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From a Distinctive Sign to an Exchangeable Asset:
Exploring the U.S. Market for Trademark Licensing

Abstract:	A remarkable growth in the value of trademark licensing has been recently recorded. Our paper contributes to the understanding of this under-explored phenomenon using a dataset newly released by the USPTO. Our study analyses the evolution of licensing activities in the U.S. during the 2003-2017 period, the characteristics of these trademarks and agreements, and certain features of the licensing parties involved. We found that licensing activities varied considerably during these years. They were usually signed between two parties only, and, on average, they involved more than one trademark. Excluding under-reporting effect, the analyses reveal that a large portion of heterogeneity in licensing activity is due to the NICE international classes associated with each trademark. Indeed, trademark licensing agreements appear to be unevenly distributed across these classes, suggesting that this activity and the way it is carried out is correlated with the market to which the licensed trademark refers.

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1.   Introduction

An estimated 9.11 million trademark applications were filed worldwide in 2017 (WIPO 2018), with trademarks as Intellectual Property (IP) right being the most widely used by firms worldwide. Indeed, unlike patents, trademark use is not simply limited to innovative companies facing competitive pressures to build and consolidate their technological leadership (Graham, Marco and Meyers 2018; WIPO 2013). Almost all types of organizations of any size, across all economic sectors, including institutions and governmental and non-governmental bodies, use trademarks to develop, support, promote, and consolidate the recognition and reputational value of their brands[1] in the product and service markets (Castaldi, 2018a; Castaldi 2019b; Graham, Marco and Meyers 2018; Frey, Ansar and Wunsch-Vincent 2015; WIPO 2013).

The widespread and increased use of trademarks worldwide has fostered a progressive process of disembodiment – also called 'unbundling' (Ramello 2006) – of the value of the sign (the trademark itself) from that of the product/service involved. Regardless of who manufactures/offers the product/service, what makes the difference is having and exploiting the associated trademarks. Consequently, we are witnessing an increasing number of trademarks being licensed, bought and sold between different entities, both at the national and international level (Frey, Ansar and Wunsch-Vincent 2015), which shows that this sign

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[1]'Trademark' and 'brand' refer to two different concepts. Even though these terms are sometimes used interchangeably as 'rough synonyms' (Landes and Posner 1987), it is important to make a distinction: 'while a brand is a corporate image that builds over time and is a reputation of quality in the eyes of customers, a trademark is legal protection of the brand, granted by the Trademark and Patent Office' (https://www.upcounsel.com/trademark-vs-brand, accessed on November 2018). In other words, trademarks attribute a legal status to an intangible asset of the company – the brand – and create a series of legally operable property rights (WIPO 2013). For the purposes of this paper, we hereinafter refer only to trademarks.

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has become more and more an asset that can be autonomously traded (Beebe 2004; Ramello 2006; Ramello and Silva 2006). The massive volume of trademark transactions resulted in the unveiling of so-called 'markets for trademarks' (Castaldi 2019b; Graham, Marco and Meyers 2018; Frey, Ansar and Wunsch-Vincent 2015; WIPO 2013).

Albeit only recently, several authors (e.g. Millot 2009; Colucci, Montaguti and Lago 2008; De Vries *et al.* 2017; Castaldi 2016; Block *et al.* 2014; Flikkema, De Man and Castaldi 2014) have contributed towards enriching the discussion of the role of the trademark as a 'sophisticated business tool' rather than as a 'humble identifier of origin" (WIPO 2013, 4) or as a legal right characterized by high symbolic power (Brown 1948; Landes and Posner 1987; Carter 1990; Beebe 2004; Katz 2010). However, the market for trademarks remains a relatively unexplored territory compared to markets for technology/patents, which have received a great deal of attention so far (among others, Arora, Fosfuri and Gambardella 2001; Arora and Gambardella 2010). In addition, to the best of our knowledge, this new research still lacks an empirical understanding of the phenomenon, due to the scarce data on transactions available, until recently (Frey, Ansar and Wunsch-Vincent 2015; Graham, Marco and Myers 2018).

Accordingly, we have embraced the call raised by Graham *et al.* (2013, 669), to open 'new streams of research on trademarks and what they indicate about their users, [and] the strategies for employing them', by providing fresh and original evidence on the market for trademarks. We decided to dig into the licensing share of this market[2], as it has been overlooked so far, despite the fact that the economic importance of this type of transactions is

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[2] Under a licensing contract, the licensor grants the right of use of the property for a certain period, in a specific field within a specified geographical area, under binding conditions (e.g. exclusive terms), to the licensee who agrees to use the trademark right in full compliance with these conditions in exchange for monetary and/or non-monetary compensation.

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soaring year after year. According to the Global Licensing Industry Survey[3] (2018) the aggregate value of the trademark-licensing transactions amounted to $14.5 billion in royalty revenues on $271.6 billion in retail sales in 2017, up 2.6% and 3.3%, respectively, compared to 2016. If we turn our attention to the Top Licensor of the year in 2017, the Walt Disney Company, which 'ranks steadily first with $53 billion in retail sales of licensed merchandise' (Top 150 Global Licensor 2018[4], 6), we can further appreciate the vast potential of this phenomenon.

Inspired by these numbers, we carried out an empirical study based on a novel longitudinal database of U.S. trademark licensing agreements signed over the period 2003-2017 which had been drawn from the USPTO Trademark Assignment dataset (see Graham, Marco and Myers 2018 for a full reference). The aim of our research is to provide some of the first empirical evidence on the phenomenon of trademark licensing by looking at the characteristics of the trademarks that are licensed. Besides offering a full picture of the phenomenon in terms of volume, industry and types of trademarks involved, we are particularly interested in understanding whether there are some features (e.g. trademark classes) linked to licensed trademarks that are more often associated with the licensing phenomenon. Whilst our empirical results do not provide any cause-and-effect evidence, we think they bring to light some interesting correlations that can pave the way for future research in this area.

In more detail, the analysis of the data reveals that in the US, the development of the market for trademark licences has been fostered by the soaring number of trademarks that have been registered since the beginning of the new millennium. This market, however, is not

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[3] Global Licensing Industry Survey 2018, available at: https://www.licensingitalia.it/en/2018-lima-global-licensing-industry-survey/, accessed on June 2019.

[4] "Top 150 Global Licensor", LICENCE GLOBAL. The Licensing Industry's Thought Leader, available at: https://www.licenseglobal.com/resource/top-150-global-licensors-2018, accessed on June 2019.

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evenly distributed across all goods and services. In fact, the analysis of the distribution by international classification reveals that licensed trademarks are more frequent in some classes than in others. This evidence, together with the fact that the average amount of time between registration and the licensing agreement also varies across classes, suggests that the trademark licensing phenomenon is strictly connected to the characteristics of the markets and niches where trademarked goods and services are exchanged[5]. At the firm level, our results show that licensing activity bears more weight for organizations with a smaller trademark portfolio, both in the licensor's and licensee's shoes. All together this evidence may suggest that this practice is used to enter specific markets (for the licensor) with a visible sign (for the licensee).

The findings of this explorative study, albeit limited by the scant availability and incompleteness of the data[6], reveal at least three contributions to the extant literature. First, they add to the 'Market for Trademarks' literature (Frey, Ansar and Wunsch-Vincent 2015; Graham, Marco and Myers 2018) through a granular description of one relevant portion of this market – the licensing phenomenon – shedding light on its main features from different angles and hence fostering our understanding of its importance. Second, our findings contribute to the 'Marketing and Innovation' literature (De Vries *et al.* 2017; Castaldi 2016; Block *et al.* 2014; Flikkema, De Man and Castaldi 2014) by affording the reader a novel grasp of the practice of trademark trade, which is fast becoming a viable mean for firms both to access a third party's trademark in order to flag their innovation efforts while augmenting the value perception of their offerings (demand side) and to reap new opportunities for

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[5] We also try to provide stronger evidence than mere descriptive statistics on the role of trademark classes for the licensing process by running two econometric exercises. The main purpose of these exercises is to show the persistence of heterogeneity across classes even when controlling for other structural aspects. All in all, we find robust evidence that trademark classes capture a significant degree of variation both in the probability of licensing and in the speed of trademark licensing. For full references, see the Empirical Analysis section.

[6] See Frey, Ansar and Wunsch-Vincent (2015) and WIPO (2013); Graham *et al.* (2013) and Graham, Marco and Myers (2018) for a full-fledged analysis of the reasons for the lack of complete data on the licensing phenomenon.

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increasing revenues and sustaining profits (supply side). Finally, our research discloses new lines of research focused on trademark development and deployment in accordance with a broader Intellectual Property (IP) management strategy, which has traditionally centred on 'high-value patents' (Graham, Marco and Myers 2018, 403; Fosfuri 2006; Arora and Gambardella 2010; Leone and Reichstein 2012).

The remainder of this paper includes a section that provides a broad overview of the extant literature on trademark roles and markets, with specific emphasis on licensing transactions, followed by a section that encompasses a detailed description of the data collection process and a full-fledged analysis and discussion of the findings of the empirical study. Finally, the paper closes with concluding remarks and suggestions for future research.

2.   Theoretical background

2.1. *The evolving role of trademarks: from a distinctive sign to an exchangeable asset*

Traditionally, trademarks involve a *distinctive function* (WIPO 2013) as they signal and convey to the market relevant information about the product/service sold and the company itself (Economides 1988; Landes and Posner 1987; Ramello 2006; Ramello and Silva 2006; WIPO 2013). This allows consumers to draw a connection between certain goods and the information collected from past consumer experiences (Economides 1988; Landes and Posner 1987), either through advertising and other forms of marketing activity (Wilkins 1992; WIPO 2013) or indirectly through third parties (Landes and Posner 1987; WIPO 2013), and to then repeat purchases accordingly (Mangàni 2006). Put differently, trademarks are symbols which have the power to influence the desirability of the commodity upon which they appear (Brown 1948), and hence to mould consumers' expectations of the quality, functionality, reliability and other attributes of the product or service (Economides 1988; Landes and Posner 1987; WIPO 2013). These 'packets of information' (Carter 1990, 759)

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allow consumers to reduce search costs (Landes and Posner 1987), to mitigate the riskiness of the purchase (Lane 1988), and essentially to make informed purchasing decisions[7] (Economides 1988; Landes and Posner 1987; WIPO 2013). In addition, this virtuous circle provides companies with an incentive to avoid opportunistic behaviour and meet the qualitative standards of their offerings (Landes and Posner 1987; Mangàni 2006; Ramello 2006; Ramello and Silva 2006), in turn allowing them to build trusting and long-lasting relationships with their customer base (so-called *brand loyalty*) while attracting potential new ones (Landes and Posner 1987; Mangàni 2006; Wilkins 1992; WIPO 2013). Definitively, companies also use trademarks to reap reputational benefits (Economides 1988; Landes and Posner 1987; Ramello 2006).

Recently, some authors (Castaldi 2018; Flikkema, De Man and Castaldi 2014; Greenhalgh *et al.* 2011; Greenhalgh and Rogers 2012; Millot 2009; Block *et al.* 2014) have investigated the role of trademarks as an indicator of the innovative performance of the attached product/service/companies. Although novelty and technological progress are not requirements for registering a trademark (Flikkema, De Man and Castaldi 2014), these authors demonstrate that the registration of a new one is usually linked to the launch of an improved version of a product (i.e. quality upgrades or new varieties) (Greenhalgh and Rogers 2012; Millot 2009). In this vein, trademarks may entail some comparative advantages over the more frequently-used innovation indicators (Castaldi 2016; Greenhalgh *et al.* 2011; Mendonça, Pereira and Godinho 2004; Millot 2009; Potepa and Welch 2017); while patents refer more to inventions and R&D investments (*input* indicators), trademarks are very often filed in proximity to the launch of the product/service on the market (*output* indicators)

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[7] In other words, trademarks are the remedy introduced to mitigate a failure of the market – namely, information asymmetry – which characterizes the relations between producers and consumers in terms of their knowledge of the characteristics and quality of goods and services (Landes and Posner 1987; Ramello 2006; Ramello and Silva 2006; WIPO 2013). In modern markets, especially those of consumer goods, the neoclassical assumption of perfect information – where buyers have full knowledge of the quality and characteristics of all the products and services offered – is not fulfilled in practice (WIPO 2013).

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(Castaldi 2016; Flikkema, De Man and Castaldi 2014; Greenhalgh *et al.* 2011; Millot 2009). Furthermore, trademarks can encapsulate a broader range of innovations (Potepa and Welch 2017) that may encompass, among others, non-technological (e.g. marketing) innovations (OECD/Eurostat 2005; Millot 2009) and those that do not quite achieve the 'inventive step' necessary to benefit from patent protection (e.g. incremental innovations, Millot 2009). Additionally, trademarks capture innovation activities in low-tech sectors and the service sector – where patents are not frequently used – as well as innovation activities carried out by small and medium enterprises (SMEs), which mostly prefer trademarks to patents because their registration is less costly and the registration requirements are more easily met (Castaldi 2018; De Vries *et al.* 2017) [8].

More recently, with the increasing recognition of their economic importance and given the soaring number of trademark filings and transaction trends, scholars have started evaluating the progressive evolution of the role played by trademarks in market dynamics. From an instrument originally designed to facilitate product purchases (i.e. 'mental shortcuts when making purchasing decisions', Katz 2010, 1; Ramello and Silva 2006), the trademark seems to have assumed the traits of an autonomous economic entity, which produces its own utility and turns it into a specific willingness of the market to potentially pay for it (Ramello 2006). In other words, the meaning (and the value) of trademarks is, to a lesser extent, attached to purely informative content (Economides 1988; WIPO 2013), but more and more often it falls within the sphere of pure semiotics, which is not necessarily underpinned by any of the concrete features of goods themselves (Ramello and Silva 2006). The process of disembodiment or 'unbundling' (Ramello 2006) of the value of the sign from that of the associated product/service determines the transformation of the

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[8] For a further analysis of trademark functions and impacts, refer to the article 'Empirical studies of trade marks – the existing economic literature' by Schautschick and Greenhalgh (2016), which offers a wider review of trademark-related literature.

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trademark into a commodity (Beebe 2004; Lemley 1999; Ramello 2006; Ramello and Silva 2006), which can then be transferred from one product/company to another and freely traded on the market (Ramello 2006; Ramello and Silva 2006).

2.2. The rise of markets for trademarks: exploring the potential of trademark licensing

Markets for trademarks "allow companies to diversify their business and to expand into additional product categories […] [and] to access competences outside their own core strategic assets, and to generate new revenues without substantial investments into building or acquiring additional knowhow or manufacturing capability" (WIPO 2013, 12). They include both the 'temporary transfer of the right to use an IP' (trademark licensing and franchising) and the 'sale or purchase of IP ownership rights' (trademark acquisition) (Frey, Ansar and Wunsch-Vincent 2015).

Recently, scholars have started appraising the rise and economic relevance of the market for trademarks (Graham, Marco and Myers 2018; Frey, Ansar and Wunsch-Vincent 2015; WIPO, 2013), partly thanks to the opportunity for data access that has only recently become available (Castaldi 2018; 2019a; 2019b). As a matter of fact, the obstacles in reporting systematic data on each type of transfer mechanism and the lack of granular knowledge mainly due to the sensitive nature of this information (Frey, Ansar and Wunsch-Vincent 2015) have so far not allowed a deeper investigation of the phenomenon. This is why the United States Patent and Trademark Office (USPTO) has recently tackled the challenge of data unavailability by releasing the USPTO Trademark Assignment Dataset[9] (Graham, Marco and Myers 2018), thus offering data to trace general trends in trademark applications, registrations, and renewals as well as trademark transactions.

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[9] The USPTO Trademark Assignment Dataset is publicly available for download at: https://www.uspto.gov/learning-and-resources/electronic-data-products/trademark-assignment-dataset. We used the 2017 version, which is the most recently updated. A complete description of this dataset is provided by Graham, Marco and Myers (2018).

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Despite these attempts, the lack of empirical understanding of markets for trademarks is more evident if we turn our attention to the licensing phenomenon, which is systematically underreported in the public record (e.g. "licences" comprise less than 2% of all transactions, Graham, Marco and Myers 2018, 410). We nevertheless decided to take the opportunity to delve deeper into the exploration of licensing transactions, firstly because there is a need for a better understanding of the phenomenon in practical terms, given its increasing financial weight in the overall value of trademark transactions (WIPO 2013; Global Licensing Industry Survey 2018); secondly, we did so because there is an original academic interest in trademark licensing, traced back to the 1980s, when economic scholars theoretically debated the motives for and barriers to this mechanism for trade (for instance, Meyer, C. H. Tinney and T. J. Tinney 1985; and more recently: Jiang and Menguc 2012; Jayachandran *et al.* 2013); thirdly, another reason was that our analysis would complement the corresponding patent-based literature, which has provided several insights on the market for patent licensing (among others: Fosfuri 2006; Arora and Gambardella 2010; Leone and Reichstein 2012).

Trademark licensing, indeed, entails several strategic opportunities for both the licensor and the licensees. First of all, it opens up new opportunities for increasing revenues and sustaining profits[10] (Frey, Ansar and Wunsch-Vincent 2015; Meyer, C. H. Tinney and T. J. Tinney 1985; WIPO 2003, 2010) from the licensor's perspective; namely, the additional financial inflows from the commercial exploitation of the trademark make it possible to recover the investment incurred during construction of brand value and image and while gathering new resources to develop long-term company projects, such as innovation and growth (Quelch 1985). Trademark licensing can also be a valid option for the owner to monetize the value of dismissed or non-strategic trademarks, as an alternative to their

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[10] According to the 2013 WIPO report, the analysis of available deals shows that, across sectors, average royalty rates in trademark licensing agreements vary from less than 5% to more than 25% of (gross or net) sales. The highest average rates are found within the Celebrity and Character category, while the lowest average royalty rates relate to Corporate/Product and Fashion trademarks.

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outright sale (WIPO 2010). From the licensee's perspective, trademark licensing provides substantial cost savings by avoiding the complexities and the time and effort required for the creation of a valuable new brand from scratch (Frey, Ansar and Wunsch-Vincent 2015). In addition, in the specific case of a well-established trademark, the licensee may be better equipped to augment the value perception of his or her offering, which justifies the payment of a premium price (Meyer, C. H. Tinney and T. J. Tinney 1985; WIPO 2010, 2013).

Besides the direct economic returns, trademark licensing can also bring indirect economic effects. First, as underscored by Meyer, C. H. Tinney and T. J. Tinney (1985), the licence can contribute to the pursuit of many key marketing objectives, such as brand and product awareness, customer recognition, image building, and customer loyalty (Albanese 2001; Meyer, C. H. Tinney and T. J. Tinney 1985). Secondly, trademark licensing affords the opportunity to not only enter new sectors but also new geographic and product markets that might otherwise be inaccessible or difficult to reach internally[11] (Clegg and Cross 2000; WIPO 2003), thus supporting the process of international growth and business diversification (Frey, Ansar and Wunsch-Vincent 2015; Tomar 2009; WIPO 2003, 2010). By so doing, licensors can exploit synergies between their intangible assets and licensees' productive and commercial assets (Calboli 2007; Colucci, Montaguti and Lago 2008; U.S. FTC 2017; Jiang and Menguc 2012; WIPO 2003). This is particularly evident in cases of internationalization, where partnering with foreign partners ameliorates the presence and the international reputation of the brand (Jayachandran *et al.* 2013) and, at the same time, ensures the safeguarding of a given licensor's trademark rights in those markets, where the original company could not or does not wish to operate directly[12] (Frey, Ansar and Wunsch-Vincent

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[11] Trademark licensing is one of the few strategies that companies can use to gain access to markets in which commercial, regulatory or cultural barriers preclude – or strongly discourage – the use of autonomous entry methods such as exports and direct investments (Clegg and Cross 2000; WIPO 2003).

[12] In almost any jurisdiction, trademark protection is linked to its effective use; therefore, businesses need to show stable commercial use of a trademark in order to preserve the rights they have over it. Since the licensee's

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2015; Jayachandran *et al.* 2013). In addition, licensees can leverage a licensor's brand reputation and visibility and combine his or her trademarks with their own technology portfolio (WIPO 2003), thus allowing them to introduce new products and services to the market more quickly and effectively (Albanese 2001; Frey, Ansar and Wunsch-Vincent 2015; WIPO 2003).

We therefore identify the need to further explore the trends and characteristics of the licensing transactions so as to uncover the potential of this ever-increasing IP strategy. We will achieve this through an exploratory analysis, as explained in the following section.

3. Empirical analysis

3.1. Data sources and sample construction

The study is based on a dataset consisting of primary data relating to trademark licensing agreements signed for the U.S. market. The data were gathered from the Trademark Assignment Dataset – provided by the USPTO– which includes more than 970,000 trademark transactions (assignments, security interest agreements, licences and other types of agreement) that have been registered between 1952 and 2018.

For the aim of our analysis we selected only those transcriptions referring to trademark licensing operations. We therefore used the brief description available in the original registration (termed 'conveyance text' in the original file[13]) to exclude all those records not dealing with newly signed licensing agreements (i.e. termination, cancellation,

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use of the brand is to the benefit of the licensor, the licence allows him/her to defend his/her rights in all countries and for all product categories for which the trademark has been regularly registered but not directly used by the original owner (Frey, Ansar and Wunsch-Vincent 2015).

[13] Conveyance text captures non-standardized information from the coversheet describing the interest conveyed or transaction recorded (Graham, Marco and Myers 2018).

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releases, corrective registrations[14] and the like). We also decided to exclude sub-licensing agreements, cross-licensing agreements and licences operating in the context of settlement agreements, due to the peculiarities of those transactions.

To build the final database we restricted our focus to the most recent years, namely trademark licensing agreements whose execution dates ranged from 2003 to 2017.[15] For these transactions, we retrieved the basic information on the date of the event,[16] the names of the licensors and the licensees, and the licensed trademark serial numbers. This process led us to define a final set of 995 licences, corresponding to a sample of 1732 unique companies: 895 contracted as licensors, 810 contracted as licensees and 27 operating both as licensor and licensee in different agreements. All told, 4534 licensed trademarks were involved.

Finally, we used the USPTO Trademark Case Files Dataset[17] to link each agreement to the corresponding licensed trademarks (retrieving information on dates for key events, trademark status,[18] classification and the like) and then to determine the breadth of their registered trademark portfolio (number of classes) and the modal primary class of the company trademarks included in our database. Throughout the dataset, the same company may have been registered with different names due to misspelling or changes in the corporate

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[14] We identified corrective registrations as corrections, re-recordations or amendments (and the like), and manually corrected them by linking these registrations, when possible, to the original recordations (through the unique licence code).

[15] Since the data gathered so far for 2018 might underestimate the extent of the phenomenon – due to the lag between execution and recordation date of the most recent agreements (Graham, Marco and Myers 2018) – we have opted to omit this year.

[16] As suggested by Graham, Marco and Myers (2018), we used a given contract's execution date (or the acknowledgement date if the execution date field was not populated) – not the recordation date – to be the reference starting date of the agreement. Since transactions are recorded on a per-assignor basis and multiple execution dates are possible for a single transaction, we used the most recent execution date under the assumption that it denoted the moment the transaction was complete.

[17] The Trademark Case Files Dataset contains detailed information on approximately 9.1 million trademark applications filed with, or registrations issued by, the USPTO between 1870 and 2018 (https://www.uspto.gov/learning-and-resources/electronic-data-products/trademark-case-files-dataset-0). A complete description of this dataset is provided by Graham *et al.* (2013).

[18] Status was captured using a three-digit code indicating whether an application was abandoned or pending or whether a registration was live, cancelled or expired (Graham *et al.* 2013).

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structure and therefore to denomination and the like. There is a vast literature on how to disambiguate individuals (Pezzoni, Lissoni and Tarasconi 2014) and companies (Morrison, Riccaboni and Pammolli 2017). We applied similar principles, although in a less sophisticated fashion, as this went well beyond the scope of this research. We compared the similarity of company names and reduced the number of firms that engaged in licensing activities by 2.5%.

3.2. Findings

3.2.1. General trends in trademark and trademark licensing activities in the US

During the last two decades US markets have been witnessing a blossoming of new trademarks. Indeed, starting in 2003 the sheer number of newly registered trademarks has steadily exceeded 200,000 units and, despite a mild reduction in the aftermath of the crisis, it almost reached 445,000 units in 2017 (Figure 1).

[Figure 1 about here]

Yet the protection of one's own product via trademark is not an evenly distributed practice across markets. By looking at the distribution of trademarks by international NICE classes[19] (Figure 2a, 2b; Table 1) it is possible to observe some heterogeneity. This evidence could be the outcome of different dynamics. On the one hand, it may be driven by structural differences since the need for firms to distinguish their own products/services from those offered by their rivals is stronger in some sectors than in others. On the other hand, it may be bound to technological factors deriving from the fact that the rate of product/service innovations varies from one sector to the other. Regardless of which of the two aspects prevails, trademarks seem to be more concentrated in some categories of goods and services

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[19] The NICE classification, named after the "Nice Agreement" (1957), is an international standard to classify goods and services on the basis of their trademarks. It is made of 45 classes: the first 34 refer to goods while the remaining 11 refer to services. https://www.wipo.int/classifications/nice/en/

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than in others. For example, class 15 ('musical instruments') contains 8,000 trademarks, which constitutes less than the 1% of the size of the two top classes combined (9 'electrical and scientific apparatuses' and 25 'clothing'). These differences seem to be correlated with the extent of a market which, in return, is associated with the type of demand and the number and nature of market niches.

[Table 1 about here]

Given the fact that trademarks may be assigned to multiple classes, we computed the total number of trademarks by international class in two different ways. In the first one (Figure 2a), when a trademark presented more than one class, we assigned an equal share of the trademark to each one of those classes. For instance, if a trademark fell within four classes, we assigned 0.25 of that trademark to each one of these classes. This technique labelled 'fractional count' (De Rassenfosse *et al.* 2013), is used in order to avoid multiple allocations of the same trademark to different classes. Without this correction, the size of classes whose trademarks belong to multiple classes might be overestimated. For the sake of completeness, though, in Figure 2b we report the same distribution by allocating the different trademarks without fractional counting. Although the two distributions seem to be similar, the relative importance of classes changes from Figure 2a to Figure 2b. For example, in the case of a fractional count, the ratio between the number of trademarks belonging to class 25 and the number of trademarks belonging to class 9 equals 0.74, whereas, without a fractional count, this statistic comes to 0.69.

[Figure 2a and 2b about here]

The pattern of expansion described above has also paved the way for the rise and development of an ad-hoc market where these property rights could be exchanged via licences. In particular, the USPTO data show that, from 2003 to 2017 the overall number of trademarks licensed in the US totalled about 4,534 units (Figure 3).

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[Figure 3 about here]

It is important to stress that these data may suffer from an underestimation problem. As underlined by Graham et al. (2018, 411), the 'executed assignments that have yet to be recorded will be (increasingly) missing for the most recent years'.

Nonetheless, the presence of truncation problems does not seem to affect the representativeness of the sample of licensed trademarks for the most recent years. As a matter of fact, by comparing the distribution of licensed trademarks by class over the whole sample with the distribution of licensed trademarks by class over a shorter time span, regarded as less likely to suffer from truncation issues (2003-2011), we do not observe any substantial difference (Figures 4a and 4b).

[Figures 4a and 4b about here]

Providing we exclude 2008 and 2009 (the epicentre of the financial crisis), up until 2011 the yearly number of newly licensed trademarks was, on average, 333. If we also include the most recent years within this computation, this number drops to 302, while its standard deviation more than doubles. Although the aforementioned truncation issue makes it impossible to assess the exact volume of licensed trademarks, we can conclude that, if a reduction in this activity occurred it did not dramatically change the size of this market.

3.2.2. *The agreements and the players of licensing activity*

The picture drawn so far has focused on trademarks. Although, at this stage, this is the most relevant level of analysis to tackle the trademark licensing phenomenon, a broader framework is needed to better understand how this activity unfolds. In particular, two aspects are important: the licensing agreements and the players stipulating these agreements. Indeed, the trend of licences outlined in the previous section is the outcome of licensing activity that exchanges trademarks by means of an agreement (i.e. the licence) between two parties (i.e.

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licensors and licensees). An understanding of how these agreements have been designed and of how many parties are involved in these agreements complements an analysis of the evolution of trademark licensing.

To begin with, the 4,534 trademarks licensed during the period 2003–2017 were exchanged through almost 1,000 (995) licensing agreements, which implies, on average, 4.6 trademarks per licence. Although the picture appears to be far from steady due to its fluctuating trend, the yearly number of agreements actually fluctuated around 66 over the whole period, increasing to 73 if we consider only the 2003-2011 subperiod (Figure 5). The major discrepancies in these averages can be observed during two periods: the first is between 2008 and 2009 and the second from 2014 to the most recent years. In the former it is reasonable to assume that the drop in the number of licences can be correlated with the outbreak of the financial crisis. The considerable reduction in the number of licensing agreements that occurred in the most recent years may be partly due to an underestimate deriving from the truncation problem discussed in the previous pages.

[Figure 5 about here]

In the large majority of these cases, the licences were stipulated between two firms, i.e. one licensor (henceforth LOR) and one licensee (henceforth LEE), with each firm undersigning one licensing contract per year only. Indeed, if we look at the numbers of LORs and LEEs rather than at the number of contracts, the order of magnitude remains the same as that of Figure 5. The differences that emerge between Figure 5 and Figure 6 are driven either by a few firms that stipulated multiple licensing contracts in the same year or by a few trademark licences that involved more than one LOR/LEE at a time.

[Figure 6 about here]

If we focus on these firms' characteristics, we can observe two main results. First of all, over 60% of licensors tend to license a trademark falling within the same class of its

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trademark portfolio mode. This percentage drops to 50% for licensees. This may suggest that licensees use trademark licenses as a way to enrich the variety of trademarks in their portfolio. Second, the importance of licensing activity varies across firms of different size. Figure 7 reports the average share of trademarks given/taken as licences by firms by dividing organizations into three classes, identified on the basis of the size of their trademark portfolio. Specifically:

- the first group includes all the firms (LORs and LEEs) with a trademark portfolio whose size falls within the 33rd percentile of the distribution (equal to 6 trademarks);
- the second group includes all the firms (LORs and LEEs) with a trademark portfolio whose size falls between the 33rd and the 66th percentile of the distribution (equal to 28 trademarks);
- the third group includes all the firms (LORs and LEEs) whose trademark portfolio is larger than the 66th percentile of the distribution.

[Figure 7 about here]

These data suggest that licensing activity has a greater bearing on smaller than on larger firms. Indeed, as the size of the trademark portfolio increases, the average share of licensed trademarks decreases. To an extent, it is thus possible to hypothesize that licensing activity is a significant policy option, especially for smaller organizations.

3.2.3. Characteristics of licensed trademarks

In the previous sections we sought to shed some light on the phenomenon of trademark licensing in the US by providing some figures on its extent in terms of licensed trademarks, classes, agreements (licences) and players (LORs and LEEs) involved. In this section we go a step further and provide some evidence useful in understanding whether there

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are structural characteristics of a trademark which are most correlated with the licensing process.

In interpreting the following statistics, however, it is important to bear a major caveat in mind: our evidence can only provide some indications on the mechanisms underlying the dynamics of interest and, if any relationship is mentioned, it is only a matter of speculation based on our results. To put it in another way, we interpret the following analyses as a starting point for future work investigating the correlations emerging from our data.

The first aspect relates to the scope of a trademark, which is interpreted as the number of classes it belongs to. As shown in section 3.2.1., a significant degree of heterogeneity displayed by trademarks (both licensed and non-licensed) depends on the classes with which each trademark is associated (Figures 2 and 4a). If one considers that different classes are connected to different markets, the larger the number of classes to which a trademark belongs, the wider its applicability on different markets. As a result, the scope of a trademark can be connected to its future uses and also to its likelihood of being licensed.

To delve into this issue, we compared the average number of classes assigned to licensed trademarks with the average number of classes assigned to non-licensed trademarks for the 2003-2017 period. Table 2 reports the results of a series of t-tests in which we compared the average scope of licensed vs non-licensed trademarks. We relaxed the classic t-test assumption of equal variances by using the Welch approximation (Welch 1947). Results indicate that the average scope lies between 1 and 2, by implying that multi-class trademarks are rather uncommon. At the same time, we did not find any statistically significant difference between the two groups, suggesting that the number of classes is not a pivotal aspect in the licensing process.

[Table 2 about here]

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In addition to the above, the low degree of variability in the average scope leads us to believe that the heterogeneity highlighted in Figures 2 and 4a does not stem from the number of classes associated with each trademark. If this is the case, then, these differences are linked first and foremost to the specific characteristics of the market where each trademark is used.

The choice of whether to grant a trademark licence or not may occur at different stages of maturity of a trademark. Therefore, a second important element is represented by the time occurring between the filing date of the trademark and the execution date of the licensing contract. Figure 8 reports the distribution of these time spans. According to our results, about 70% of trademarks are licensed within 5 years of their filing date while only 3% of them are licensed after 10 or more years. These results may be due to different strategies adopted by firms, ranging from the use of trademark licensing as a vehicle to scan the potential profitability of unexplored geographical markets (Park and Lippoldt 2005) to the attempt to further exploit trademarks during a declining phase of their lifecycle.

[Figure 8 about here]

If we split this distribution by trademark classes (Figure 9) we observe a substantial degree of variability. This implies that, despite the aforementioned contingent strategies implemented by firms, there are structural differences across markets. For example, on average, trademarks falling within classes 2 ('Paints') and 26 ('Fancy goods') take between 7 and 8 years to be licensed whereas trademarks falling within classes 1 ('Chemicals'), 15 ('Musical instruments') and 39 ('Transportation and storage') only take 2 to 3 years.

[Figure 9 about here]

All in all, then, these results seem to point to the prominent role played by the markets bound to each trademark class. This implies that licensing activities and strategies are at least to some extent influenced by the context in which the firms operate. In order to bolster this purely descriptive evidence we decided to perform two exploratory econometric exercises.

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First, we inspected the factors associated with the probability of a trademark being licensed. We fit a simple linear probability model in which we regressed the licensing status (a variable that takes value 1 for licensed trademarks and 0 for non-licensed ones) on a set of filing year dummies, a set of class dummies and a variable that measures trademark scope. Given that licensed trademarks account only for 0.04% of the overall trademarks registered in the US between 2003 and 2017, we extracted a subsample of observations that closely resemble the pool of licensed ones from the sample of non-licensed trademarks, by means of a propensity score technique (Rosenbaum and Rubin 1983; Dehejia and Wahba 2002). The variables that were entered into the matching process were the same as those used in the regression. In Figure 10 and Figure 11 we report the values of the propensity score before and after the matching process. We can observe a substantial reduction in the imbalance between the characteristics of licensed and non-licensed trademarks. Nevertheless, some differences remain, as shown in Figure 12, where we plot the coefficients relative to the trademark class dummies; the probability of incurring in a licensing event differs across classes. The class in which a trademark is registered emerges as a discriminant dimension within licensing activities.

[Figure 10, 11 and 12 about here]

The second econometric exercise delves into the pool of licensed trademarks only. We try to highlight some of the factors that are associated with the heterogeneity observed in the time span that occurs between the trademark filing date and the licensing contract execution date. Specifically, such differences (expressed in years) were regressed on the same set of covariates that we used in our first econometric specification (that is, filing year dummies, trademark class dummies and patent scope). Results indicate that trademarks falling within specific classes such as 2 (Paints), 5 (Pharmaceuticals) and 26 (Fancy goods) are, on average, licensed at a slower pace compared with trademarks that belong to, for

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instance, class 12 (Vehicles), 13 (Firearms) and 15 (Musical instruments). It is reasonable to

hypothesize that the time spans between the filing date of a trademark and the execution of

the licensing contract depend on the intrinsic characteristics of the trademarked

goods/services which are, in turn, related to the structure of the market and the nature of the

technology behind them (Figure 13).

[Figure 13 about here]

4. Conclusion

This paper is the first attempt to provide an original representation of the trademark

licensing market based on a recently released USPTO trademark transactions dataset

(Graham, Marco and Myers 2018). We decided to focus on trademark licensing because,

despite its remarkable growth in terms of volume and value (WIPO 2013), little is known

about the features of trademark transactions. The lack of empirical investigation and

understanding of this market is also surprising given the fact economics scholars have already

debated the motives for and barriers to this mechanism of trade (for instance, Meyer, C. H.

Tinney and T. J. Tinney 1985; and more recently, Jiang and Menguc 2012; Jayachandran *et

al.* 2013), and given the great consideration paid to the corresponding patent-based market

(among others, Fosfuri 2006; Arora and Gambardella 2010; Leone and Reichstein 2012).

We therefore aimed to further our understanding of the relevance of trademarks in

current market dynamics by focusing on their new role – that of an exchangeable asset. Our

reasoning and empirical investigation are therefore rooted in a recognition of the progressive

process of disembodiment or 'unbundling' (Ramello 2006) of the value of the sign (the

trademark itself) from that of the associated product/service. This unbundling process has

driven the transformation of the trademark into an autonomous economic entity, which

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produces its own utility and subsequently cultivates a specific willingness of the market to potentially pay for it (Ramello 2006).

Building on a theoretical investigation of the transformative evolution of trademarks from a distinctive sign to an exchangeable asset, as well as an exploration of the potential of markets for trademarks, we proposed a novel investigation into the trademark-licensing field. We studied the growth of licensing activities in the U.S. during the 2003–2017 period, the characteristics of the trademarks, the agreements, and, finally, some features of the licensing parties involved (i.e. licensors and licensees).

The findings reveal that licensing activities varied in these years, even though the reduction recorded during the latest period may not entirely reflect a reduction in this market but rather could be due to truncation issues resulting from the dataset (Graham, Marco and Myers 2018). At the same time, a large majority of these contracts were stipulated by two parties only, i.e. one licensor and one licensee, but, on average, they contain more than one trademark each. This means that, usually, firms trade bundles of marks rather than single marks. The analyses reveal, however, that a large amount of heterogeneity in licensing activity is due to the classes associated with each trademark. Indeed, trademark licensing turns out to be unevenly distributed across these international classes, suggesting that trademark licensing activity and the way it is carried out both depend on the product/service market to which the licensed trademark refers. Additionally, the findings suggest that this practice works more for firms with smaller trademark portfolios.

Our results call for a deeper investigation, mainly focused on two topics: (i) the relationship between trademark licensing and the corresponding product/service market, as well as (ii) the relationship between a firm's structure and its trademark licensing activity, in order to understand the factors underpinning licensor and licensee behaviour. For instance, new venues of research might investigate sector specificities in conducting trademark

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licensing. Another possible stream of literature could focus on the analysis of possible strategies of trademark development and deployment through either internal growth or external acquisition, and in relation to other IP strategies, which are mainly patent-based. It would also be interesting to understand the impact of licensing on a firm's economic performance, as the literature so far has dwelt only on the link between trademarks and the innovation of the underlying product/service and companies (e.g. Millot 2009; Colucci, Montaguti and Lago 2008; De Vries *et al.* 2017; Castaldi 2016; Block *et al.* 2014; Flikkema, De Man and Castaldi 2014). Finally, all these new issues could be explored more thoroughly by focusing on the differences across firms of difference size and belonging to different product categories/industries.

This study is not immune to limitations. To begin with, we are aware that transactions are recorded with minimal verification by the USPTO (Graham, Marco and Myers 2018). While we endeavoured to find and resolve these flaws, recording errors and redundancies may still have partially affected our dataset. Furthermore, 'censoring' due to non-recorded transactions ('a substantial underreporting in the original data'), and 'truncation' due to the lag between execution and recordation date of the most recent agreements, may have caused lower estimates in our statistics (Graham, Marco and Myers 2018). Notwithstanding this, we believe and hope that our paper can be a catalyst for future research on this topic in terms of marketing, innovation and IP management, and that it can stimulate further and better investigations of the underlying mechanisms driving the choices of licensor and licensees.

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Appendix

TABLE 1. TRADEMARKS CLASSES (NICE CLASSIFICATION)

Code	Trademark Class	Code	Trademark Class
001	Chemicals	024	Fabrics
002	Paints	025	Clothing
003	Cosmetics and cleaning preparations	026	Fancy goods
004	Lubricants & fuels	027	Floor coverings
005	Pharmaceuticals	028	Toys and sporting goods
006	Metal goods	029	Meats and processed foods
007	Machinery	030	Staple foods
008	Hand tools	031	Natural agricultural products
009	Electrical & scientific apparatus	032	Light beverages
010	Medical apparatus	033	Wine and spirits
011	Environmental control apparatus	034	Smokers' articles
012	Vehicles	035	Advertising and business
013	Firearms	036	Insurance and financial
014	Jewellery	037	Building construction and repair
015	Musical Instruments	038	Telecommunications
016	Paper goods and printed matter	039	Transportation and storage
017	Rubber goods	040	Treatment of materials
018	Leather goods	041	Education and entertainment
019	Non-metallic building materials	042	Computer, scientific & legal
020	Furniture and articles not otherwise classified	043	Hotels and Restaurants
021	Housewares and glass	044	Medical, beauty & agricultural
022	Cordage and fibres	045	Personal
023	Yarns and threads		

TABLE 2. T TEST: AVERAGE SCOPE BY TRADEMARK

| Year	Licensed trademarks	Non licensed trademarks	Difference	p-value
2003	1,35	1,25	0,09	0,28
2004	1,28	1,27	0,01	0,90
2005	1,42	1,29	0,13	0,04
2006	1,32	1,31	0,01	0,90
2007	1,26	1,33	-0,07	0,27
2008	1,32	1,33	0,00	0,98
2009	1,21	1,31	-0,10	0,05
2010	1,34	1,32	0,02	0,82
2011	1,45	1,33	0,12	0,34
2012	1,47	1,33	0,13	0,37
2013	1,31	1,34	-0,04	0,61
2014	1,59	1,35	0,24	0,09
2015	1,42	1,36	0,06	0,67
2016	1,62	1,37	0,24	0,11
2017	2,00	1,36	0,64	0,38

Figures

FIGURE 1. NUMBER OF NEWLY REGISTERED TRADEMARKS PER YEAR
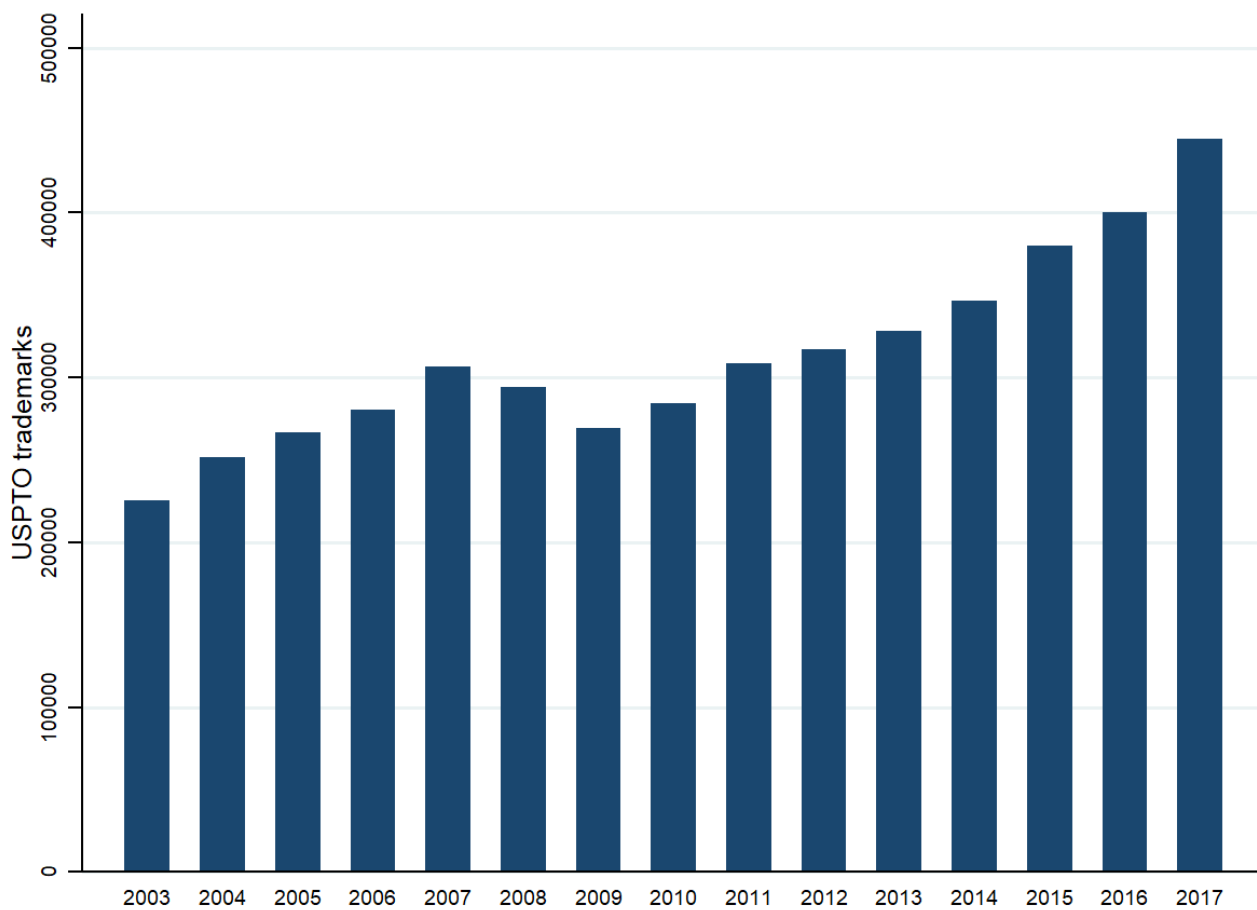
Note: the height of the bars represents the whole number of newly registered trademarks in each year. **Source:** authors' elaboration on USPTO dataset.

FIGURE 2A. FRACTIONAL COUNT DISTRIBUTION OF TRADEMARKS BY NICE CLASS
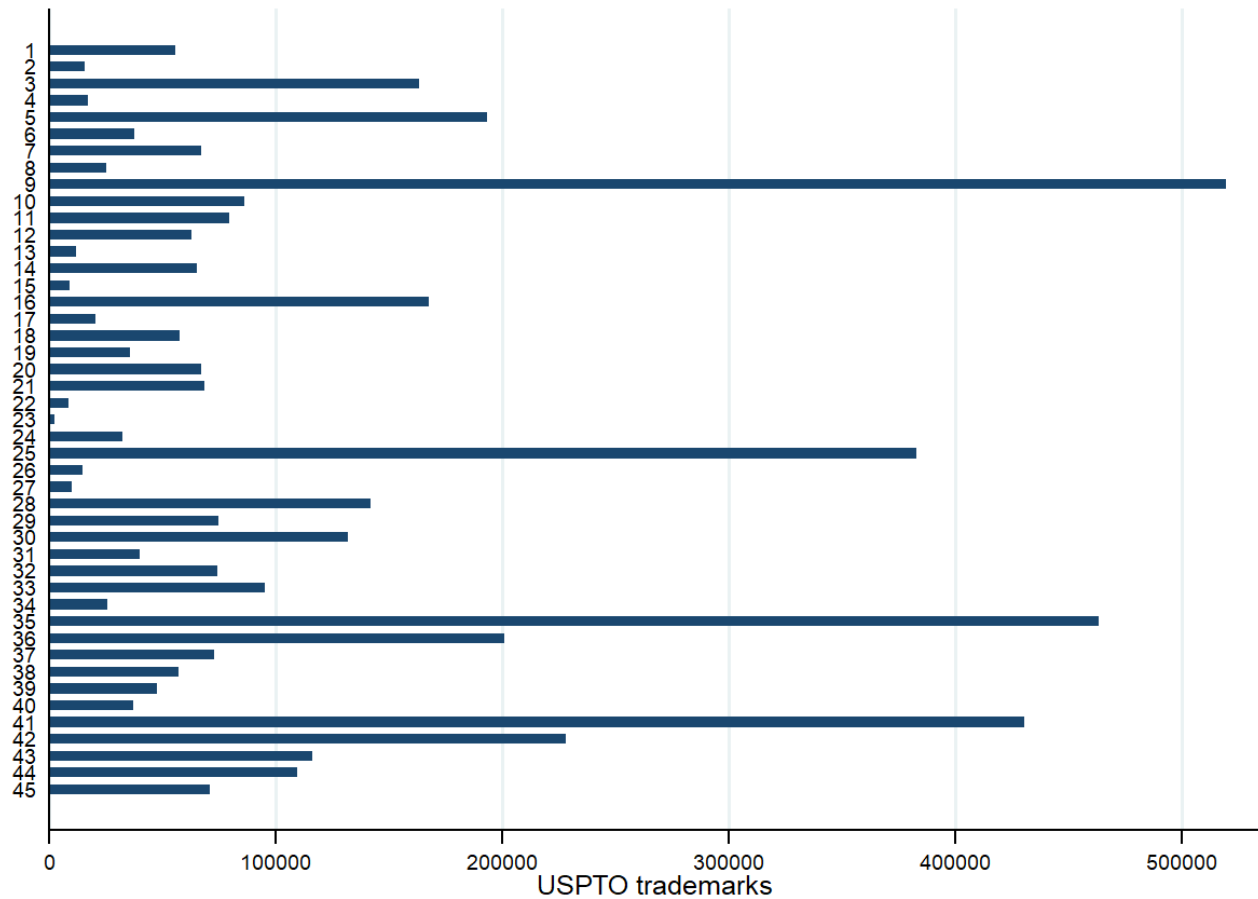
Note: the length of each bar represents the number of trademarks falling within the corresponding NICE class. The count for each class has been performed following the 'fractional count' principle (De Rassenfosse et al., 2013): when a trademark was associated with more than one class, an equal share of it was allocated among these classes. The numbers on the y-axis correspond to the NICE classes: 001 'Chemicals', 002 'Paints', 003 'Cosmetics and cleaning preparations', 004 'Lubricants & fuels', 005 'Pharmaceuticals', 006 'Metal goods', 007 'Machinery', 008 'Hand tools', 009 'Electrical & scientific apparatus', 010 'Medical apparatus', 011 'Environmental control apparatus', 012 'Vehicles', 013 'Firearms', 014 'Jewellery', 015 'Musical Instruments', 016 'Paper goods and printed matter', 017 'Rubber goods', 018 'Leather goods', 019 'Non-metallic building materials', 020 'Furniture and articles not otherwise classified', 021 'Housewares and glass', 022 'Cordage and fibres', 023 'Yarns and threads', 024 'Fabrics', 025 'Clothing', 026 'Fancy goods', 027 'Floor coverings', 028 'Toys and sporting goods', 029 'Meats and processed foods', 030 'Staple foods', 031 'Natural agricultural products', 032 'Light beverages', 033 'Wine and spirits', 034 'Smokers' articles', 035 'Advertising and business', 036 'Insurance and financial', 037 'Building construction and repair', 038 'Telecommunications', 039 'Transportation and storage', 040 'Treatment of materials', 041 'Education and entertainment', 042 'Computer, scientific & legal', 043 'Hotels and Restaurants', 044 'Medical, beauty & agricultural', 045 'Personal'. **Source:** authors' elaboration on USPTO data.

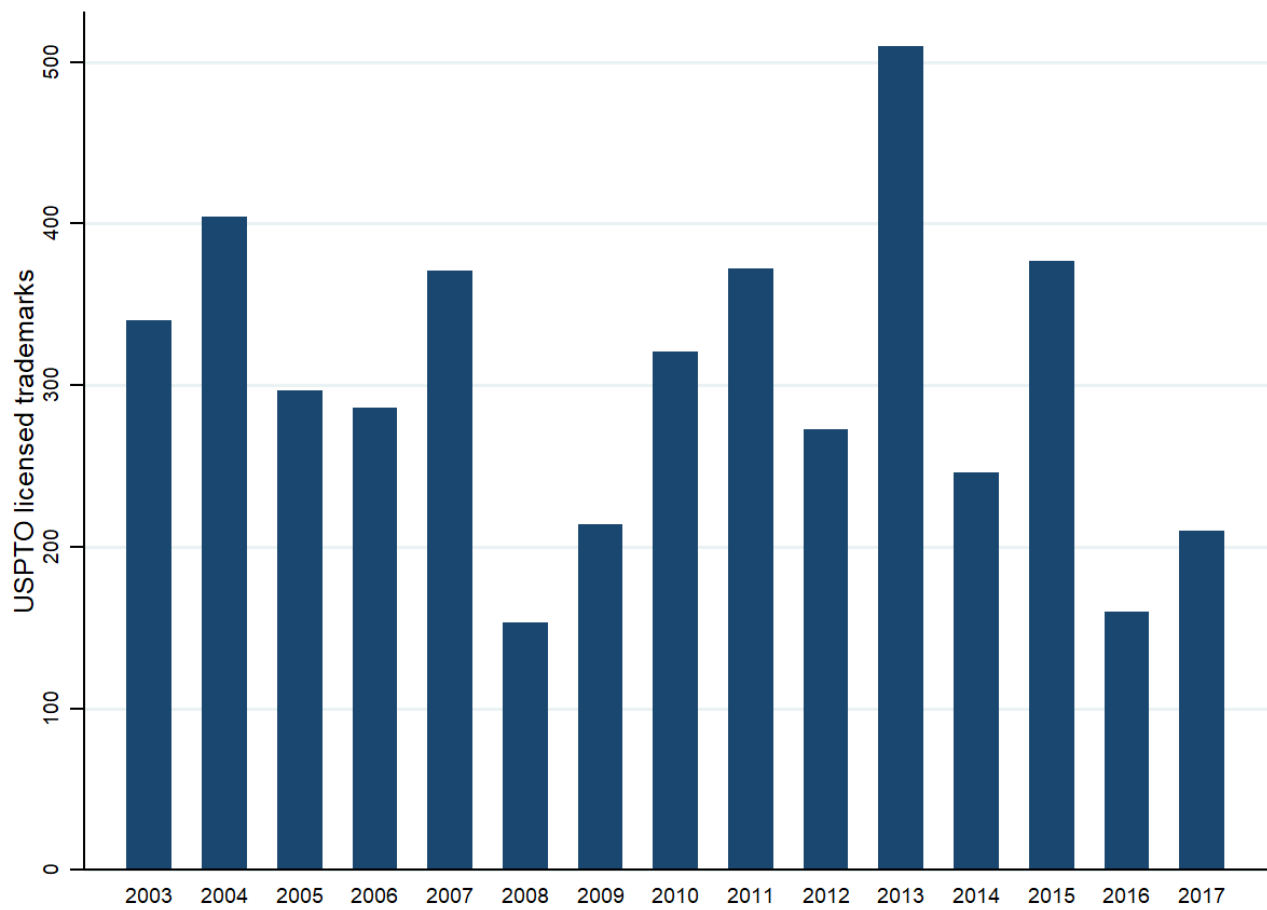FIGURE 2B. DISTRIBUTION OF TRADEMARKS BY NICE CLASS
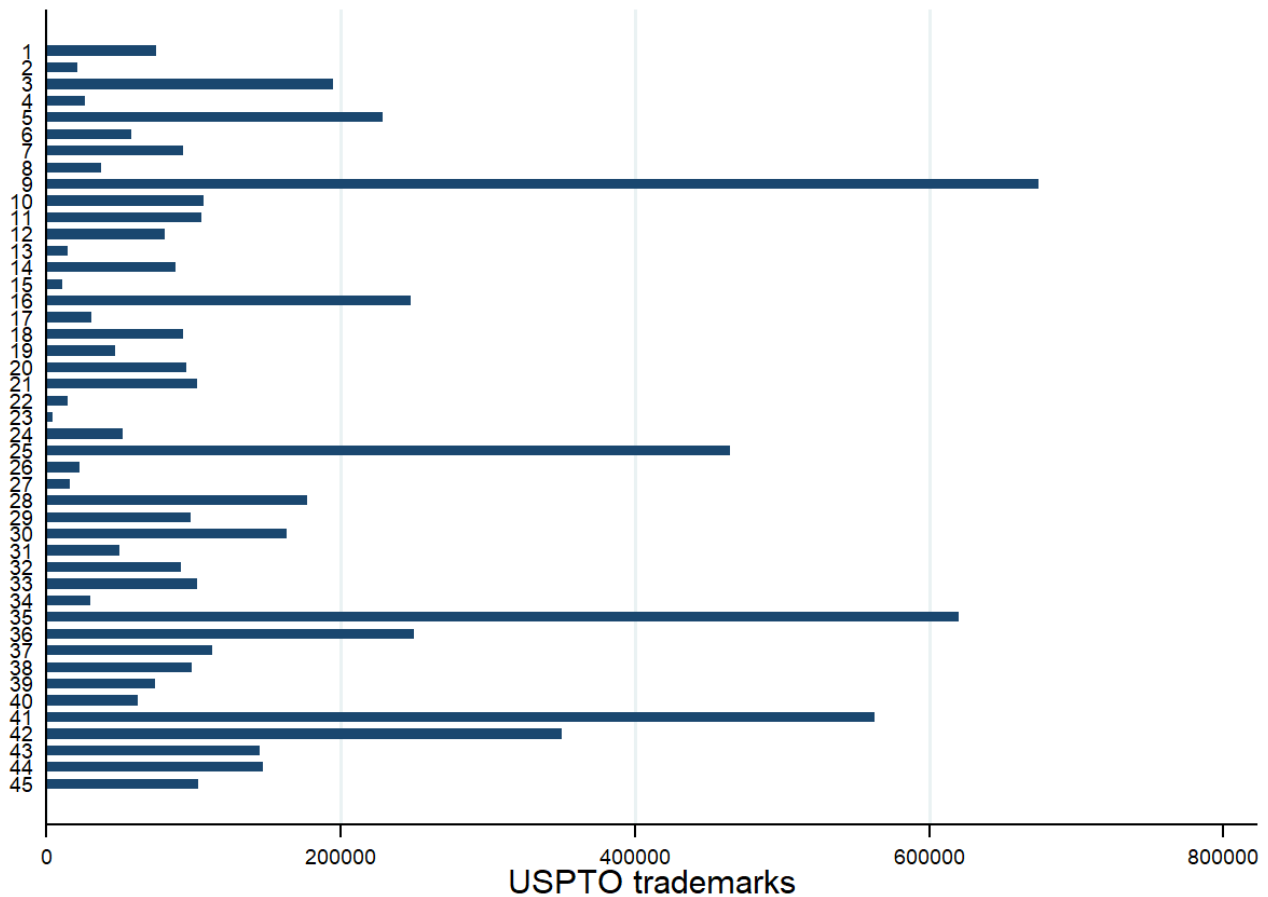
Note: the length of each bar represents the number of trademarks falling within the corresponding NICE class. When a trademark was associated with more than one class, it was counted once in each one of them. The numbers on the y-axis correspond to the NICE classes: 001 'Chemicals', 002 'Paints', 003 'Cosmetics and cleaning preparations', 004 'Lubricants & fuels', 005 'Pharmaceuticals', 006 'Metal goods', 007 'Machinery', 008 'Hand tools', 009 'Electrical & scientific apparatus', 010 'Medical apparatus', 011 'Environmental control apparatus', 012 'Vehicles', 013 'Firearms', 014 'Jewellery', 015 'Musical Instruments', 016 'Paper goods and printed matter', 017 'Rubber goods', 018 'Leather goods', 019 'Non-metallic building materials', 020 'Furniture and articles not otherwise classified', 021 'Housewares and glass', 022 'Cordage and fibres', 023 'Yarns and threads', 024 'Fabrics', 025 'Clothing', 026 'Fancy goods', 027 'Floor coverings', 028 'Toys and sporting goods', 029 'Meats and processed foods', 030 'Staple foods', 031 'Natural agricultural products', 032 'Light beverages', 033 'Wine and spirits', 034 'Smokers' articles', 035 'Advertising and business', 036 'Insurance and financial', 037 'Building construction and repair', 038 'Telecommunications', 039 'Transportation and storage', 040 'Treatment of materials', 041 'Education and entertainment', 042 'Computer, scientific & legal', 043 'Hotels and Restaurants', 044 'Medical, beauty & agricultural', 045 'Personal'. **Source:** authors' elaboration on USPTO data.

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FIGURE 3. NUMBER OF NEWLY LICENSED TRADEMARKS PER YEAR

Note: The height of the bars represents the whole number of newly licensed trademarks in a specific year. **Source:** authors' elaboration on USPTO dataset.
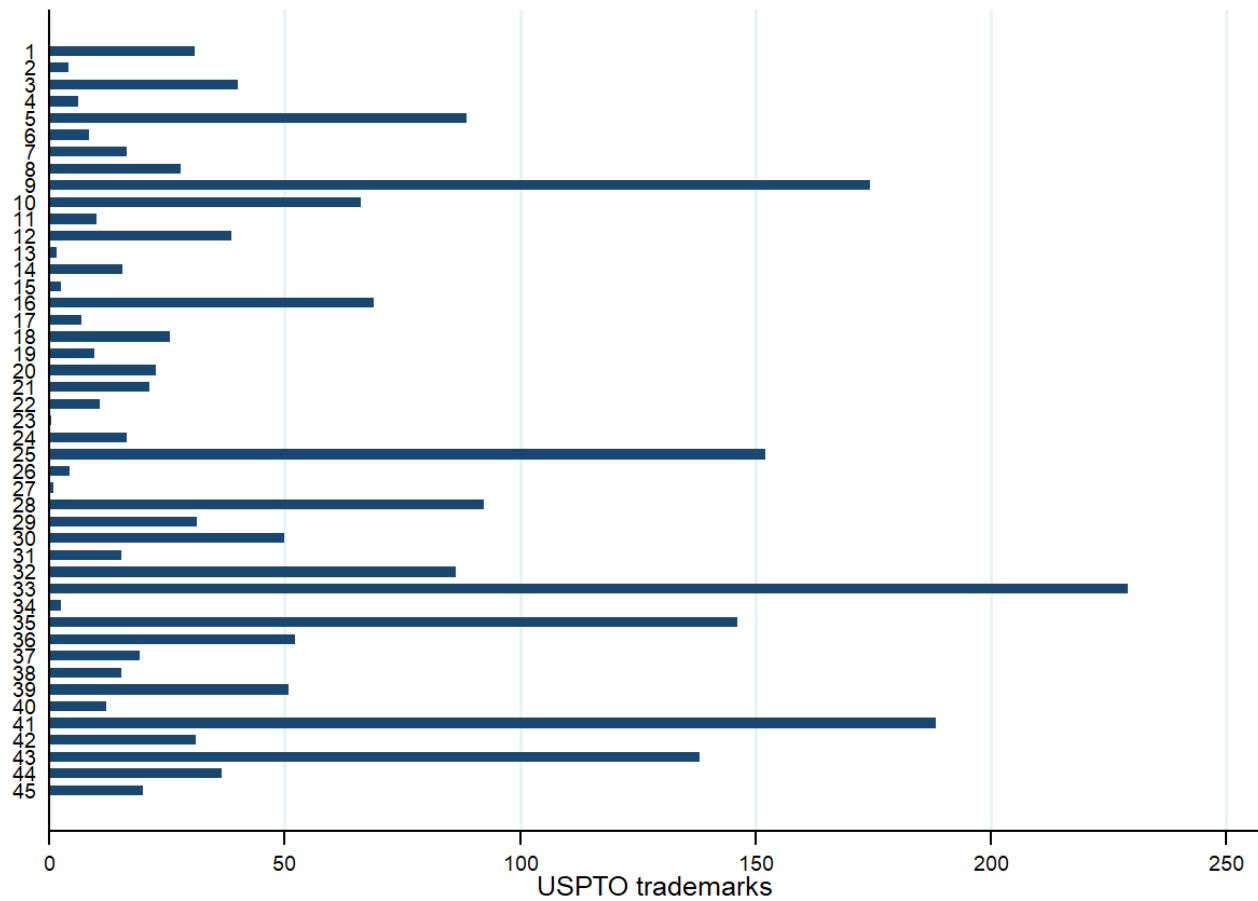
FIGURE 4A. FRACTIONAL COUNT DISTRIBUTION OF LICENSED TRADEMARKS BY NICE CLASS
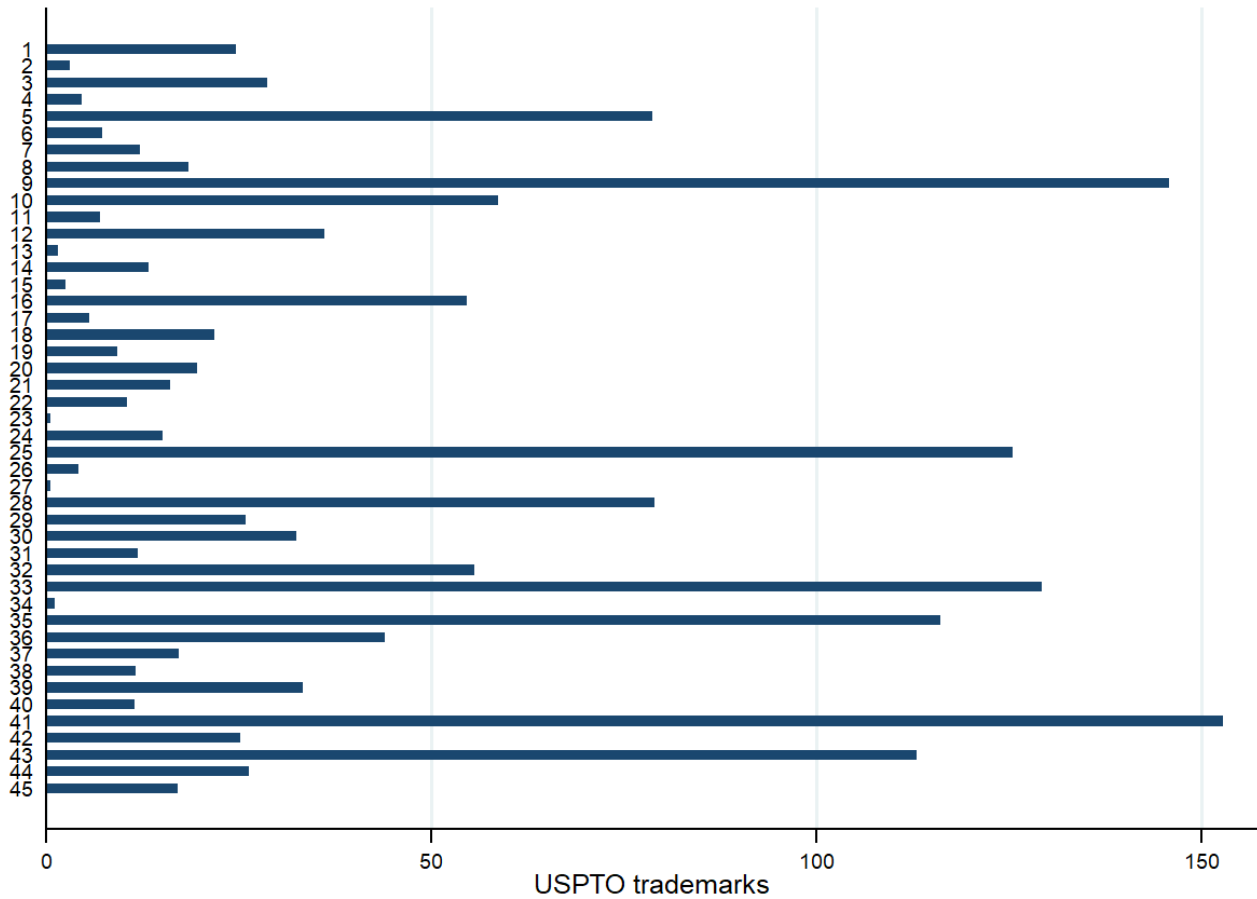
Note: the length of each bar represents the number of licensed trademarks falling within the corresponding NICE class. The count for each class has been performed following the 'fractional count' principle (De Rassenfosse et al., 2013): when a licensed trademark was associated with more than one class, an equal share of it was allocated among these classes. The numbers on the y-axis correspond to the NICE classes: 001 'Chemicals', 002 'Paints', 003 'Cosmetics and cleaning preparations', 004 'Lubricants & fuels', 005 'Pharmaceuticals', 006 'Metal goods', 007 'Machinery', 008 'Hand tools', 009 'Electrical & scientific apparatus', 010 'Medical apparatus', 011 'Environmental control apparatus', 012 'Vehicles', 013 'Firearms', 014 'Jewellery', 015 'Musical Instruments', 016 'Paper goods and printed matter', 017 'Rubber goods', 018 'Leather goods', 019 'Non-metallic building materials', 020 'Furniture and articles not otherwise classified', 021 'Housewares and glass', 022 'Cordage and fibres', 023 'Yarns and threads', 024 'Fabrics', 025 'Clothing', 026 'Fancy goods', 027 'Floor coverings', 028 'Toys and sporting goods', 029 'Meats and processed foods', 030 'Staple foods', 031 'Natural agricultural products', 032 'Light beverages', 033 'Wine and spirits', 034 'Smokers' articles', 035 'Advertising and business', 036 'Insurance and financial', 037 'Building construction and repair', 038 'Telecommunications', 039 'Transportation and storage', 040 'Treatment of materials', 041 'Education and entertainment', 042 'Computer, scientific & legal', 043 'Hotels and Restaurants', 044 'Medical, beauty & agricultural', 045 'Personal'. **Source:** authors' elaboration on USPTO data.

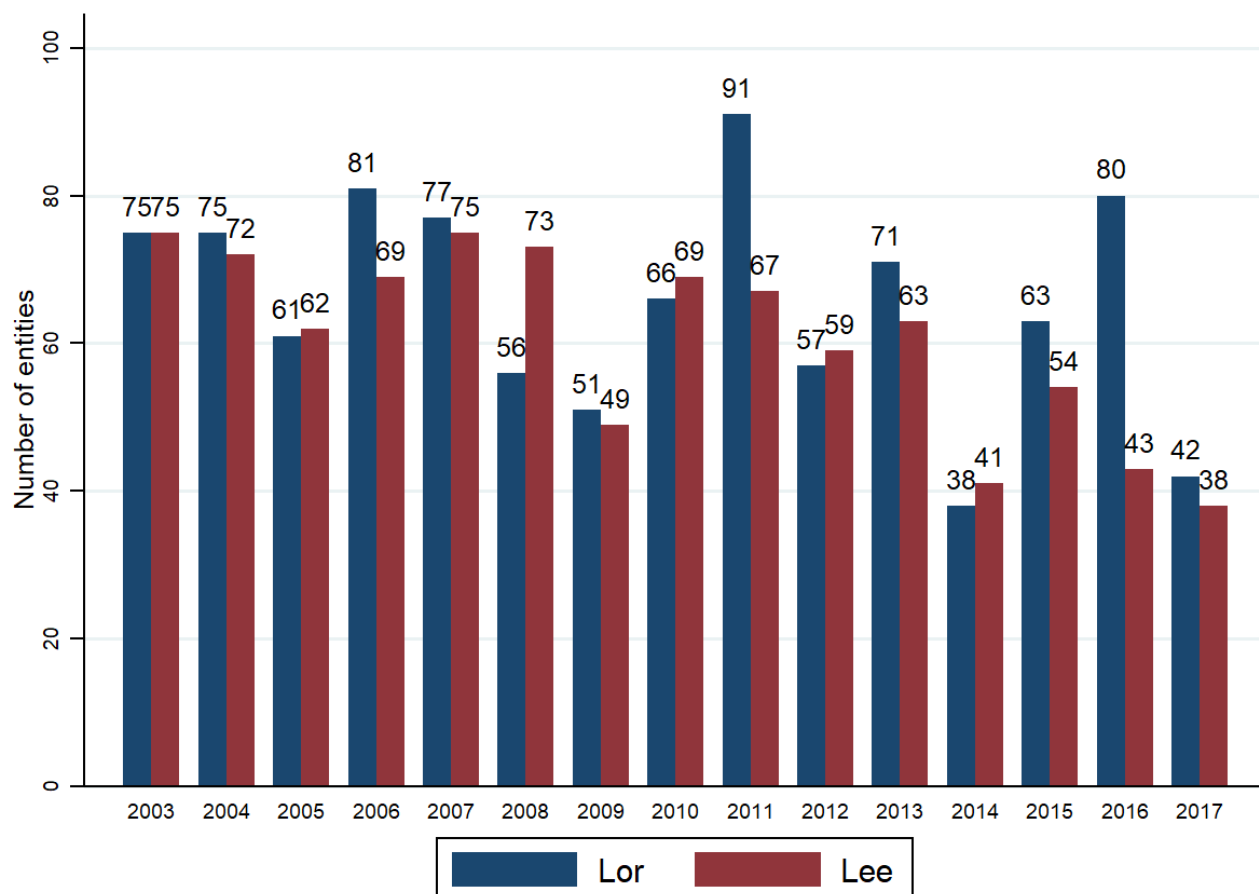FIGURE 4B. DISTRIBUTION OF LICENSED TRADEMARKS BY NICE CLASS

Note: the length of each bar represents the number of licensed trademarks falling within the corresponding NICE class. When a licensed trademark was associated with more than one class, it was counted once in each one of them. The numbers on the y-axis correspond to the NICE classes: 001 'Chemicals', 002 'Paints', 003 'Cosmetics and cleaning preparations', 004 'Lubricants & fuels', 005 'Pharmaceuticals', 006 'Metal goods', 007 'Machinery', 008 'Hand tools', 009 'Electrical & scientific apparatus', 010 'Medical apparatus', 011 'Environmental control apparatus', 012 'Vehicles', 013 'Firearms', 014 'Jewellery', 015 'Musical Instruments', 016 'Paper goods and printed matter', 017 'Rubber goods', 018 'Leather goods', 019 'Non-metallic building materials', 020 'Furniture and articles not otherwise classified', 021 'Housewares and glass', 022 'Cordage and fibres', 023 'Yarns and threads', 024 'Fabrics', 025 'Clothing', 026 'Fancy goods', 027 'Floor coverings', 028 'Toys and sporting goods', 029 'Meats and processed foods', 030 'Staple foods', 031 'Natural agricultural products', 032 'Light beverages', 033 'Wine and spirits', 034 'Smokers' articles', 035 'Advertising and business', 036 'Insurance and financial', 037 'Building construction and repair', 038 'Telecommunications', 039 'Transportation and storage', 040 'Treatment of materials', 041 'Education and entertainment', 042 'Computer, scientific & legal', 043 'Hotels and Restaurants', 044 'Medical, beauty & agricultural', 045 'Personal'. **Source:** authors' elaboration on USPTO data.

FIGURE 5. LICENSING AGREEMENTS PER YEAR
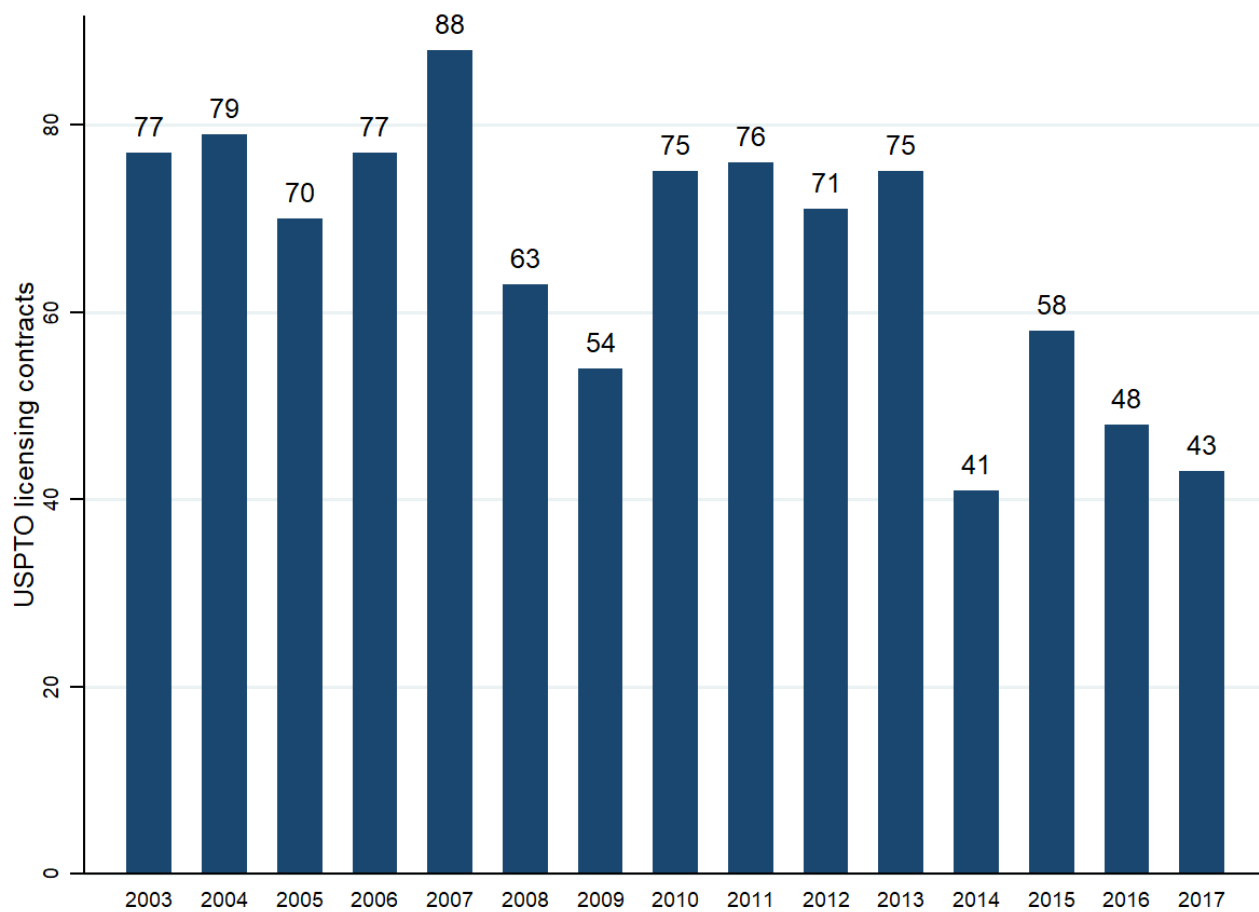
Note: the height of the bars (and the corresponding numbers) represents the whole number of licensing agreements newly stipulated in each year. **Source:** authors' elaboration on USPTO dataset.

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FIGURE 6. NUMBER OF LICENSORS AND LICENSEES PER YEAR

Note: the height of the blue bars (and the corresponding numbers) represents the whole number of licensors (Lor) in each year. The height of the red bars (and the corresponding numbers) represents the whole number of licensees (Lee) in each year. **Source:** authors' elaboration on USPTO dataset.

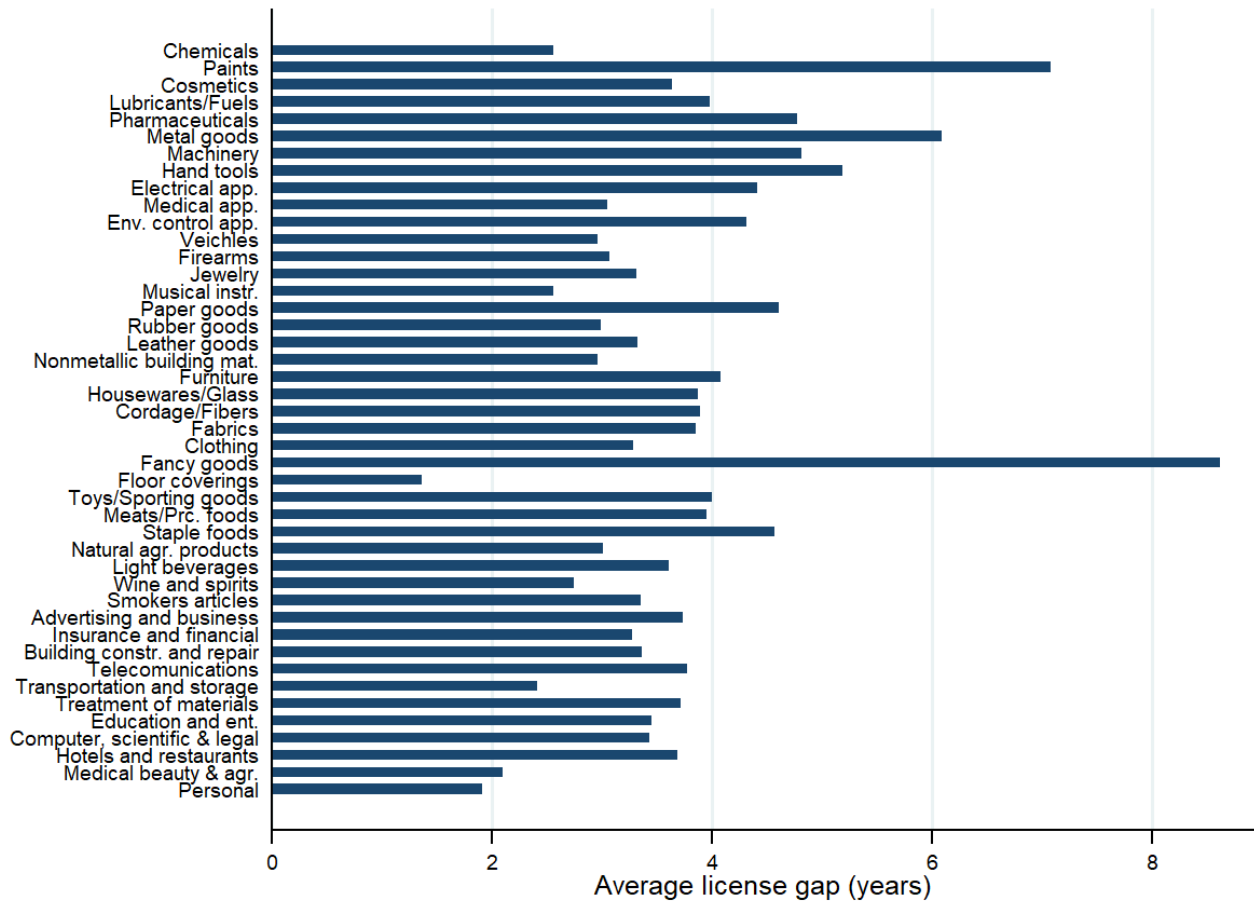FIGURE 7. AVERAGE SHARE OF TRADEMARKS GIVEN/TAKEN AS LICENCES BY FIRM SIZE
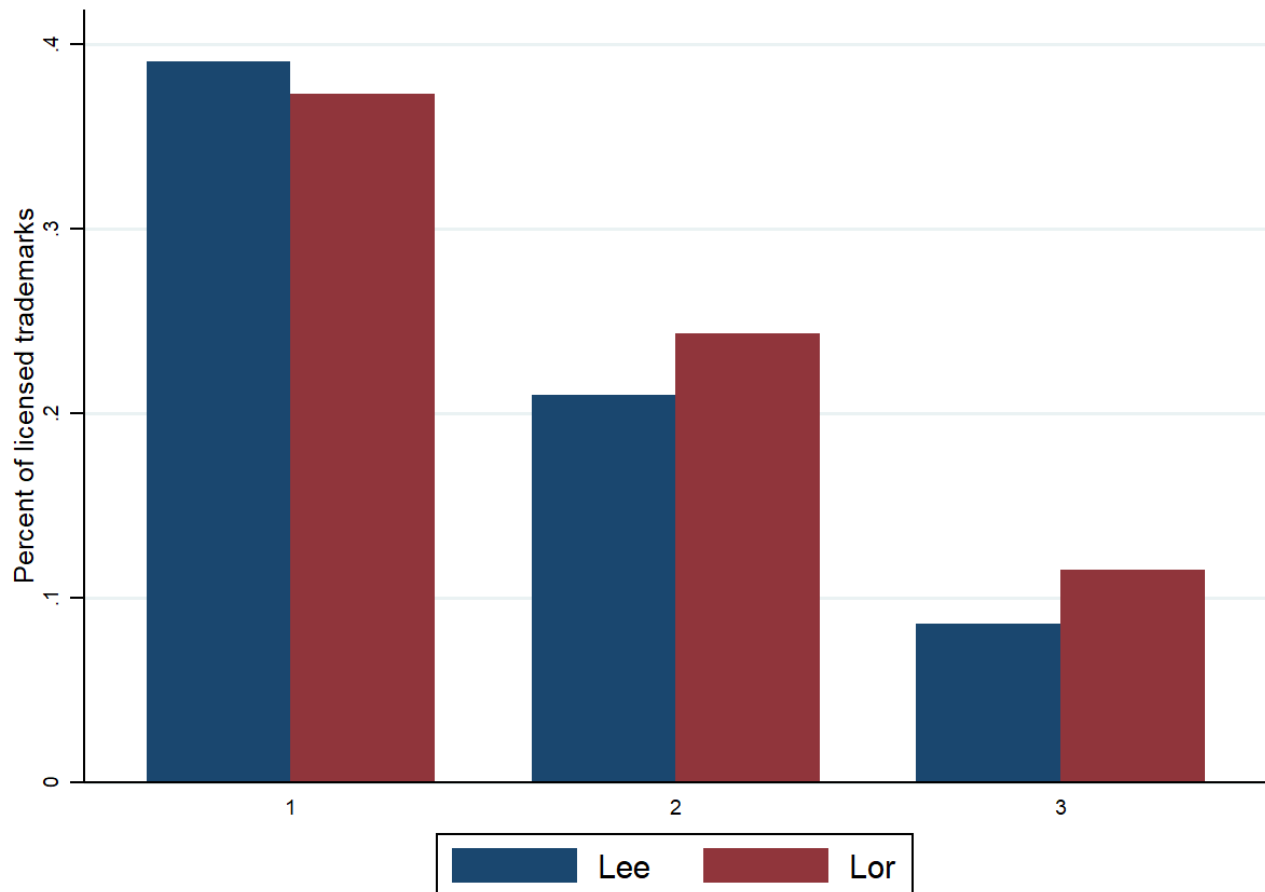
Note: the height of the blue bars represents the average share of licensed trademarks over the whole portfolio of trademarks among licensors (Lor). The height of the red bars represents the average share of licensed trademarks over the whole portfolio of trademarks among licensees (Lee). The numbers on the x-axis correspond to the three size classes: class '1' includes all the entities with a trademark portfolio whose size is smaller than the 33rd percentile (included) of the trademark portfolio size distribution; class ''2' includes all the entities with a trademark portfolio whose size falls within the 33rd percentile (excluded) and the 66th percentile (included) of the trademark portfolio size distribution; class '3' includes all the entities with a trademark portfolio whose size is larger than the 66rd percentile (excluded) of the trademark portfolio size distribution **Source:** authors' elaboration on USPTO dataset.

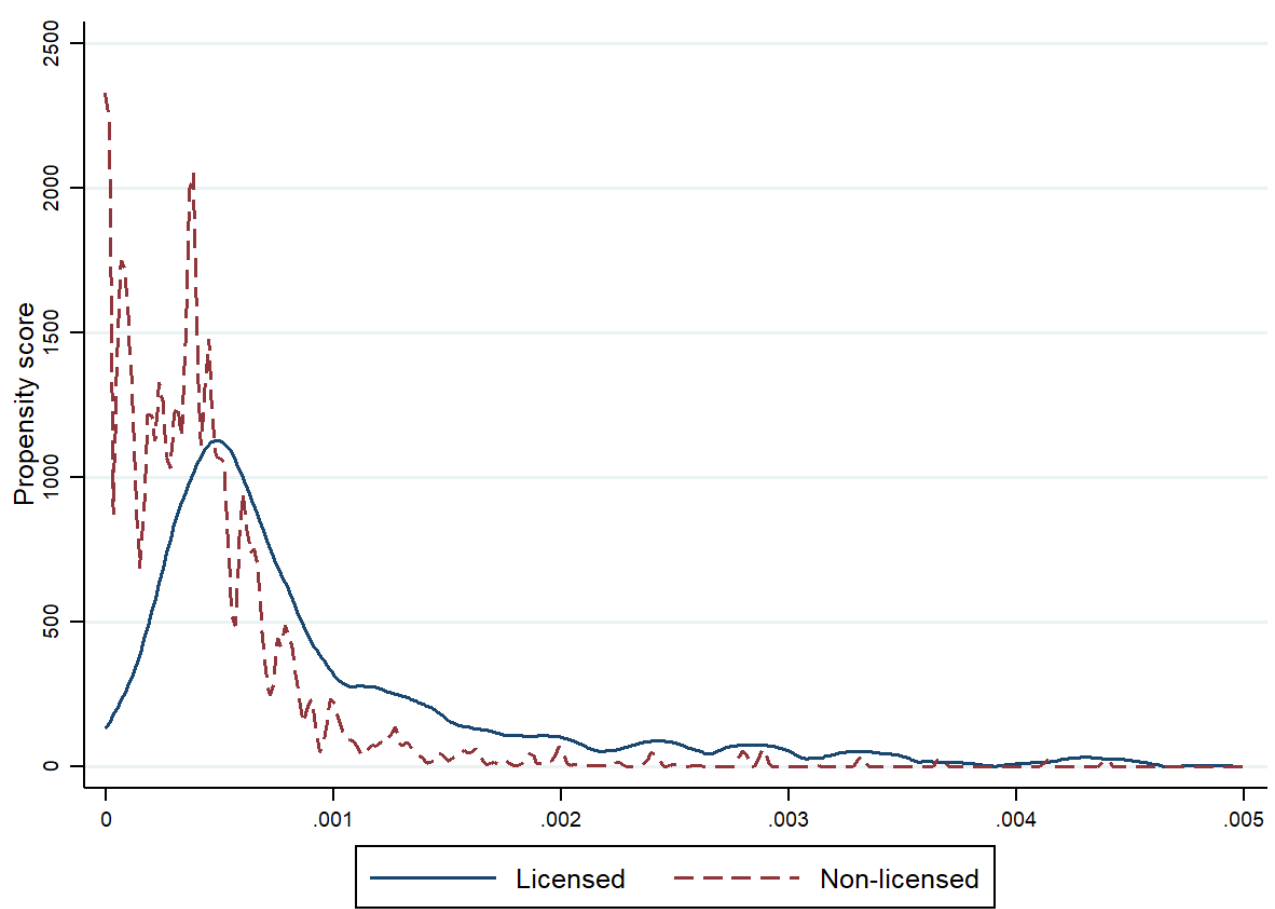FIGURE 8. DISTRIBUTION OF THE TIME BEFORE A TRADEMARK IS LICENSED
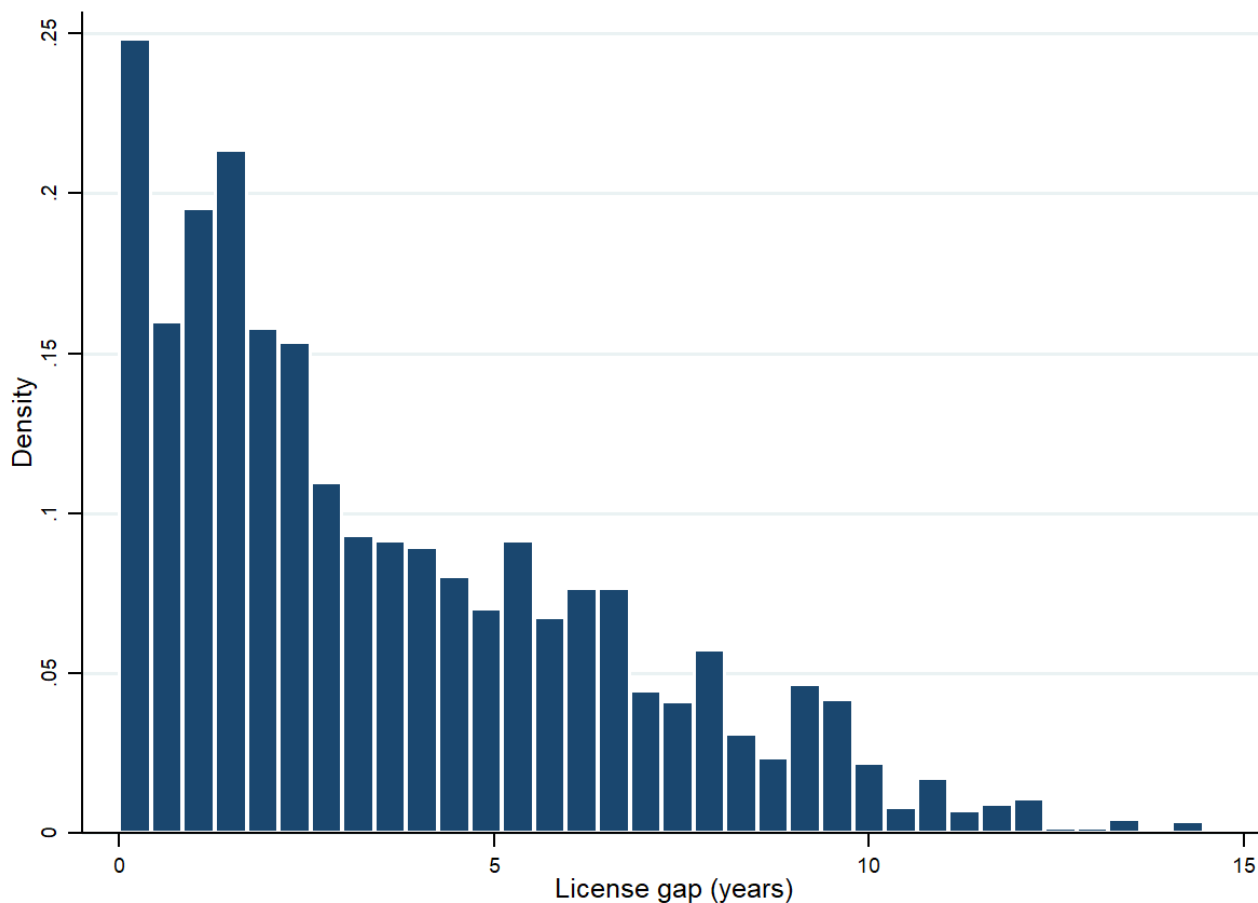
Note: the graph reports the distribution of the time before a trademark is licensed, computed as the difference (in days terms) between the filing date of the trademark and the execution date of the license. The data have been rescaled to provide the information in years' term.
Source: authors' elaboration on USPTO dataset.

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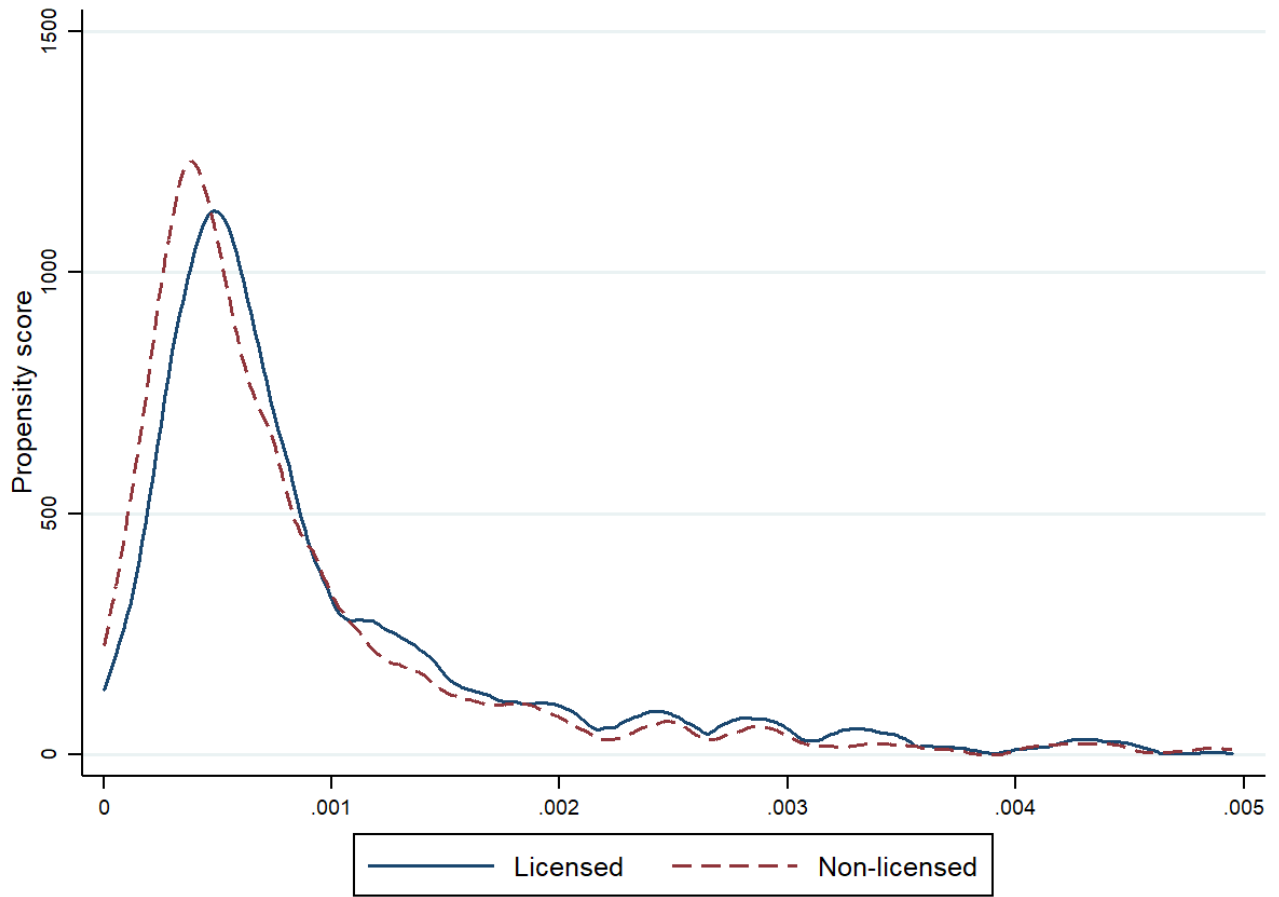FIGURE 9. AVERAGE NUMBER OF DAYS BEFORE A TRADEMARK IS LICENSED IN EACH CLASS

Note: the length of each bar represents the average number of years (computed as the number of days divided by 365) between the filing date of the trademark and the execution date of the licence in each NICE class. **Source:** authors' elaboration on USPTO dataset.

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FIGURE 10. PROPENSITY SCORE VALUES BEFORE THE MATCHING PROCESS

FIGURE 11. PROPENSITY SCORE AFTER THE MATCHING PROCESS

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FIGURE 12. LINEAR PROBABILITY MODELS FOR THE PROBABILITY OF A TRADEMARK OF BEING LICENSED
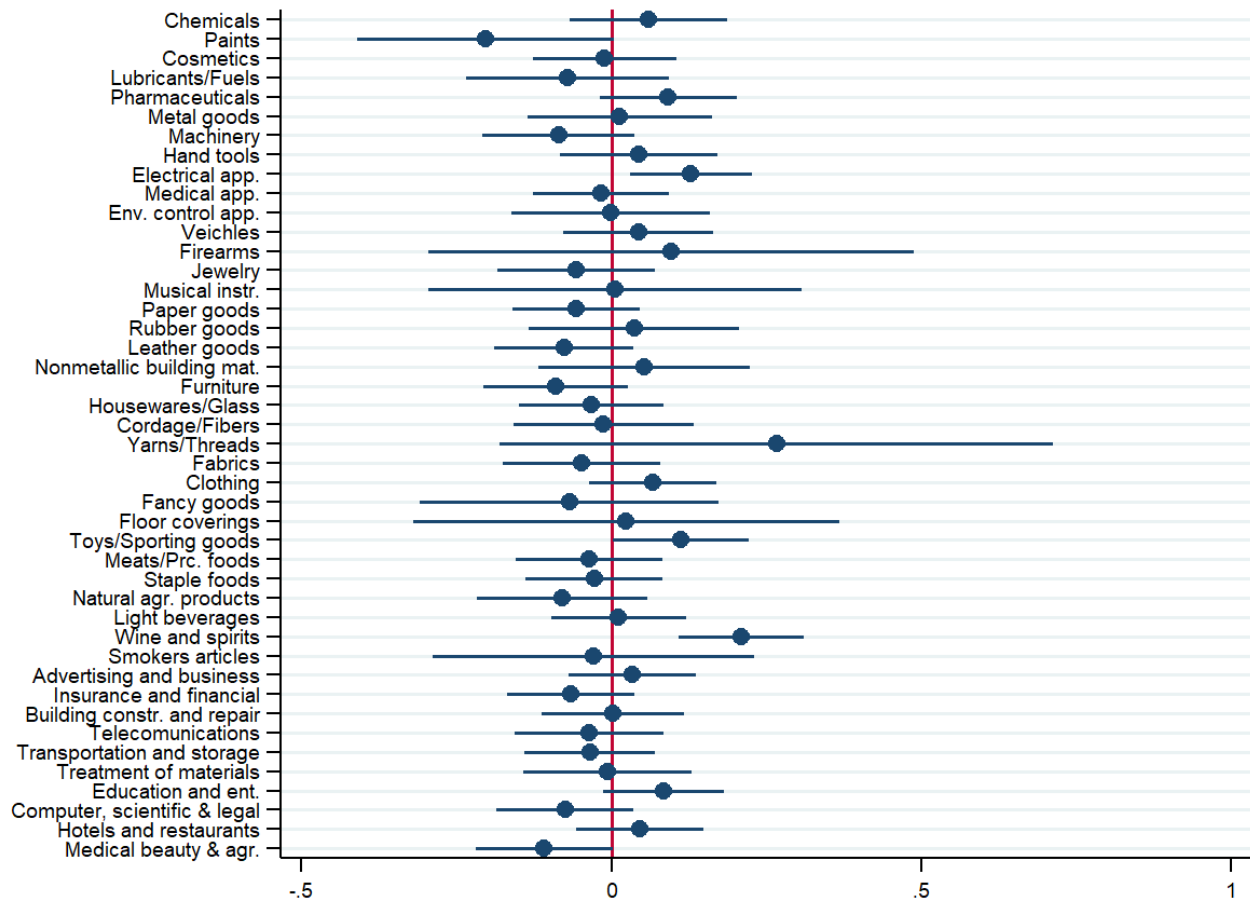
Note: Regression coefficients of trademarks NICE class dummies. Results refer to a linear probability model in which the dependent variable is a dummy that takes value 1 if the trademark has been licensed, zero otherwise. Controls include: filing year dummies and the scope of the trademark. Bootstrapped standard errors (1000 reps).

FIGURE 13. REGRESSION ON THE SPEED OF LICENSING
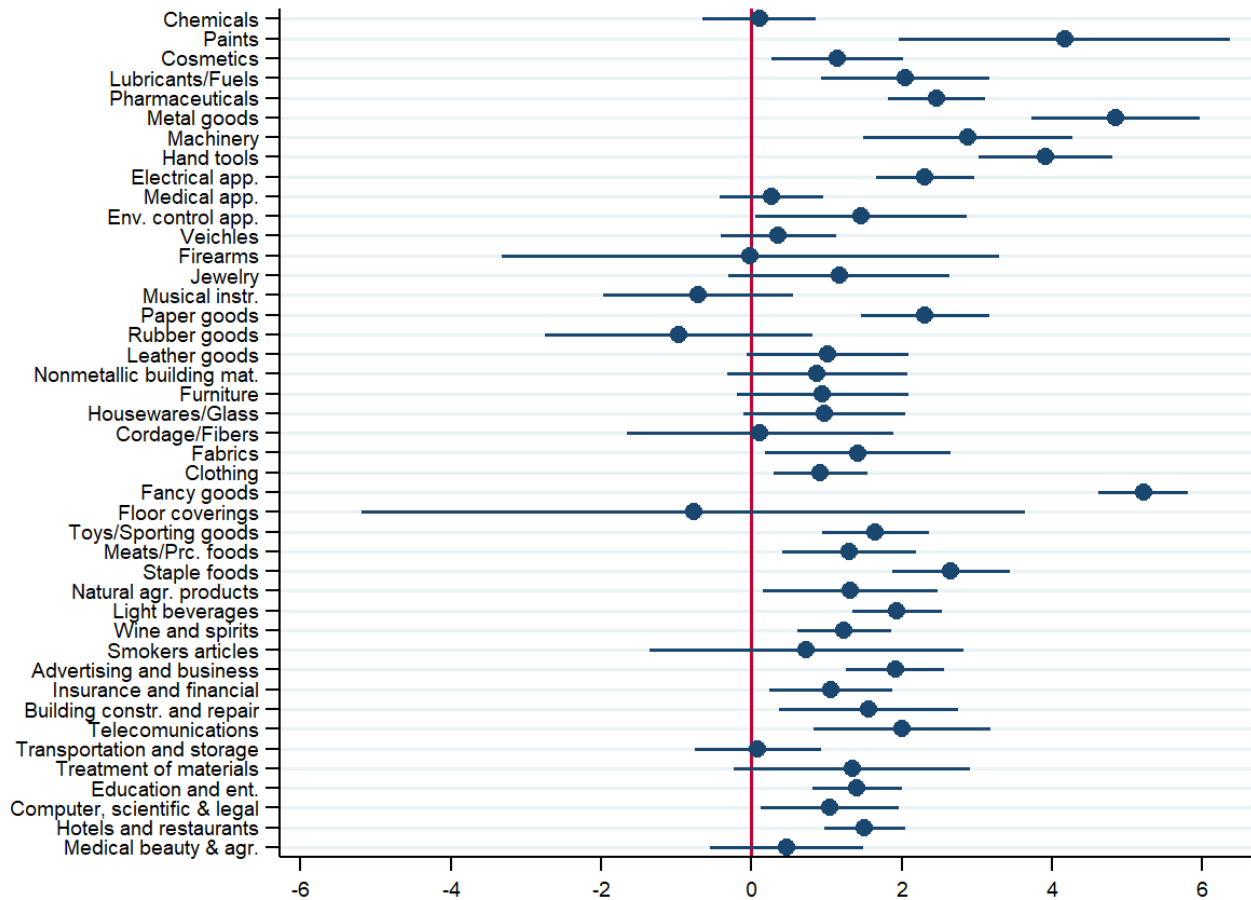
Note: Regression coefficients of trademarks NICE class dummies. Results refer to an OLS model in which the dependent variable is the number of years (computed as the number of days divided by 365) between the filing date and the license registration date. Controls include: filing year dummies, scope of the trademark. Bootstrapped standard errors (1000 reps).