

## **Committee on Development and Intellectual Property (CDIP)**

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### **SUMMARY OF THE STUDY ON THE USE OF INTELLECTUAL PROPERTY IN CHILE**

*prepared by the Secretariat*

1. The Annex to this document contains a summary of the study on the Use of Intellectual Property in Chile, undertaken in the context of the Project on Intellectual Property and Socio Economic Development - Phase II (document CDIP/14/7).

2. The study has been prepared by the WIPO Secretariat in collaboration with Ms. Bronwyn Hall, Professor of Technology and the Economy, Department of Economics, University of California, Berkeley, United States of America, and Mr. Christian Helmers, Assistant Professor, Department of Economics, Santa Clara University, U.S.A. It has been reviewed by Roberto Alvarez Espinosa, Professor, Department of Economics, University of Chile, Santiago de Chile. The study is available as WIPO Economic Research Working Paper No. 43 (at [http://www.wipo.int/econ\\_stat/en/economics](http://www.wipo.int/econ_stat/en/economics)).

3. *The CDIP is invited to take note of the information contained in the Annex to the present document.*

[Annex follows]

## INTRODUCTION

Chile was one of the countries included in the first phase of the CDIP project on IP and Socioeconomic Development (CDIP/5/7). As detailed in its final report (CDIP/11/INF/4), the first phase project consisted of an effort by the National Industrial Property Institute of Chile (INAPI) and the World Intellectual Property Organization (WIPO) to build a comprehensive database on the use of IP in Chile. This database contains all patent, trademark, utility model and industrial design filings for Chile over the period 1991-2010. One key contribution of the data construction work was to harmonize applicant names and uniquely identify applicants for all four forms of IP. This database enabled the research work on the incidence and consequences of trademark squatting in Chile as well as on pharmaceutical patents in Chile, which also took place during the project's first phase (CDIP/14/INF/3 and CDIP/15/INF/2, respectively). Another output of the first phase project was the matching of the data on IP use to firm-level data of the National Statistical Institute (INE) – specifically, the manufacturing census (ENIA) as well as five waves (1997-2008) of the Chilean innovation survey (INNOVACION).

Building on the accomplishments of the first phase, the project's second phase consisted of a follow up study on what determines use of the IP system in Chile and to what extent it makes a difference in the performance of firms. Similar studies have been conducted for high-income countries, notably for the United States and the United Kingdom.<sup>1</sup> In a nutshell, they conclude that less than ten percent of firms in those countries file patents, with somewhat higher rates of use for trademarks. The evidence from high-income economies also suggests that firms using patents and trademarks tend to be more productive and higher valued. The key objective of the new research in Chile – the first of its kind in a middle-income country – was to investigate in which ways the results would be any different. The investigation relied on the matched dataset on IP use and firm performance data developed during the project's first phase.

This Summary offers a brief overview of the research conducted during the second phase. It describes the unique features of the micro database created in Chile, outlines the empirical approach adopted, summarizes the main results and points to a few lessons learned.

## MICRO DATABASE ON IP USE AND FIRM PERFORMANCE

The micro database created during the first phase combines three different data sources:

- **INAPI's IP data.** The data on patents, utility models, industrial designs and trademarks contain bibliographic information as well as information on the prosecution history and legal status of the IP rights. Applicant names were harmonized relying on name matching algorithms, Chile's domestic tax identifier (RUT) and manual checks.
- **Manufacturing survey (ENIA).** The Chilean manufacturing census (ENIA) surveys annually all manufacturing companies with at least 10 employees. ENIA contains detailed plant-level information on inputs and outputs as well as plant characteristics including industrial affiliation and geographical location.
- **Innovation survey (INNOVACION).** The Chilean innovation survey – modeled after the European Community Innovation Survey (CIS) – asks Chilean firms a wide range of

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<sup>1</sup> See Balasubramanian, N. and J. Sivadasan (2011): What happens when firms patent? New evidence from U.S. Economic census data, *The Review of Economics and Statistics* 93(1): 126-146; and Hall, B.H., C. Helmers, M. Rogers, and V. Sena (2013): The importance (or not) of patents to UK firms, *Oxford Economic Papers* 65 (3): 603-629.

questions on their innovation activities. The survey started in 1995 and has been conducted every 3-4 years. The first three rounds collected data at the plant-level and rounds 4 and 5 collected data at both the firm- and plant-level. The survey has also expanded significantly in its coverage over time. The first two surveys only covered the manufacturing industry, rounds 3 and 4 expanded to mining and utilities, and the subsequent rounds covered firms across all industries.

The three different data sources were combined into a single database using the unique tax identifier available in all three datasets. The data matching was performed by INE and the database released to the researchers suppressed the identity of individual firms to protect statistical confidentiality. The reliance on a unique tax identifier represents a major advantage over similar datasets created in high-countries that are based on less reliable name-based matching techniques.

Table 1 presents an overview of the available data. It shows that there are on average around 5,000 firms in the ENIA between 1995 and 2005, for a total of 9,279 unique firms. The number of firms covered by the INNOVACION data varies much more substantially over time, from 443 for round 2 to 4,243 for round 6. Nearly 2,000 firms are in both datasets, which is a sizeable number keeping in mind that the ENIA is limited to the manufacturing industry whereas INNOVACION covers a wider range of sectors from round 3 onward.

**Table 1: Overview of data coverage**

Year	ENIA					INNO					Both ENIA and INNO				
	All	Patent	Industrial design	Utility model	Trade-mark	All	Patent	Industrial design	Utility model	Trade-mark	All	Patent	Industrial design	Utility model	Trade-mark
1995	4,957	19	15	3	572										
1996	5,275	27	18	6	556										
1997	5,044	22	11	4	551	443	11	5	4	128	418	11	5	3	120
1998	4,785	29	12	7	508	443	15	7	3	120	401	15	7	3	114
1999	4,671	21	13	7	471										
2000	4,544	21	12	3	444	631	8	7	1	118	560	8	7	1	112
2001	4,464	20	17	5	434	631	10	10	5	130	527	9	9	4	118
2002	4,785	24	17	3	452										
2003	4,766	27	16	2	438	2,602	20	10	1	337	1082	14	9	1	168
2004	4,993	31	13	4	461	2,602	27	7	1	356	1067	19	7	1	165
2005	5,034	33	21	3	507	3,194	30	14	2	378	1247	18	13	2	194
2006						3,194	25	9	3	343					
2007						4,243	15	7	2	417					
2008						4,243	20	9	3	391					
Total#	53,318	274	165	47	5,394	22,226	181	85	25	2,718	5,302	94	57	15	991
Unique*	9,279	141	70	36	2,502	8,017	100	45	16	1,524	1,995	52	34	11	480

# Total number of firm-year observations

\* Unique number of firms

## EMPIRICAL APPROACH

The study's empirical investigation is divided into three parts. The first part presents a set of descriptive statistics to paint an overall picture of IP use among Chilean manufacturing firms. The second part explores the determinants of IP use among Chilean firms based on descriptive regression analysis. In particular, it estimates to what degree different firm and industry characteristics explain whether firms use different forms of IP and how intensively they do so. Relevant characteristics include how large firms are, how capital intensive they are, whether they are domestically or foreign owned, whether they export, where in Chile they are located and in which industry they operate.

The third part delves deeper into firms' IP use and asks whether such use makes a difference in firm performance. Identifying any causal relationship to this effect is empirically challenging. In particular, a mere statistical correlation between IP use and firm performance may simply indicate that successfully innovating firms are more successful in the marketplace. It would not, on its own, signify that the legal right itself makes a difference. Seeking to address this concern and following the approach of the prior literature, the study focuses on whether first-time use of different IP instruments made a difference in firm performance. The focus on first-time use makes it easier to isolate any direct contribution of the IP system to firms' subsequent performance.

## **MAIN FINDINGS**

The study's main findings can be summarized as follows:

- Only 2.4 percent of manufacturing firms filed for one or more patents in the time period under consideration. Similarly low shares apply to utility model and industrial design use. By contrast, 51.9 percent of manufacturing firms filed for at least one trademark.
- To a large degree, the determinants of IP use in Chile mirror those of high-income countries. In particular, larger firms, exporting firms, and those located in the Santiago metro region are more likely to use any kind of IP protection. The use of trademarks and design rights increases with capital intensity, conditional on size and industry. Foreign-owned firms are far more likely to patent than domestic firms, but they are less likely to make use of trademarks.
- Patenting is more frequent in chemicals, metals and machinery, and motor vehicles. It is absent in electrical and electronics sector, which see intensive patent use in high-income countries. Trademarks are used more uniformly across sectors, with the highest use in chemicals which includes pharmaceuticals.
- There is clear evidence that firms increase in size after their first trademark application or patent filing. However, this largely reflects that firms that use the IP system during the period of analysis are faster growing ones. They already exhibit faster growth before first-time IP use and such use does not change their growth trajectory. In simple terms, business success seems drive first-time IP use, rather than the other way around.
- Finally, trademark use is associated with new-to-the-world product innovation, which suggests that Chilean firms employ branding strategies to appropriate returns to their investments in product innovation. This finding is consistent with evidence on the branding-innovation link in developed countries.

## **LESSONS LEARNED**

The study's findings hold two lessons for IP policy. First, the notion that business success drives first-time IP use suggests that IP awareness raising campaigns are best targeted at those firms whose growing intangible asset portfolio renders them potential users of different IP instruments, and not at the general population of firms. Second, the finding that trademark use is associated with new-to-the-world product innovation – combined with the relatively sparse use of patents by Chilean firms – suggests that branding may be a relatively more important way for firms in Chile and other middle-income economies to appropriate returns to innovation. This conclusion points to a sequencing of IP policies, with relatively greater emphasis placed on the trademark system at earlier development stages.

From a methodological perspective, there is much promise in studying the performance of IP use by relying on matched IP use and firm performance data. Indeed, the database created in Chile has the potential to enable research on additional questions on how innovative activities, IP use and commercial outcomes relate to one another. At the same time, studies of this type also face important limitations. Only few Chilean firms use patents and most of those only do so sporadically. The same pattern likely prevails in many other middle-income countries. This weakens the reliability of statistical relationships and thus the ability of researchers to draw firm conclusions. A second important caveat is that the study's empirical approach relies on comparing firms that use IP to those that do not; the results thus do not offer any insight into the extent to which IP laws incentivize innovation across all firms.

Finally, the study in Chile showed that growing firms find it useful to protect their intangible assets through IP. Given the data used, it could not offer detailed insights into how evolving IP strategies fit into firms' business models and how these strategies depend on product, technology and industry characteristics. More research on these questions could contribute to better understanding the causes and consequences of IP use among firms in middle-income countries.

[End of Annex and of document]