The use of Intellectual Property Right bundles by firms in copyright intensive industries

Working paper

11 July 2014

Antanina Garanasvili[i]

Michał Kazimierczak[ii]

George Lazaridis[iii]

Abstract

This paper contributes to the complementarity theory of Intellectual Property rights (IPRs) and seeks to explain how companies active in copyright industries bundle different types of formal IP protection in order to effectively protect their original works and maximise economic returns from their creative activity. Based on a unique set of data covering IP activity of copyright-intensive European companies a number of regression models have been developed to identify factors explaining the use of the various protection mechanisms.

Statistical analysis indicates that only a small share of companies in copyright industries use other forms of IP protection. Regression analysis further demonstrates that copyright companies employ other forms of IP protection less frequently than non-copyright companies. However there is an observed strong size effect, with larger copyright companies having larger probability to use other forms of IP more frequently than small companies. The paper provides support for complementarity between copyright and other forms IP given company specific characteristics.

Keywords: Intellectual Property Right bundles, copyright, complementary protection mechanisms, intangible assets.

[ii] *antanina.garanasvili@wipo.int* (contact reference)
[ii] OHIM. *michal.kazimierczak@oami.europa.eu*
[iii] EPO. *glazaridis@epo.org*

1. Introduction

Academic research on intellectual property has shifted away from the analysis of individual forms of IP rights, which has been traditionally concentrating mainly on patents, and only recently has started to focus on analysing the effects of Intellectual Property bundles on the performance of companies. By recognising that various forms of IP rights can reinforce each other this stream of research is looking at how companies can jointly employ IP rights in order to better protect their creative work and maximise returns on their investments. Yet again the bulk of these studies have been mostly driven by patents and trademarks and to a lesser extent by industrial designs, with copyrights being kept usually at the margins of the academic interest. Certain restrictions especially with regard to data availability have contributed to this: unlike other forms of IP protection, copyrights are not registered and data cannot be easily extracted for a meaningful economic analysis.

However, like all other formal means of IP protection, copyrights perform a vital economic function in the market by encouraging creativity and the originality of works and contributing to the stock of knowledge. By offering protection to the creator of a masterpiece for a limited period of time the proprietor can exploit the work and profit from the fruits of his or her ingenuity. It is these higher profits that provide the incentives to engage in creative activity[iv].

At the same time copyright industries represent the exceptional and interesting case of creative innovation as they have been evolving dynamically over time along with market and technological developments. Certain technological breakthroughs such as the printing press, sound recording, broadcasting radio, television, VCRs and the DVDs have all changed the way we perceive the functions of copyright in the market and its role in generating profits.

Undeniably the importance of the copyright industries and of the firms active in them is increasingly growing[v], whilst recent developments in the digitalised information technology and the emergence of internet have expanded the significance of copyrights and their role in the economy. Although it will be hard to predict how further development of digital markets and 3D printing will affect copyright industries, it may well appear that these will generate higher returns and facilitate an increase in market power for companies acting in some of them, while creating significant obstacles for small firms and individual creators to appropriate the returns.

[iv] Corrigan and Rogers (2005) clearly distinguish between the creator per se (e.g. the writer) and the agents, or companies (e.g. publishers) that embed the creative work in a product available to consumers, and recognise that creators may be less responsive to economic incentives than agents.

[v] A study conducted jointly by EPO and OHIM in 2013 found that copyright intensive industries account for 3.2% of total employment and generate 4.2% of the total economic output (GDP) in the EU.

To gain a better insight into the issues surrounding the role of copyright in generating profits for the company it is useful to analyse the complementary protection mechanisms these companies employ. Using a novel dataset that brings patent, trademark and design information of nearly half of a million EU companies together, and building on a logistic regression model the study focuses on companies that make an extensive use of copyright protection and tries to explain choices of IP protection of copyright firms based on their size, turnover and geographical location. In addition, aspects of complementarities are analysed to test whether the combination of different forms of IP yield better performance results for the companies in focus.

The remainder of the paper proceeds as follows. Chapter II provides the theoretical background and findings of recent academic work and existing literature. Chapter III describes the data and the methodology of the study and identifies the copyright industries used in our analysis. Chapter IV presents the first descriptive findings based on the data analysis. Chapter V explains the regression models and the econometric results. Finally, the paper concludes with Chapter VI where key findings are brought together and the directions for the future research are outlined.

2. Theoretical background

Scholars have always sought to understand how firms extract value from intangible assets. The use of IP has been recognised by industry and academics alike as an important means of appropriating value. However, the almost exclusive attention given to patents in the literature has been to the detriment of research on other IP types, such as copyright, trademarks and secrecy.

Earlier work has also largely ignored the *relationships* between different types of IP rights. As noted by Graham and Somaya (2006), the prevailing implicit assumption viewed the different types of intellectual property rights as substitutes rather than as complements, largely focusing on the trade-off between patents and trade secrets. The very influential Yale innovation survey (Levin et al., 1989), for instance, reduces legal appropriability mechanisms to two dimensions – patent and non-patents (including secrecy) – which appeared to be used as substitutes. Other surveys conducted in Europe (Harabi, 1995; Arundel, 2001) either assumes that a firm had to choose between patenting and secrecy and implicitly considers them to serve as substitutes.

However the possibility that IP rights may act as complements, and if so under what circumstances, are questions that could fundamentally alter our conception of IP strategy, and therefore deserves greater attention. Early work by Teece (1986) on the role of complementary assets and how these could generate profits from innovation has given rise to more recent comprehensive analysis (Cohen, 2000; Amara et al., 2008; Graham and Somaya, 2006; Ramello and Silva, 2006) of how firms mix various protection mechanisms.

Similarly, recent contributions have emphasized the role of symbolic value – defined as the set of social and cultural aspects associated with a product, which enables consumers to use it to communicate about their identity and social and status. Following this rationale, among intangible resources, trademarks and industrial design can play a fundamental role in the process of accumulation, protection and exploitation of symbolic value, and by doing so build up brand equity.

It is not uncommon to see different types of Intellectual Property rights being jointly used by firms. Depending on the industry and size of a firm, IP rights are increasingly being used in bundles. Bringing new products to the markets can require strategic use of multiple Intellectual Property rights that are complementary to each other. The empirical evidence points to the synergistic role of combined use of IP rights across firms.

Somaya and Graham (2006) suggest that different types of IP rights may act as complements due to market-driven factors and economies of scope. Such complementarities will arise if increased enforcement of patents leads to more exclusivity of the product associated with the patent, which in turn leads to a higher value of the corresponding brand. Complementarities between IP rights in the form of economies of scope will occur if the existing know-how and experience with one

type of IP right simplifies the introduction of another type. In other words, firms that already own one type of IP rights, and have relevant experience, are might be more likely to consider supplementing their intangible assets portfolio by additional IP rights protection and in more efficient than company which has no prior IP related experience.

Millot and Llenera (2013) developed a theoretical model in which patents create a temporary monopoly, and absent any trade mark protection, advertising by one firm benefits its competitors, too. Thus, trade mark protection is modelled to reduce positive externalities from advertisement. The model produces two effects: a substitution effect, which occurs because the patent is assumed to prevent competition and therefore renders the effect of the trade mark worthless while the patent is in force, and a complementary effect, which occurs once the patent expires by creating additional streams of revenue once the technological lead is lost.

The most recent study was published by UK IPO (2013). A report for the UK Intellectual Property Office presents analysis of the use of different types of IP rights for the same product by firms registered in the UK. Authors conclude that owning patents as well as trademarks correlated positively with firms' performance.

The way in which different IP rights are combined depends on the firm, the industry in which it operates and the type of product or service it provides. While a high-tech firm may rely on a combination of patents, registered designs, trademarks and trade secrets, a web designer may have the option of choosing from copyright, trademark, and database protection.

Since majority of the studies have been mostly driven by patents and trademarks and to a lesser extent by industrial designs, with copyrights being kept usually at the margins of the academic interest, we find it important to engage in the empirical research regarding copyright intensive industries.

3. Data and methodology

The research object of this paper is the bundle of intellectual property rights employed by the companies operating in copyright intensive industries. We aim to assess interrelated effects of four main types of intellectual property rights: copyright, trademark, patent and design, considering them in their core function as legal protection devices.

The companies using bundles of IP rights are clustered into following categories, reflected in the table 1 below.

Table 1. Intellectual Property Right bundles

	Abbreviation	**Name of IP right bundle**
1.	**PAT**	European Patent
2.	**TM**	Community Trademark (CTM)
3.	**DES**	Registered Community Design (RCD)
4.	**PAT & TM**	European Patent and Community Trademark
5.	**PAT & DES**	European Patent and Registered Community Design
6.	**TM & DES**	Community Trademark and Registered Community Design
7.	**PAT & TM & DES**	European Patent in combination with Community Trademark and Registered Community Design

It is important to explain these types of intellectual assets in more detail. Copyright gives right holders exclusive rights to control the use of their works, such as reproduction, adaptation, translation, performance or public display, and to enables them to be adequately remunerated for their creative efforts.

Patent protection is available for inventions intended to serve as new solutions to technical problems. Inventions must meet the requirements of novelty, non-obviousness to the skilled professionals of the field and industrially applicable. Once granted, the patent prevents any other entity from commercially exploiting the invention without authorization of the owner. European patents typically are granted for the maximum period of 20 years since the date of application.

Trademark is a distinctive sign that identifies certain goods and services provided by certain company or person. The main economic function of the trademark is reduce consumer search costs and to serve in market place as identification mark for of the nature and quality of those goods and services. In order to be eligible for legal protection, a trademark must satisfy the requirements of distinctiveness and non-descriptiveness. The term of protection of the

Community Trademark is typically ten years, but it can be renewed indefinitely subject to payment of fees, for successive periods of ten years.

Design protection comprises the visual appearance of a product, some part of a product or its ornamentation. A design must be new and have an individual character, as differing from any previous designs. Owners of registered designs enjoy exclusive rights to use the design and can prevent any third parties from exploiting it. In the European Union, the Registered Community Design is granted for the maximum period of 25 years, and has initial period of 5 years from the date of filling.

Unlike other forms of IP protection, such as patents, trademarks and designs, copyrights do not require registration, and therefore introducing a method for accurately counting them is not feasible. For this reason we adapt the original methodology developed by WIPO in the *"Guide on Surveying the Economic Contribution of the Copyright-Based Industries"*. The methodology is based on the assumption that companies acting in copyright intensive industries rely on protection of this unregistered IP right. In total we distinguish 33 copyright intensive industries as classified in the Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE industry classification.

In our research we rely on OHIM, EPO and ORBIS databases. Subject to the study are the firms operating in above mentioned copyright intensive industries. We seek to observe firms' ownership of the registered European patents, trademarks and designs as well as the internal statistical information of those companies, i.e. number of employees and turnover.

The firm level data is extracted from the commercial database ORBIS containing industry classification and other information for more than 20 million European companies. As a next step the data of companies operating in copyright intensive industries is joined with the original OHIM-EPO database in order to identify different patterns and bundles of intellectual property rights (Community Trademarks, Registered Community Designs and European Patents).

With the purpose to explore which variables contribute to differences in the rate of usage of other than copyright formal IP rights we engage in econometric study. We build logistic regression and multinomial logistic regression models to investigate relative importance of various firm characteristics on the choice of the protection bundle for its products. Among the firm characteristics we are able to investigate are such factors as NACE code (proxy for the main copyright industry firm is active in), firm size, turnover and geographical location.

The objective of the statistical analysis is to reveal broad patterns in firms' use of different forms of IP rights and their joint exploitation. Subsequently, the multinomial logistic model enables us to analyse marginal effects on the probability of the choice of the IP bundle controlling for changes in the firm characteristics. In addition, it also enables us to compare the characteristics of the firms using different IP bundles with the basic scenario of relying only on the copyright protection.

The holistic view of intellectual property that we develop in this study allows offering novel insights about the theory and practical use of intangible assets protection mechanisms in different copyright industries and between companies across Europe.

3.1 Copyright intensive industries

Copyright gives right holders exclusive rights to control the use or economic exploitation of their works, e.g. reproduction, distribution, adaptation, translation, performance or public display. It is important to note that copyright is applicable only to the expression of ideas, not to the ideas themselves. No copyright registration is required (or possible) on EU level[vi]; the protection is granted automatically from the moment a work is created.

According to the findings of recently published study *"Intellectual Property Right Intensive Industries: contribution to economic performance and employment in the European Union"* copyright intensive industries accrue significantly to economic growth. These industries generate over 7 million jobs or 3.2% of total jobs in the EU. Copyright intensive sectors also account for 509 billion euros (4.2%) of total EU GDP. Copyright intensive industries have a positive trade balance, equal to 15.3 billion euros in 2010.

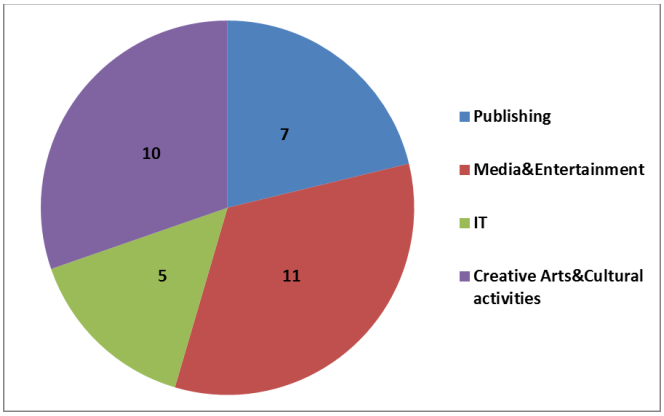
Acquiring copyright protection does not entail the registration. Therefore introducing a method for accurately counting them is not feasible. In our study we adapt the original methodology developed by WIPO *"Guide on Surveying the Economic Contribution of the Copyright-Based Industries"*. This methodology is based on the assumption that companies acting in copyright intensive industries rely on protection of this unregistered IP right. In total we distinguish 33 copyright intensive industries as classified in the Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE industry classification.

These industries are further grouped into four relevant broader clusters in order to ensure a sufficient level of information in order to ensure a sufficient level of information that would allow for a meaningful statistical analysis. The copyright intensive industries are clustered into the following groups:

- Publishing
- Media & Entertainment
- Information Technology (IT)
- Creative arts and Cultural activities

[vi] Voluntary registration is, however, possible in many Member States.

Figure 1. The groups of copyright intensive industries.



The figure 1 above illustrates the copyright intensive industry groups and the number of industries contained within them.

Table 2. Publishing group of copyright intensive industries:

NACE code	NACE industry description
5811	Book publishing
5812	Publishing of directories and mailing lists
5813	Publishing of newspapers
5814	Publishing of journals and periodicals
5819	Other publishing activities
5821	Publishing of computer games
5829	Other software publishing

Table 3. Media & Entertainment group of copyright intensive industries:

NACE code	NACE industry description
5911	Motion picture, video and television program production activities
5912	Motion picture, video and television program post-production activities
5913	Motion picture, video and television program distribution activities
5914	Motion picture projection activities
5920	Sound recording and music publishing activities
6010	Radio broadcasting
6020	Television programming and broadcasting activities
6312	Web portals
6391	News agency activities
6399	Other information service activities
7021	Public relations and communication activities

Table 4. IT group of copyright intensive industries:

NACE code	NACE industry description
6120	Wireless telecommunications activities
6201	Computer programming activities
6202	Computer consultancy activities
6203	Computer facilities management activities
6209	Other information technology and computer service activities

Table 5. Creative arts & Cultural activities' group of copyright intensive industries:

NACE code	NACE industry description
7311	Advertising agencies
7312	Media representation
7410	Specialized design activities
7420	Photographic activities
7430	Translation and interpretation activities
9001	Performing arts
9002	Support activities to performing arts
9003	Artistic creation
9101	Library and archives activities
9329	Other amusement and recreation activities

In total we observe 33 copyright-intensive industries that are considered to be core copyright industries. All these industries are involved in the creation and/or recording (in print, magnetically or digitally) of copyright-protected works, and are referred to be core copyright industries. Based on WIPO (2003) definition, the core copyright industries are the ones that are wholly engaged in creation, production, manufacturing, performance, broadcast, communication and exhibition, or distribution and sales of works and other protected subject matter.

We rely on even more restrictive approach adapted from USPTO study (2012) in defining the set of industries that are defined as core copyright intensive, considering only the industries primarily responsible for the creation and production of creative copyrighted materials. Industries that are not involved in the creation of the content but only in the distribution of copyrighted work are thus not included. There are few exceptions however, as, for instance; the newspaper industry is involved in both production and distribution of copyrighted content.

4. Intellectual Property Right bundles by companies

It is not unusual for firms to employ a variety of mechanisms to protect their inventions. Bringing new products to the markets can require strategic use of multiple intellectual property rights that are complementary to each other. The empirical evidence points to synergistic role of combined use of IP rights across firms.

Copyright industries represent the exceptional and interesting case of creative innovation. Copyright in many aspects is an exceptional IP right due to its long term (author life plus 70 years) of protection and its function of providing incentives to engage in creative activities.

It is well worth to analyse what complementary protection mechanisms of the intangible assets companies employ in different copyright industries and throughout different European countries based on robust data and econometric research.

Employment and combination of various intellectual property protection strategies are observed not only in large multinational companies but small and medium sized companies as well. The most common IP bundling strategy is to combine copyright with trademark. Every intellectual; property right plays its own significant role in companies marketing and finance portfolio:

- Patents protect industrial inventions, offering a solution to a specific technological problem.
- Trademarks serve as identification tools in the marketplace and allow consumers to distinguish between particular products or services.
- Design protects the visual appearance of objects.
- Copyright protection extends to any original expressive work fixed in a tangible medium of expression.

In this paper we are primarily interested in the joint use of registered IP rights within the copyright intensive industries.

First of all, it is important to highlight the need for an integrated analysis of intellectual property. There have been few attempts to estimate the use of IP right bundles (UK IPO – *"The use of intellectual property right bundles by firms in the UK"*, 2013; *"Towards an integrated theory of intellectual property"*, 2002). Nevertheless, these reports only take into account the bundles of patents and trademarks. The joint use of patents and trademarks could stand as good proxy for the intellectual property right bundles, as argued by the UK IP Office. However, the lack of the empirical research in both areas: economic studies of copyright and the joint use of IP rights calls for more clarity and data precision.

The contribution of this paper stands in holistic approach it employs as it captures three main forms of registered intellectual property rights – trademarks, patents and designs. We seek to explore the use of these bundles particularly in copyright intensive sectors.

Combining copyright, patent or design protection can create important synergies for a company. First, the existence of a patent or copyright can reduce the cost of establishing a strong brand, as the costs of advertising may be lowered by the exclusivity of former rights and the period of the monopoly granted in the marketplace. Xerox, for example, succeeded in establishing a strong branding for its photocopy machines and its trademarks has virtually become a synonymous and generic word for its product. Disney Company has registered trademarks for its characters originally protected by copyright in order to leverage its protection and establish their exclusivity in the market.

As noted by Parchamovsky and Siegelman (2002), the possibility to leverage patents through trademarks describes patentees' ability to charge supra-competitive prices even after the patent has lapsed and the invention is protected only by a trademark. These leverages might benefit consumers and innovators by providing greater incentives to innovate, and must be overlooked by policymakers.

Both economic and law scholars have ignored the research of the bundles and synergetic effects among the various types of IP protection.

Especially, the copyright industries provide an interesting base for this kind of observations. First of all, copyright being a subject of recent and relevant policy changing subject (e.g. the term extension from 50 to 70 years for performers and sound recording producers in the EU in 2011) raises the questions of the effects and impact of the copyright length and scope. Second, economic aspects of copyright are complex, reflecting various trade-offs between the interests of creators, distributors, performers and consumers as well as short-term versus long-term effects. The general object of copyright protection system is the trade-off between ensuring public interest and the access to the copyrighted works and providing sufficient degree of incentives for innovators to engage in the creative activities and be adequately compensated for their efforts.

The extensive research of whether and how companies employ complementary intellectual property assets to protect the creative content could contribute to providing some answers to these questions and add up significantly to the stock of empirical economic research in this field.

4.1 Statistical findings

In this section the joint use of European patents, trademarks and designs by firms active in copyright intensive industries is observed. The objective of the statistical analysis is to reveal broad patterns in companies' use of different forms of intellectual property rights and their joint exploitation.

We have composed the dataset consisting of all the companies active in copyright intensive industries in accordance with the original WIPO methodology. In total we examine 33 copyright intensive industries as classified in the NACE industry classification (Statistical Classification of Economic Activities in the European Community).

ORBIS commercial database contains industry classification and other information for European firms. We encounter almost half of a million companies operating in copyright intensive sectors (458.672 firms) in the 27 European Union Member States. Employment information was available for 341.700 companies and turnover information for 384.282 companies. Cases where several records appeared for the same company were eliminated and we have taken into consideration only those companies for which either employment or turnover data was available.

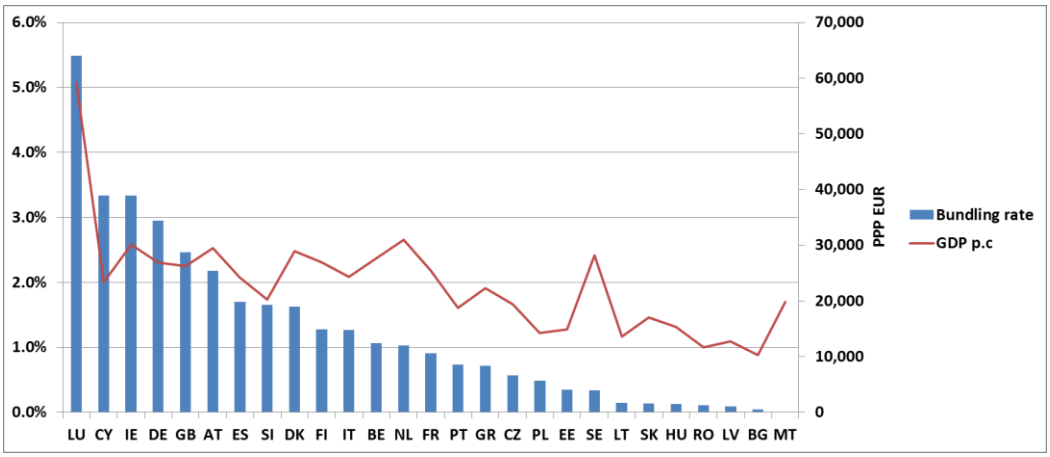
The year of the data included in the study is 2009, for both employment and turnover. Trademarks, patents and designs observed were those applied for during the period 2004-2008, and accordingly registered, granted or published by 2013. We included registered IP rights in 27 European Union Member States.

It is interesting to observe that the rate of bundling copyright protection with the Community trademarks, Registered Community designs or European patents is rather low and amounts to almost 1% (4.589 companies out of 458.672). The reason for such a small share of companies complementing the copyright protection with one of the formal intellectual property rights is partly influenced by the data used. In this study we were able to include only European registered IP rights. Therefore, patents, trademarks and designs registered in the national European IP offices remained uncaptured. On the other hand, these results could reveal some interesting insights into the level of international protection of the brands, inventions and product appearances in the European companies acting in copyright industries.

We could draw a conclusion that companies operating in copyright intensive industries do not have strong incentives to use complementary registered IP rights, as relying on copyright alone provides sufficient protection. Conversely, we could assume that companies not having trademarks, patents or designs to supplement protection of their intangible assets do not exploit their full potential in domestic and international markets. Less surprising is the case of patents and designs. Nevertheless, the pattern of not having community trademark (CTM) protection is indicative of the domestic focus of the companies acting in copyright industries in Europe. From

this we could induce broader assumptions and conclusions regarding the current legal system of copyright protection, licencing issues, activities of Copyright Collecting Societies (CCS), and cultural differences, including the language, of markets for creative works in Europe.

Figure 2. *Share of companies using IP right bundles and GDP per capita in European countries.*



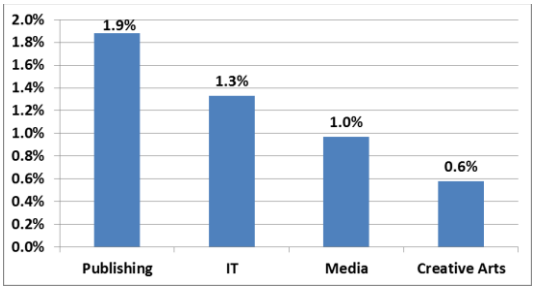
First, we observe (see figure 2 above) that there are significant differences between the European Member States regarding the rate of complementing the copyright protection with registered IP rights. For old Member States the average bundling rate is nearly 2%. Whereas in the new Member States that joined the European Union after 2004, only 0.6% of the firms tend to bundle copyright with at least one of the formal IP protection rights.

Table 6. *IP rights bundling rate in the European Union*

European Union MS	IP rights bundling rate
Prior 2004	1.8%
After 2004	0.6%
EU average	1.0%

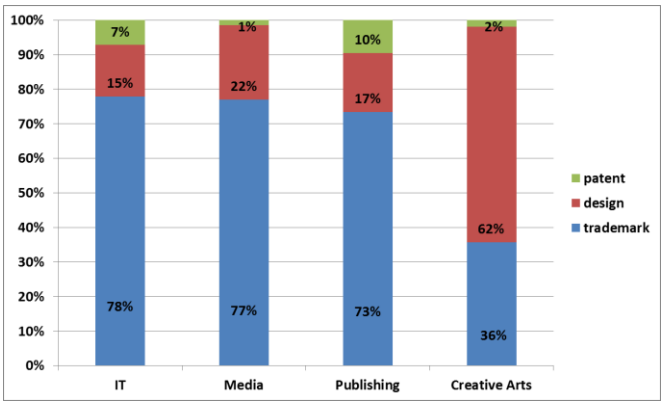
The largest share of bundling companies is observed in Luxembourg, Cyprus, Germany, UK and Austria. Higher income economies tend to have higher propensity to bundle intellectual property rights. GDP per capita and share of bundling companies are correlated, with coefficient of determination being 0.67. We provide it for the readers' interest and cannot however draw significant conclusions from this correlation rate. Many aspects other than countries' income can come into play when influencing the joint use of the intellectual property rights, such as the size of the companies, the industries in which these companies are active in, the international angle of their business, as well as the knowledge of or willingness to rely on the European IP registry system.

Figure 3. *Share of companies using IPR bundles in copyright intensive industries.*



As it is displayed in the figure above, European companies that operates in different sectors exhibit quite different rates of bundling copyright protection with at least one of the formal IP rights. Bundling rate of nearly 2% is the highest is Publishing industries, such as book, newspaper or software publishing. On average, 1% of the companies in IT industries tend to own a registered trademark, patent or design. The lower bundling rates are observed in the industry groups of Media & Entertainment and Creative arts & Cultural activities.

Figure 4. *Distribution of IP rights portfolio by the industry group.*



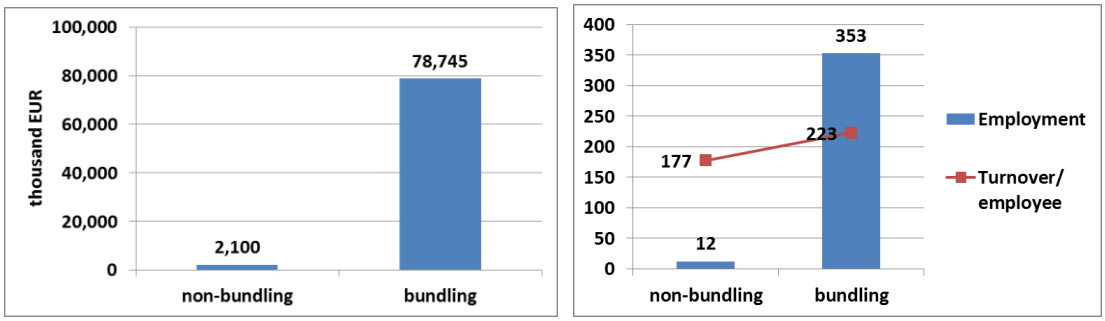
The above figure shows the distribution of the number of registered IP rights in the portfolios of the companies acting in different copyright industry groups.

It is observed that majority (over 70%) of the complementing IP rights in IT, Media & Entertainment and Publishing industries are registered trademarks. Conversely, companies in Creative Arts & Cultural Activities rely mostly on the protection of registered designs, as they comprise 62% of their registered IP rights portfolio. This finding is partly in line with theoretical speculation by Parchamovsky and Siegelman (2002) that *"trademark protection is virtually irrelevant to most types of copyrighted works, such as paintings, sculptures, and even movies"*.

Patents are mostly used by the companies in IT and Publishing industries. In the case of the latter, most of the patents are encountered in the field of software publishing. Companies operating in the field of Information Technologies, register most of the patents in computer programming activities as well as IT and computer service activities.

Bundling versus non-Bundling

Figure 5. *Turnover and employment in bundling and non-bundling companies*

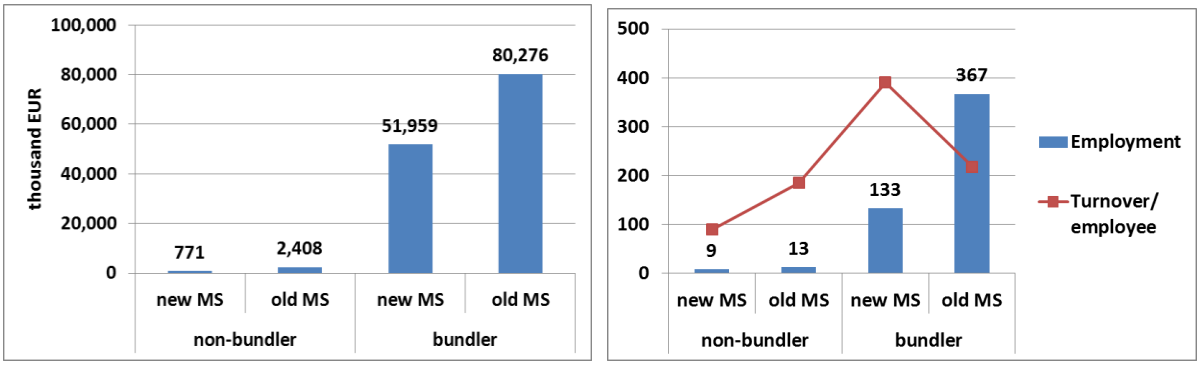


As indicated in Figure 5, the significant differences between bundling and non-bundling companies are noticeable in terms of turnover and employment.

Companies that rely on at least one additional registered IP right – i.e. registered community trademark, community registered design or European patent – generate 37 times higher turnover than those companies that rely solely on copyright protection. Observed average turnover in bundling companies is 79 million euros, while only 2 million in non-bundling firms. Same trend is apparent while comparing number of employees in IP rights' bundling and non-bundling companies. Those firms that rely on additional registered IP right protection on average hire 353 employees, while others, non-bundling firms hire 12 workers.

In the figure 5, the difference of turnover per employee ratio can also be observed. However, the difference in terms of productivity is found to be much smaller than in absolute terms of employment or turnover in bundling versus non-bundling companies. Bundling companies generate 223 thousand euros of turnover per employee in comparison to 177 thousand in non-bundling companies.

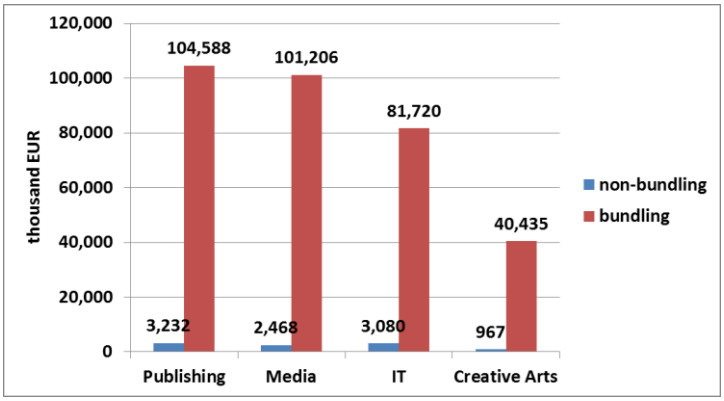
Figure 6. *Turnover and employment in bundling and non-bundling companies by company size and location*



Whilst analysing bundling and non-bundling firms in different European Union countries, differences is encountered in terms of turnover. Bundling firms in new (accepted after 2004) and old (prior to 2004) Member States generate 52 and 80 million euros turnover accordingly. Meanwhile, non-bundling firms earn only 0.7 and 2.4 million euros turnover. It is worth to emphasize that bundling firms in new European Member States generate 67 as high turnover as non-bundling firms. This difference of 33 is much less essential in old Member States.

The average bundling firm in new Member States employs 15 times more workers than its non-bundling counterpart. Average bundling company in old Member State hires 28 times more employees as non-bundling firms. It is well worth to note that bundling companies in new Member States are far more productive generating nearly twice as turnover (390 thousand) per employee in comparison to old Member States (200 thousand euros per employee).

Figure 7. *Turnover in bundling and non-bundling companies in different copyright industries*



Companies that operate in the copyright intensive sectors and rely on complementary intellectual property rights generate larger turnover than those that do not bundle. The largest turnover is generated by the companies in Publishing and Media & Entertainment sectors where average turnover slightly exceeds 100 million euros. Companies operating in the same copyright industries but not having registered formal IP rights are observed to generate 3.2 and 2.5 million euro turnover.

Companies representing the Information Technology industry group and operating in activities such as computer programming and computer consultancy tend to use complementing formal IP rights, generate turnover of around 82 million euros. Bundling firms in Creative arts (such as performing arts, specialized design or artistic creation) and Cultural activities group generate average turnover of 40.4 million euros.

Nevertheless, it is important to emphasize that companies that have registered trademarks, designs and patents also tend to be larger companies, operating on the international level, therefore no causal relationship between IPR usage and firm performance could be established based on data at our disposal.

Table 7. *Mean turnover and employment in large companies and SMEs in bundling and non-bundling categories*

Bundling type	Company size	Number of companies	Mean turnover (thousand EUR)	Mean employment	Turnover/ employee
bundler	SME	4,016	4,761	25	187
non-bundler		451,323	601	4	140
Total		**455,339**	**5,362**	**30**	**180**
bundler	LARGE	573	523,066	1,989	263
non-bundler		2,760	191,086	746	256
Total		**3,333**	**714,152**	**2,735**	**261**

Since the bundling rate of copyright protection with the Community trademarks, Registered Community designs or European patents is very low and amounts to 1% (4.589 companies out of 458.672), it is important to observe the distribution bundling versus non-bundling firms in more detail.

First of all, it might be possible to assume that huge differences in average turnover and number of employees in bundling and non-bundling companies is a direct consequence of that only large companies tend to bundle and thus account for much larger revenue and employment. Nevertheless, small and medium sized companies account for 87% of the whole bundling companies' sample (4589 firms). The share of SMEs in non-bundling sample is larger as they account for 99% of all non-bundling companies.

Comparing the turnover in the same class companies, we can observe that bundling large companies generate 520 million euros turnover, nearly three times as the same size category non-bundling companies' produce. Small and medium sized companies that rely on more than one IP right on average generate almost 5 million euros turnover. This is nearly 8 times higher than turnover generated by SMEs that rely solely on copyright and do not supplement it by European level registered IP right. Large bundling companies on average employ 2000 workers in comparison to 750 employees in non-bundling large firms. Small and medium size bundling firms tend to hire 25 workers in comparison to only 4 employees in non-bundling SMEs.

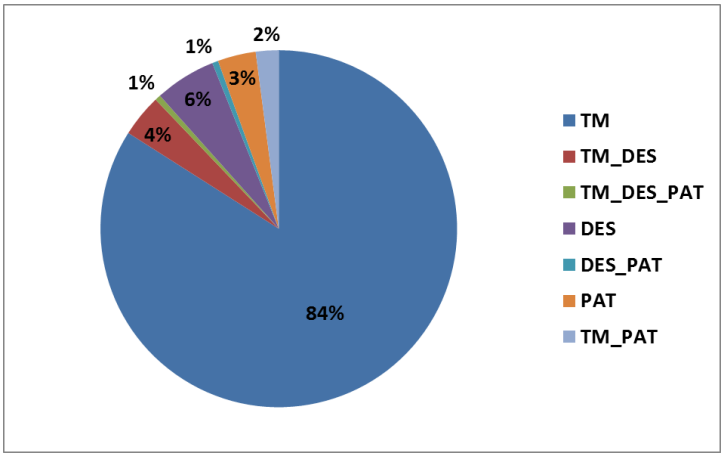
The productivity measured as turnover/employment ratio is higher in bundling companies both large and small and medium size. Nevertheless, we do not observe significant differences in productivity among bundling and non-bundling companies.

Bundling categories

The companies using bundles of IP rights are clustered into following categories:

1. Copyright and patents
2. Copyrights and trademarks
3. Copyright and designs
4. Copyright, patents and trademarks
5. Copyright, patent and design
6. Copyright, trademark and design
7. Copyright, patent, trademark and design

Figure 8. *Share of companies in different bundling categories*



As it is possible to observe in the figure 8 above, most of the companies fall into the bundling category 'TM'. It means that 84% companies that are active in copyright intensive industries and tend to complement the copyright protection with registered IP rights, choose to register European Community Trademark. These results are hardly surprising, as trademarks constitute an important channel of communication between firms and consumers. Brand protection allows consumers to associate goods and services to the provider and allows for the companies to build brand loyalty and transmit the message promoting the virtues of their product or service.

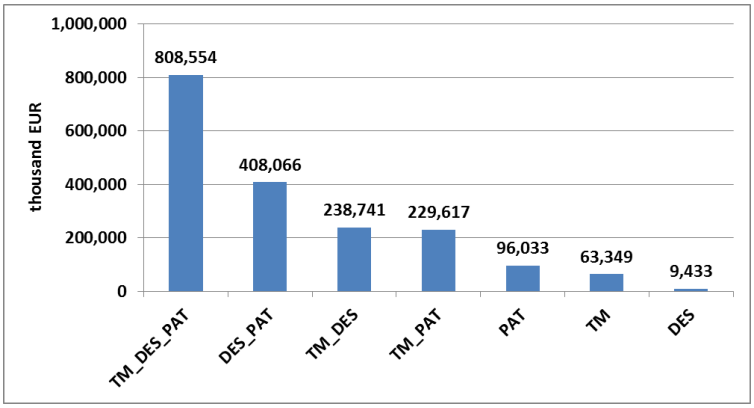
The remaining 16% of the companies tend to supplement copyright protection using different mechanisms. 6% of all companies that tend to rely on copyright protection jointly with formal IP rights, fall into category 'DES' – owning Registered Community Designs. Accordingly, 4% of the bundling companies rely on joint trademark & design protection.

Copyright is complemented by patent protection by 3% of the companies, representing mainly the industries of software publishing and computer programming and consultancy activities. Smaller share – 2% of the bundling firms – tend to jointly rely on both trademark and patent legal protection in addition to copyright.

The smallest share of the companies – only 1% fall into bundling category of joint use of registered designs together with patents. It is a rather rare case when company has an interest and innovative capacity to register both design and patent. Few examples are found in computer consultancy and advertising agencies activities.

Also, only 1% of the bundling companies have registered all three formal IP rights – patent, trademark and design. Most of such companies represent IT and computer service activities and computer programming activities.

Figure 9. *Average turnover generated by companies in different bundling categories*



Additionally, it is interesting to observe whether the companies that represent the bundle of more registered intellectual property rights tend to generate larger turnover. Figure 9 above illustrates that companies owning all three registered IP rights, trademark, design and patent, generate the largest - nearly 809 million euros turnover. In comparison, companies that complement copyright protection with trademark solely, generate 63 million, or patent solely – 96 million turnover.

5. Econometric Model

In all specifications we model utility of each alternative on the basis of firm's individual variables and do not use attributes of the choices such as costs of each alternative bundle. This is the most important limitation of our models as it is very plausible that not only firm's attributes but also attributes of each choice have impact on the probability of selection of the specific form of additional intellectual property rights protection.

General model specification is then

$$Y^* = \beta_0 + \beta x' + \varepsilon, \qquad y = 1[y^* > 1]$$

Where Y* is a latent variable describing the utility of each alternative, $\beta x'$ is the vector of firm specific variables and ε is usual error term (Wooldridge 2012).

With first set of models we want to check whether firms active in copyright intensive industries rely less on other formal intellectual property rights protection than companies from other industries. Before constructing our dataset we eliminated all observations where either number of employees or turnover for 2009 was not available. Then we drew random sample of 1 million firms representing non-copyright industries and added to that all the observations representing copyright intensive industries with non-missing employment or turnover data. Thus our final dataset consists of 1 458 672 representing 27 Member States of European Union except Croatia. Our sample is unbalanced with overrepresentation of copyright intensive industries. It does not introduce any bias to our models but allows for more precise computation of respective coefficients for copyright intensive industries.

Table 8*. Logistic regression. Dependent variable: IP bundler.*

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.59925	0.01693	-212.635	< 2e-16	***
copyright_intensive	**-0.59074**	**0.01700**	**-34.758**	**< 2e-16**	*******
CountryAT	0.33244	0.04496	7.394	1.42e-13	***
CountryBE	-0.49533	0.04895	-10.120	< 2e-16	***
CountryBG	-3.10684	0.12336	-25.185	< 2e-16	***
CountryCY	-0.54969	0.71254	-0.771	0.44044	
CountryCZ	-1.28011	0.06407	-19.979	< 2e-16	***
CountryDE	0.60822	0.02402	25.318	< 2e-16	***
CountryDK	0.04460	0.05101	0.874	0.38197	
CountryEE	-1.27403	0.10825	-11.769	< 2e-16	***
CountryES	0.05973	0.02436	2.451	0.01423	*
CountryFI	-0.32326	0.04933	-6.553	5.63e-11	***
CountryFR	-0.63308	0.02645	-23.932	< 2e-16	***
CountryGB	0.55964	0.02769	20.209	< 2e-16	***
CountryGR	-0.89950	0.14755	-6.096	1.09e-09	***

CountryHU	-2.23073	0.09328	-23.913	< 2e-16 ***
CountryIE	0.26978	0.08970	3.007	0.00263 **
CountryLT	-2.00628	0.13990	-14.341	< 2e-16 ***
CountryLU	1.20873	0.14804	8.165	3.21e-16 ***
CountryLV	-2.26255	0.16771	-13.491	< 2e-16 ***
CountryMT	-0.85973	0.22010	-3.906	9.38e-05 ***
CountryNL	-0.42730	0.03562	-11.994	< 2e-16 ***
CountryPL	-1.73928	0.04689	-37.092	< 2e-16 ***
CountryPT	-0.87429	0.04681	-18.676	< 2e-16 ***
CountryRO	-2.59969	0.08086	-32.151	< 2e-16 ***
CountrySE	-1.14270	0.03279	-34.847	< 2e-16 ***
CountrySI	-0.37986	0.15842	-2.398	0.01649 *
CountrySK	-2.38528	0.23656	-10.083	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The reference case is an Italian firm representing industries other than copyright intensive. Controlling for seat country, firms active in copyright intensive industries have lower probability to use European intellectual property rights (patent, trademark or design) than firms active in other industries.

To check whether the propensity of use of IP is homogenous among the firms active in copyright intensive industries, in the second specification we compare the differences in probability of using IP rights by the firms active in each copyright industry with those firms active in other non-copyright intensive industries.

In the second specification we compare the differences in the probability of using IP rights by firms active in each copyright industry with those firms active in other non-copyright intensive industries.

There is only one copyright intensive NACE division - 61 with bigger and statistically significant probability of using formal European IPR than non-copyright industries. For divisions 58 and 60 respective coefficients are positive but statistically non-significant, thus we cannot reject the hypothesis of no difference in probability of IPR usage in comparison to non-copyright industries. For firms active in all the others copyright intensive industries the probability of using IPR is lower than for non-copyright intensive industries.

Table 9*. Logistic regression. Dependent variable: IP bundler.*

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-3.59595	0.01694	-212.296	< 2e-16 ***
CountryAT	0.31939	0.04499	7.099	1.26e-12 ***
CountryBE	-0.50450	0.04899	-10.298	< 2e-16 ***
CountryBG	-3.10701	0.12337	-25.185	< 2e-16 ***
CountryCY	-0.58248	0.71256	-0.817	0.41367

CountryCZ	-1.26059	0.06418	-19.641	< 2e-16	***
CountryDE	0.58839	0.02409	24.421	< 2e-16	***
CountryDK	0.02745	0.05104	0.538	0.59066	
CountryEE	-1.26050	0.10829	-11.640	< 2e-16	***
CountryES	0.06129	0.02439	2.513	0.01197	*
CountryFI	-0.33545	0.04936	-6.796	1.08e-11	***
CountryFR	-0.63962	0.02649	-24.143	< 2e-16	***
CountryGB	0.55303	0.02781	19.886	< 2e-16	***
CountryGR	-0.94545	0.14756	-6.407	1.48e-10	***
CountryHU	-2.24617	0.09330	-24.076	< 2e-16	***
CountryIE	0.25853	0.08973	2.881	0.00396	**
CountryLT	-2.01197	0.13991	-14.380	< 2e-16	***
CountryLU	1.22222	0.14823	8.245	< 2e-16	***
CountryLV	-2.27053	0.16772	-13.537	< 2e-16	***
CountryMT	-0.86570	0.22010	-3.933	8.38e-05	***
CountryNL	-0.43151	0.03566	-12.102	< 2e-16	***
CountryPL	-1.75763	0.04692	-37.459	< 2e-16	***
CountryPT	-0.87583	0.04683	-18.704	< 2e-16	***
CountryRO	-2.60951	0.08087	-32.270	< 2e-16	***
CountrySE	-1.08853	0.03293	-33.051	< 2e-16	***
CountrySI	-0.39280	0.15843	-2.479	0.01316	*
CountrySK	-2.39737	0.23657	-10.134	< 2e-16	***
NACE_division58	**0.04461**	**0.03714**	**1.201**	**0.22969**	
NACE_division59	**-0.77904**	**0.05681**	**-13.712**	**< 2e-16**	***
NACE_division60	**0.06132**	**0.09474**	**0.647**	**0.51749**	
NACE_division61	**0.32318**	**0.12207**	**2.647**	**0.00811**	**
NACE_division62	**-0.46303**	**0.02436**	**-19.011**	**< 2e-16**	***
NACE_division63	**-0.31930**	**0.09903**	**-3.224**	**0.00126**	**
NACE_division70	**-1.05146**	**0.09119**	**-11.530**	**< 2e-16**	***
NACE_division73	**-0.78545**	**0.04283**	**-18.340**	**< 2e-16**	***
NACE_division74	**-0.84849**	**0.05866**	**-14.465**	**< 2e-16**	***
NACE_division90	**-1.53265**	**0.08707**	**-17.602**	**< 2e-16**	***
NACE_division91	**-1.88928**	**0.57888**	**-3.264**	**0.00110**	**
NACE_division93	**-1.62605**	**0.10551**	**-15.411**	**< 2e-16**	***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Next we want to explore which variables contribute to differences in the rate of usage of other formal intellectual property rights among copyright intensive industries. In order to check what variables contribute to the probability of using formal IPR we built another logistic regression model. We model a choice among two alternatives: not using European IP rights to complement copyright protection or bundle copyrights with other formal IP rights. For this model we analyse only firms representing copyright intensive industries.

Table 10. *Logistic regression. Dependent variable: IP bundler.*

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-2.82503	0.08630	-32.737	< 2e-16	***
old_MS	1.38050	0.07102	19.438	< 2e-16	***
NACE_division58	0.33355	0.04644	7.182	6.85e-13	***
NACE_division59	-0.43061	0.06450	-6.676	2.45e-11	***
NACE_division60	0.33514	0.10443	3.209	0.001331	**
NACE_division61	0.46573	0.13851	3.362	0.000773	***
NACE_division63	0.12003	0.11375	1.055	0.291318	
NACE_division70	-0.53446	0.10379	-5.149	2.62e-07	***
NACE_division73	-0.42498	0.05209	-8.158	3.41e-16	***
NACE_division74	-0.65321	0.06682	-9.775	< 2e-16	***
NACE_division90	-1.45374	0.09722	-14.954	< 2e-16	***
NACE_division91	-1.13996	0.58188	-1.959	0.050102	.
NACE_division93	-1.13863	0.11370	-10.014	< 2e-16	***
SME	-2.78288	0.05120	-54.351	< 2e-16	***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

The reference values for dummy variable are respectively new Member State, big company and a firm active in NACE division 62.

Model shows that size of the company has a positive and significantly significant impact on the probability of using other formal IP rights by firms active in the copyright intensive industries. Likewise location in one of the old Member States (meaning the countries being members of EU before May 2004) has positive and significant impact of that probability.

Model allows for comparison of differences in probabilities of combining copyright protection with other forms of IPR based on industry in which firm operates. Firms active in division, 58,60 and 61 have bigger probability of bundling copyright with European IPRs than firms representing NACE division 62 when controlling for location (in old or new MS) and size. On the other hand firms active in NACE divisions 59, 70, 73, 90 and 93 have statistically significant lower probabilities of using other formal rights of intellectual property protection than companies active in NACE 62. Although coefficients for divisions 63 and 91 differ from 62 they are not significant and we cannot reject hypothesis that they have same impact of probability of using bundles than NACE division 62.

As the model for logistic regression is non-linear interpretation of the marginal effects is not straightforward. The best approach to estimate partial effect is to use regression equation to directly estimate a change in the probability depending on change in the dependent variable of interest. Few examples of such comparison are represented in the following table.

***Table 11**. Probabilities of joint use of IP rights by industry and by company size.*

NACE code	NACE industry name	New MS		Old MS	
		Large	SME	Large	SME
58	Publishing activities	**8%**	1%	**25%**	2%
59	Motion picture, video and television program production, sound recording and music publishing activities	4%	0%	13%	1%
60	Programming and broadcasting activities	**8%**	1%	**25%**	2%
61	Telecommunications	**9%**	1%	**27%**	2%
62	Computer programming, consultancy and related activities	6%	0%	**19%**	1%
63	Information service activities	6%	0%	**21%**	2%
70	Public relations and communications	3%	0%	12%	1%
73	Advertising and market research	4%	0%	13%	1%
74	Design, photography and translation	3%	0%	11%	1%
90	Creative, arts and entertainment activities	1%	0%	5%	0%
91	Libraries, archives, museums and other cultural activities	2%	0%	7%	0%
93	Sports activities and amusement and recreation activities	2%	0%	7%	0%

As outlined in the above table 12, the probability for a firm to use complementary IP protection rights varies depending on the industry it operates in, firms' size and on its' the geographical location.

Company size seems to be an important factor influencing the probability for a company to employ complementary IP rights. Most industries exhibit only 1-2% bundling probability in case if a company is an SME operating in one of the old EU Member States. These probabilities drop to 0% in most industries for the SMES operating in new EU Member States. The highest probability to bundle is encountered in the publishing activities, programming and broadcasting, telecommunications and information services. The probability to bundle exceeds 20% in these copyright industries for the large companies operating in old European Union Member States. In case the company operate in one of the new EU Member States, the average probability to bundle is 8% in these industries. Industries such as design, photography and translation, libraries, sports activities exhibit lowest bundling probabilities. Large companies active in those industries and operating in old Member States have 5-7% probability to use trademark, patent or design jointly with copyright protection, and only 1-2% probability in case they operate in new EU Member States.

In the last stage we model the differences of probability of using each specific alternative of bundling copyright protection with other IPR. For this model we use multinomial logistic regression. This type of models is useful for explaining the choice among several mutually exclusive alternatives.

Since we have only few observations for many NACE codes and various IP bundling categories we decided to group NACE codes into four groups: Publishing, Media & Entertainment, IT and Creative Arts & Cultural activities. Additional advantage of this grouping is that it facilitates the analysis of the main activity impact on the IP bundling choice.

Also we decided to reduce the scope of the seven bundling categories into three overriding groups with the following definitions:

- TM only – is the use of only Community trademarks in addition to copyright protection;
- DES – is the use of Community design either with or without Community trademarks but not combining it with patent protection;
- PAT – is the usage of European patent protection in whatever combination with Community trademark or Community design.

***Table 12**. Multinomial logit model for the IP bundling choice*

	(1)	**(2)**
DES:(intercept)	-3.001***	-2.893***
	(0.110)	(0.213)
PAT:(intercept)	-2.179***	-2.422***
	(0.075)	(0.220)
DES:Creative	1.778***	1.718***
	(0.132)	(0.145)
PAT:Creative	-0.745***	-0.739***
	(0.172)	(0.181)
DES:Media	0.543***	0.601***
	(0.183)	(0.195)
PAT:Media	-1.321***	-1.435***
	(0.251)	(0.274)
DES:Publishing	0.416**	0.415**
	(0.181)	(0.196)
PAT:Publishing	-0.596***	-0.621***
	(0.174)	(0.181)
DES:Turnover_log		-0.016
		(0.023)
PAT:Turnover_log		0.037
		(0.025)
Observations	4,589	3,985
R2	0.058	0.055
Note:	*p<0.1; **p<0.05; ***p<0.01	

We have specified two models which differ only by inclusion of turnover. Community trademark usage is our reference for two other choices (DES and PAT). Companies representing IT group are our reference for comparison of industry groups' dummies.

Results of both models are pretty robust and indicate that firms representing IT group are more likely than firms representing all other industry groupings to use patents as the mode of the IP protection (both in combination with other IP rights as well as standalone protection mode). On the other hand those companies have lower probability of using designs (in combination with Community trademarks or as the only protection mode) than firms representing other industry groups. Coefficient for design category and press industry grouping is statistically significant on the 5% level.

Estimated coefficients are stable even if we control for firms turnover in the second specification.

Similarly to the binary outcome logistic model, interpretation of log odds coefficients is not straightforward. To illustrate the model outcome we calculate fitted values for four cases of firms with average turnover representing all copyright industry groups. Based on the model predicted probabilities of using different bundling strategies for those firms are as follows:

Table 13*.Probabilities of the joint use of IP rights by industry group.*

Industry group	predicted probabilities			marginal effects as compared to IT (change in percentage points)		
	TM only	DES	PAT	TM only	DES	PAT
Creative	75.30%	20.41%	4.29%	-10.32	16.25	-5.93
Media	89.51%	7.95%	2.54%	3.9	3.78	-7.68
Publishing	87.89%	6.48%	5.64%	2.27	2.32	-4.59
IT	85.61%	4.16%	10.22%	0	0	0

One important limitation of the multinomial logit model is the independence of irrelevant alternatives (IIA) assumption which means that adding another alternative does not affect the odds among the remaining outcomes. The nature of our dataset with firms having broad scope of choice of IP protection which is relatively stable over time, leads us to believe that this assumption is complied with in our data.

6. Conclusions and directions for further research

The objective of this paper is to look at the bundle of IP rights employed by the companies operating in copyright intensive industries and to assess the interrelated effects of the main types of intellectual property rights involved. That is copyright, trademark, patent and design. In our research we rely on OHIM, EPO and ORBIS databases and observe firms' ownership of the registered European IP rights as well as statistical information of those companies, such as number of employees and turnover.

Analysis of the data indicates that companies operating in copyright intensive industries do not have strong incentives to use complementary registered IP rights, as relying on copyright alone provides sufficient protection. The pattern of not having community trademark (CTM) protection is indicative of the domestic focus of the companies acting in copyright industries in Europe. While less surprising is the case of patents and designs. From this we could induce broader assumptions and conclusions regarding the current legal system of copyright protection, licencing issues, activities of Copyright Collecting Societies (CCS), and cultural differences, including the language, of markets for creative works in Europe.

We also observe a certain geographical pattern in the way firms complement copyright protection with other registered IP rights, with the old EU Member states[vii] bundling on average more than new EU Member states[viii]. And although higher income economies tend to have higher propensity to bundle intellectual property rights we cannot draw significant conclusions from this correlation rate. Many aspects other than countries' income can come into play when influencing the joint use of the intellectual property rights, such as the size of the companies, the industries in which these companies are active in, the international angle of their business, as well as the knowledge of or willingness to rely on the European IP registry system.

The rate of bundling and how often IPRs are combined also differs between industries. The highest bundling is observed in Publishing industries, such as book, newspaper or software publishing. The lower bundling rates are observed in the industry groups of Media & Entertainment and Creative arts & Cultural activities.

Patents are mostly used by the companies in IT and Publishing industries, where companies register most of their patents in the field of software publishing, computer programming activities as well as IT and computer service activities. This comes as a surprise knowing that software patenting is not allowed in the EPO. However these results reflect the technical nature of the claims and the internal EPO processes in the way inventive step and non-obviousness is applied. It also indicates the growing importance of patents in these industries.

[vii] Members before 2004
[viii] Members since 2004

The econometric model reveals interesting and significant insights of the bundling propensities by firm active in copyright industries:

- Size of the company has a positive and significant impact on the probability of using other formal IPR by firms active in the copyright intensive industries.
- Likewise location in one of the old Member States (meaning the countries being members of EU before May 2004) has positive and significant impact of that probability.
- Firms active in division, 58 (Publishing), 60 (Programming and broadcasting) and 61 (Telecommunications) have bigger probability of bundling copyright with European IPRs than firms representing other copyright industries, when controlling for location (in old or new MS) and size.
- Company size is very important factor influencing the probability to employ complementary IP rights.
- Most industries exhibit only 1-2% bundling probability in case if a company is an SME in old EU Member States. These probabilities drop to 0% in most industries for the SMES operating in new EU Member States.
- The highest probability to bundle (exceeding 20%) is encountered in the publishing activities, programming and broadcasting, telecommunications and information services for the large companies operating in old European Union Member States.
- Industries such as design, photography and translation, libraries, sports activities exhibit lowest bundling probabilities. Large companies active in those industries and operating in old Member States have 5-7% probability to use trademark, patent or design jointly with copyright protection, and only 1-2% probability in case they operate in new EU Member States.

Directions for future research

The research done allows us to gain novel insights into the behavior of companies and their propensity to jointly use different forms intellectual property rights in copyright industries. We would like to outline possible directions for the future research and improvements to the data used and econometric model applied.

First, the models could be built comparing propensity of using specific intellectual property rights among copyright industries and other companies instead of current model based on comparison of propensity of using any IP right. In addition, current models could be expanded by adding variables characterizing alternative choices (such as costs of protection for each bundle).

As an important step of improvement we view the possibility to complement our sample including national registered IP rights. This would allow us to observe bundling rates and differences among industries and countries capturing national registered trademarks, designs and patents.

References

1. UK IPO (2013), "The use of intellectual property right bundles by firms in the UK", Report 2, UK Intellectual Property Office, 2013/28, London, UK

2. Parchomovsky, G. and P. Siegelman (2002), "Towards an Integrated Theory of Intellectual Property", University of Connecticut School of Law Articles and Working Papers No. 35, Univeristy of Connecticut, Hartford.

3. Graham, S. and D. Somaya, (2006), "Vermeers and Rembrandts in the same attic: Complementarity between copyrights and trade mark leveraging strategies in software", Georgia Institute of Technology TIGER Working Paper, Georgia Tech, Atlanta.

4. Llerena, P. and Millot, V. (2013): "Are Trademarks and Patents Complementary or Substitute Protections for Innovation" (2013). Working paper, Bureau d'economie theoretique et appliquee (BETA).

5. OHIM and EPO (2013), "Intellectual property rights intensive industries: contribution to economic performance and employment in the European Union". Industry-Level Analysis Report, September 2013.

6. WIPO (2003), "Guide on Surveying the Economic Contribution of the Copyright-Based Industries".

7. Cohen W.M, Nelson R.R., Walsh J.P (2000), "Protecting their intellectual assets: appropriability conditions and why U.S. manufacturing firms patent (or not). NBER, 2000.

8. Ramello G.B and Silva F. (2006), "Appropriating signs and meaning: the elusive economics of trademark".

9. Harabi N. (1995), "Appropriability of technical innovations an empirical analysis". Research policy, Volume 24, Issue 6, November 1995, pages 981-992.

10. Teece D.J. "Reflections on *Profiting from Innovation*". Science Direct, 2006.