 2011 constant international dollars using the GDP deflators from the IMF World Economic Outlook (WEO) Database.

The main control variable is yearly gross domestic product (Y_{it}), obtained from the IMF WEO database. Monthly series were obtained by linear interpolation of the yearly series. Y_{it} is reported in constant international dollars.

A second control variable is the monthly industrial production (I_{it}), obtained from the OECD Key Short Term Indicators database. The variable is available for 28 countries and is therefore not included in the baseline specification.

Table 1 provides descriptive statistics for the month 12/2010. The number of trademark applications ranges from 2 for Iceland to 440 for Germany with a mean of 68. The fee ranges from $628 for Australia to $21,595 for Estonia, with a mean of $1742 .The smallest country in terms of GDP is Iceland and the largest is the USA. Industrial production is expressed as a country-specific index.

Table 1. Overview of a data slice, December 2010

	N	Min	Mean	Max	Std. Dev.
T_{it}	41	2	68	440	102
F_{it}	42	628.36	1741.75	21,595.26	3182.65
Y_{it}	42	12.47	1379.86	15,273.22	3009.15
I_{it}	28	0.97	1.025995	1.11	0.03

Note: There are 120 time periods. GDP (Y_{it}) is expressed in billions. There are 41 observations for the variable T_{it} because one country (New Zealand) entered the Madrid system in 12/2012.

Results

The results presented in column (1) of Table 2 suggest that the short-term fee elasticity is -0.259, meaning that a 10% increase in fee leads to a 2.59% decrease in trademark applications in the next period. The corresponding long-term elasticity is reported in column (1) of Table 3 and reaches -0.311. The two values are close to each other because the speed of adjustment is close to 1 (λ=1-0.169=0.831). Correcting for the dynamic bias in column (2) has little impact on the short-term elasticity estimate and leaves the long-term estimate unchanged. The regression models presented in columns (3)–(4) of Table 2 control for time effects. The model in column (3) includes dummies for each individual month to capture global time effects that may affect all countries simultaneously. The time dummies are not significantly different from zero (joint test). The model in column (4) includes twelve monthly dummies to capture, e.g., confounding factors arising from the linear interpolation of yearly GDP series into monthly series. The dummies are significantly different from zero (joint test) but the coefficients remain largely unchanged. The model in the last column controls for a country's industrial production. A 10% increase in industrial production is associated with a 4.19% increase in the number of trademark applications. The short-term fee elasticity rises to -0.348 and the long-term fee elasticity rises to -0.423. These figures are not directly comparable to those presented in the

previous columns because the sample size changed. The coefficient associated with the short-term fee elasticity estimated for the sample used in column (5) but with the specification of column (4) has a value of -0.295 (not reported). In other words, about half the change in the elasticity estimate is driven by the use of a different sample, and the other half is driven by the inclusion of the control variable.

Table 2. Estimates of equation (1)

	(1) F.E.	(2) LSDVB	(3) LSDVB	(4) LSDVB	(5) LSDVB
$\ln T_{it-1}$	0.169*	0.178*	0.179*	0.177*	0.179*
	(0.0146)	(0.0153)	(0.0173)	(0.0154)	(0.0193)
$\ln Y_{it}$	1.069*	1.046*	1.066*	1.037*	0.671*
	(0.0939)	(0.108)	(0.114)	(0.109)	(0.145)
$\ln F_{it}$	-0.259*	-0.255*	-0.254*	-0.257*	-0.348*
	(0.0691)	(0.0657)	(0.0658)	(0.0644)	(0.0918)
$\ln I_{it}$					0.419*
					(0.129)
Time effect	No	No	Yes	No	No
Month effect	No	No	No	Yes	Yes
N	4,552	4,518	4,518	4,518	3,046
R-squared	0.61	0.61	0.61	0.61	0.71

Notes: The dependent variable is the log number of trademark applications. *: p-value < 0.01. F.E.: fixed effect regression with robust standard errors; LSVDB: Least square dummy variable correcting for dynamic panel bias with bootstrapped standard errors (Bruno 2005). A total of 42 countries included, except 28 countries in column (5).

Table 3. Long-term fee elasticities

	(1)	(2)	(3)	(4)	(5)
α_2	-0.311*	-0.311*	-0.309*	-0.312*	-0.423*

Notes: *: p-value < 0.01.

Conclusion

This paper finds that the demand for international trademark applications is inelastic to fees. Note that the study focuses on the most valuable trademarks that target the international market. This fact may explain why the estimates are significantly lower than these obtained by Herz and Mejer (2015) for trademarks filed in national offices in Europe, which can be expected to be of lesser value on average. The difference in elasticity may also be driven by the availability of substitutes. National trademark offices in Europe compete with the office for harmonization of internal market (OHIM), whereas WIPO is less affected by local competition (only for intra EU filings).

A low elasticity can be taken as a hint that trademarks provide economic value to their owners (relative to their costs). From this perspective, the significantly higher fee elasticity obtained for national trademarks elsewhere is an indication that not all types of trademarks are equally valuable. An avenue for future research is to investigate the economic returns by trademark types.

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