



OFFICE FOR HARMONIZATION
IN THE INTERNAL MARKET
(TRADE MARKS AND DESIGNS)

Intellectual property rights and firm performance in Europe: an economic analysis

Firm-Level Analysis Report, June 2015

Executive summary





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01 / Foreword

The importance of intellectual property rights (IPR) to society and the economy in Europe has become increasingly clear in recent years.

The study on the contribution made by IPR-intensive industries to the EU economy carried out in 2013, in partnership with the European Patent Office, demonstrated the importance of those industries. It showed they support directly or indirectly 35% of jobs, almost 39% of the EU's GDP and 90% of external trade.

OHIM, through the European Observatory on Infringements of Intellectual Property Rights, has now carried out a follow-up study delving deeper into the influence of these rights at the firm or company level. This study, based on official public financial data from more than 2.3 million EU firms, covers companies which own patents, trade marks and designs at both national and at EU level.

The study shows that large companies are four times more likely to own IP rights than smaller companies - 40% of larger firms have registered rights, compared with 9% of SMEs. It also shows that companies that own IP rights perform better than those that do not. This is a particularly significant finding for the 1.8 million SMEs that have registered IP rights, since they represent such an important part of the EU economy.

The results demonstrate that businesses that own Intellectual Property Rights generate more revenue per employee than those that do not, have more employees and pay higher salaries to their workers and that this relationship is particularly strong for SMEs.

This is in our view a very important message for Europe's businesses and policymakers, highlighting the virtuous cycle between IP and economic performance. While it should not be interpreted as establishing a causal link between the ownership of Intellectual Property Rights and higher revenue per employee, there is nevertheless an indication of a relationship between the two.

This report will feed in to a number of Office projects including the upcoming SME Scoreboard. This Scoreboard is designed to examine in greater detail the use that SMEs make of IP rights and will be drawn up by OHIM, through the Observatory, in partnership with the European Commission.



The Office is confident that the present report will make a valuable contribution to a wider understanding of the role of creativity and innovation in EU society and the economy and will help to bring home the important message that Intellectual Property Rights are for everyone.

A handwritten signature in black ink, reading 'António Campinos'.

António Campinos
President, OHIM

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02 / Executive summary

One of the mandates of the European Observatory on Infringements of Intellectual Property Rights (“the Observatory”) is to provide evidence-based data on the impact, role and public perception of intellectual property in the economy of the European Union (EU). In order to meet that objective, the Observatory is undertaking a programme of socio-economic studies.

In September 2013, a study was published which provided an assessment of the combined contribution of industries that make intensive use of the various types of intellectual property right (IPR) to the economies of the EU as a whole and to the individual Member States.

The present report is a follow-up study that delves deeper into the role of IPRs by analysing a large representative sample of over 130 000 European firms¹ in order to compare the economic performance of firms that own IPRs with those that do not.

The IPRs included in the study are **patents**, **trade marks** and **designs** (and any combination of the three). Because of their nature, copyright and geographical indications, which were part of the 2013 study, were not included here². On the other hand, the present study includes both European and national IPRs, an important enhancement to the data, and provides a complete view of each company’s IPRs portfolio—both European and national rights.

The data on each company’s IPR portfolio was matched with information contained in the commercial database ORBIS. This database provides financial and other information on millions of European companies, collected from the filings and accounting reports made by the companies in the commercial registers of all EU Member States. The matching of the IPR databases and the ORBIS database was done on the basis of IPR ownership. The study uses financial and other information about companies that are registered as formal owners of patents, trademarks and/or designs. Some companies that are part of a larger group structure may not be the formal owners of IPRs (their headquarters may have the formal ownership), but still use IPRs in their commercial activities.

There are various ways to measure the economic performance of a company. Because of data constraints and the need for like-for-like comparisons (eliminating the effect of firm size on the statistical results), “**revenue per employee**” was chosen as **the main indicator of firm performance**.

The dataset was constructed in such a way that of the companies examined, about half, or 63 288, have at least one patent, trade mark or design in their portfolio. This allows a comparison of the performance of companies that own these IPRs with companies that do not. It also enables a detailed

1 Some of the descriptive statistics in Chapter 5 are based on an even larger sample of more than 2.3 million firms.

2 The main reason is that copyright is not always registered, while geographical indications are not registered by individual firms. Hence, data on the ownership of those IPRs on the firm level simply does not exist.

examination of the relationship between a company's performance and the size of the company's stock of IPRs. To our knowledge, the coverage of the dataset is significantly larger than that of any other data source of this type currently available, ensuring a sample sufficiently large to draw robust and representative conclusions.

The study makes no policy recommendations, as this is not within its scope. Instead, it provides evidence that can be used by policymakers in their work, and serves as a basis for raising awareness of IP among Europe's citizens.

2.1 Methodology

The data was analysed using three types of methodology:

First, **descriptive statistics** were compiled to illustrate the differences between owners and non-owners of IPRs in terms of economic characteristics of the firm. Differences were tested for statistical significance. Chapter 5 presents the results of this analysis.

Chapter 6 reports the findings of the **econometric analysis** of the data. It allows for an in-depth examination of the relationship between firms' ownership of IPRs and their economic performance. This is in contrast to the 2013 study of IPR-intensive industries which described the structure of the economy in terms of IPR use at sector level but did not attempt to draw any analytical conclusions. The results of the analysis strongly suggest that there is a systematic, positive relationship between the ownership of IPRs and economic performance at individual company level. The present study provides an indication of this relationship, based on statistical analysis of a very large sample of individual firms.

Whilst causality cannot be proven in the strict sense of the word, given the available data, econometric analysis allows the researcher to control for several additional factors that affect economic performance and to "isolate" the relationship between IP ownership and firm performance. There are various economic theories suggesting a causal link between IP ownership and firm performance. These will be discussed in this report.

Finally, a **cluster analysis** was conducted on the data. This analysis aims at identifying groups of firms ("clusters") that are similar in terms of their ownership of IPRs. These clusters are then analysed to see whether there are systematic differences among them in respect of the variables of interest, such as revenue per employee or average employment per firm. These results are reported in Annex 8.4 of the report.

2.2 Main findings

Table 1 shows the key financial and company variables for the firms in the sample for the year 2010.

Table 1: Average values of selected variables by IPR ownership

		Number of employees	Revenue per employee (EUR/year)	Wages per employee (EUR/year)
Non-owners of IPR		93.6	225 540	37 996
IPR owners	All IPRs	547.3	290 106	45 520
	% difference compared to non-owners	484.6%	28.6%	19.8%
	Patents	1 537.6	283 567	53 424
	% difference compared to non-owners	1 542.6%	25.7%	40.6%
	Trade marks	569.9	292 011	45 139
	% difference compared to non-owners	508.8%	29.5%	18.8%
	Designs	2 103.1	296 316	46 747
	% difference compared to non-owners	2 146.7%	31.4%	23.0%

Note: Based on available observations of 132 277 firms. All differences are statistically significant at the 1 per cent level. The group of 'All IPR owners' is defined as firms that owned at least one patent, trade mark or design, or any combination thereof. The groups of 'Patent owners', 'Trade mark owners' and 'Design owners' are defined as firms that owned at least one of the particular IPRs. Since many firms owned combinations of the three IPRs, the owners of the various IPRs overlap.

As Table 1 shows, firms that own IPRs tend to be larger than firms that do not, as measured by the number of employees (547 vs. 94 employees on average). For this reason, economic performance metrics such as revenue, profits or wages are expressed on a per-employee basis.

Thus, firms that own IPRs have on average **29 per cent** higher revenue per employee than firms that do not. This can be regarded as one of the central results of this study. In terms of individual IPRs, the average performance premium experienced by IPR-owning firms is 26 per cent for patents, 29 per cent for trade marks and 31 per cent for designs.

Table 1 also indicates that firms that own IPRs pay on average **20 per cent higher wages** than firms that do not. Here, the strongest effect is associated with owning patents (41 per cent), followed by design (23 per cent) and trade marks (19 per cent). Although in terms of revenue per employee, patents, compared with trade marks and designs, seem to be less associated with "extra" performance, they are the IPR type that on average generates the highest rewards for employees. This is also consistent with the results of the previous study which looked into the

contribution of IPR-intensive industries to the EU economy, in terms of gross domestic product, employment, wages and international trade³.

The econometric analysis in Chapter 6, the results of which are summarised in Table 2 below, confirms the positive association between IPR ownership and economic performance, with revenue per employee 28 per cent higher for IPR owners than for non-owners.

In addition, the analysis shows that this relationship is particularly pronounced for **small and medium-sized enterprises** (SME).⁴ This report uses the definition based on the number of employees and turnover. SMEs that own IPRs have almost **32 per cent** higher revenue per employee than SMEs that do not own IPRs at all. Thus, while the majority of SMEs in Europe do not own IPRs, those that do own IPRs have significantly higher revenue per employee. In the case of **large companies**, revenue per employee is **4 per cent** higher for IP owners than for non-owners. Here the analysis shows that 4 out of 10 large companies in Europe own IPRs, but the association with higher revenue per employee is less pronounced than in the case of SMEs. It is important to note that these findings are obtained while controlling for other factors that could influence a firm's performance, such as the country in which it is located or the sector in which it operates.

Table 2: IPR ownership and revenue per employee by firm size

	Difference in revenue per employee of IPR owners compared with non-owners of IPR
Large companies	+ 4.0%
SMEs	+ 31.7%
Total	+ 28.0%

Note: Based on observations of a total of 130 555 firms. Differences are statistically significant at the 99 per cent confidence level

The econometric analysis in Chapter 6 further shows that increases in firm performance depend on type and combination of IPRs. The highest revenue-per-employee increases are linked to trade mark-only and combined trade mark-and-design owners: 30 per cent and 39 per cent, respectively. Patent-only owners have 15 per cent higher revenue per employee, design-only owners 15 per cent, patent-and-trade mark owners 17 per cent, patent-and-design owners 15 per cent and owners of all three IPRs 16 per cent.

The figures above reflect binary comparisons. In other words, firms that do not own a particular IPR are compared with firms that do own it. Using econometric analysis, it is also possible to calculate the effect of increasing the number of IPRs owned by a firm. This type of analysis shows that a 10 per cent *increase* in the stock of European trade marks of a firm is associated with a 2.8 per cent increase in revenue per employee, a 10 per cent increase in the stock of national trade marks is associated with a 5.2 per cent increase, while for patents a 10 per cent increase in the stock of European patents leads to a 1.8 per cent increase and a 10 per cent increase in the stock of national patents to a 4.6 per cent increase. For national designs the analysis suggests that a 10 per cent increase in stock is associated with a 0.7 per cent increase in performance. For the other

3 - Intellectual property rights intensive industries: contribution to economic performance and employment in the European Union, EPO/OHIM, September 2013.

4 - An SME is defined in Article 2 of the annex to the Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC) as a company with fewer than 250 employees and turnover not exceeding EUR 50 million and/or an annual balance sheet total not exceeding EUR 43 million.

IPRs the econometric analysis could not establish a statistically significant relationship, which means that it is not possible to state with more than 90 per cent confidence that there is a positive relationship between increases in a company's stock of the relevant IPRs and its economic performance.

2.3 Limitations of the study and directions for future research

The analysis presented in this study confirms that there is a strong positive relationship between the ownership of different types of IPR and the performance of firms, as measured by revenue per employee and average wages paid.

However, as with every statistical analysis, these results must be interpreted with care. They do not constitute conclusive proof that encouraging firms to make greater use of IPRs will cause their performance to increase. The study shows a positive relationship between firms that own IPRs and their performance (as measured by revenue per employee). Indeed, there may be several mechanisms through which the link between the ownership of IPRs and firm performance may work. However, given the available data, it is not possible to disentangle these in the analysis.

The methodology used in the study allows for identification of owners of IP rights by company name, as it appears in the IP registers, and matches this name to the ORBIS database. ORBIS is the most extensive source of demographic and financial information of European firms available to researchers. However, there is not sufficient information in ORBIS to identify all beneficiaries/users of IP rights beyond their immediate owners.

Although the ORBIS database contains information on the economic links between companies (Domestic Ultimate Owner and Global Ultimate Owner) this information is not complete. In other words, there appear to be companies in ORBIS that are part of larger economic groups but for which ORBIS does not report ownership links.

Ownership links were taken into account as much as possible in the randomised sample that was used for all econometric models that form the core of this study (Chapter 6). This smaller sample was cleaned as much as possible, so that companies that are part of a larger group structure are considered as one entity. Thus, in the econometric analysis companies that could benefit from the IP rights owned by other entities in their group were not treated as the non-owners of IP rights. This cleaning process, however, could be done only partially for reasons explained above, and it is not feasible to carry it out on the larger sample of 2.3 million companies that is used for the descriptive statistics.

Although lack of sufficient information about the potential beneficiaries of IP rights affects both large companies and SMEs, the impact on the results for large companies is larger. Large companies are more likely than SMEs to set up branches in many European countries and group IP ownership in one entity that manages the whole IP portfolio. Although registered as an ownership of only one firm, this IP portfolio brings benefits to all the firms that are part of the economic group.

Economic analysis of the benefits accrued to all the IP users (owners, users and licensees) would potentially be more informative. However, there is no publicly available repository containing sufficient information on IP licensing. Therefore all economic studies similar to the present study, that are based on large samples of firms, are necessarily limited to the benefits of IP *ownership* rather than *use*.

While this study has helped to improve our understanding of the relationships between the firms' performance and their ownership of IPRs, much scope remains for further research using the dataset compiled for this study. For example, further analysis can be conducted on separate sub-samples of manufacturing and service firms to analyse in greater depth how the impact of IPRs on company performance varies across sectors.

Another option for future research would be to analyse the impact of IPRs on SMEs and young firms in more detail. The dataset allows companies to be broken down into micro, small and medium-sized companies,⁵ and given the estimated significant relationship between IPR stocks and performance for SMEs, it would be worthwhile to analyse this dimension in more detail.

Finally, the analysis in this study is based on *counts* of IPRs held by each firm in the sample. A more challenging further development of the analysis would be to assess the extent to which the "quality" of a patent, trade mark or design affects this relationship. Higher-quality IPRs are likely to have a greater impact on performance than lower-quality ones. Hence, the results presented in this study are an 'average' of these effects.

5 - The SME category is commonly broken down further into sub-categories based on the number of employees: 1-10 (referred to as micro enterprises), 11-50 (small) and 51-250 (medium-sized)..



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