QUADERNI


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# Trademarks, Product Variety, and Economic Activity in Italy and Europe

n. 422 - Marzo 2004

**Abstract** - This paper studies the relationship between trademarks and economic activity. We compare the distribution of product classes across national, EU, and international trademarks deposited by Italian firms. In relation to EU trademarks, we analyze some characteristics of the deposits of major European countries. In particular, we compare "trademark specialization" to export specialization. A trademark is interpreted as a means to differentiate products, thus a greater number of trademarks deposited is associated with a higher degree of product differentiation.
Our findings highlight that trademark protection "follows" quite closely the structure of the real economy, with some exceptions. Thus, those economic sectors where countries exhibit economic specialization also present a higher degree of product differentiation.

**Jel classification:** D23, K13, O34.

**Keywords:** Trademarks, Intellectual property rights, Specialization, Product variety.

We thank Dennis Mueller, Paolo Mariti, Carlo Casarosa, and Marco Ricolfi for helpful suggestions and insightful comments. Although the paper is the result of a joint work, Sections 1 and 5 were written by Luigi Luini, and Sections 2, 3, and 4 by Andrea Mangàni

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## 1. Introduction

The use of trademarks has yet to be studied in great depth in the economics literature. The analysis of the manifestations of intellectual property both within and outside companies has focused on other issues, such as the use of patents. In the latter, there are a large number of theoretical and empirical studies, sometimes leading to contrasting results. Although some authors have recently put forward a theoretical analysis of the trademark strategies of various companies, there is still a lack of empirical research.

Within the literature on industrial organization, there are studies on branding strategies (Sappington, Wernerfelt, 1985, Jarrell, Peltzman, 1985, Wernerfelt, 1988, Mitchell, 1989, Sullivan, 1990, Sullivan, 1992, DeGraba, Sullivan, 1995, Choi, 1998, Tadelis, 1999, Cabral, 2000, Pepall, Richards, 2002). Branding strategies have also been largely explored by the marketing literature, which has focused on the effects of brand extensions on consumer choice, both through empirical analysis and experimental methodology. All these works, however, highlight issues that are not strictly related to trademarks, which in any case represent the legal precondition of branding strategies.

There are only a few theoretical papers that deal with specific trademark issues. Firstly, there are works which use a historical or law and economics approach. Wilkins (1992) shows that in the United States the rise of the trademark coincides with the formation of modern large companies. In fact, a trademark becomes an essential and fundamental property right which requires legal support only when firms have to increase demand and exploit scale and scope economies, the latter being a typical characteristic of large organizations. Landes, Posner (1987) use standard microeconomic tools to explain the structure of trademark law. The main conclusion is that trademark law, as in general tort law, may be explained by the hypothesis that the law is trying to promote economic efficiency and high quality products. Higgins, Rubin (1986) consider the counterfeiting of snob goods, while Huntley, Stephen (1995) deal with brand copying in the general context of competition law.

Other theoretical works focus on trademarks within oligopoly markets[1]. Lane (1988) studies the equilibrium properties of a model where compulsory trademark licensing is introduced. In Perry, Groff (1986) and Veall (1992) the concept of the trademark is used in order to enrich the traditional models of product differentiation, but the specificity of trademarks is unclear. In addition, in Veall (1992) patents and trademarks are treated as equal tools of legal protection, and receive the same theoretical treatment. Finally, Rozek (1982) analyzes how advertising

[1] The issues regarding the counterfeiting of trademarks in a general equilibrium model are analyzed by Grossman, Shapiro (1988a, 1988b).

strategies and their effects change when a specific trademark evolves into generic use, that is, when it becomes a common descriptive name for an entire product class rather than the trademark for a specific brand within a class. It should be noted that Rozek (1982) tries, unlike most other authors, to distinguish trademarks and brands, and to investigate what happens when these two legal and commercial practices interact.

Rather surprisingly, there are virtually no empirical studies on trademarks. Some authors use trademark data to infer information about firms' market value and their ability to innovate (see Bosworth, Rogers, 2001 and Feeny, Rogers, 2003). The paper by Allegrezza, Guards-Rauch (1999) is the only one that attempts to analyze the determinants of trademark deposits. They do so at a firm level using a sample of 2500 companies in Benelux. The logit regressions indicate that there is a positive correlation between national trademark deposits and, among other factors, the size of the firm, the intensity of its R&D efforts, and the percentage of exports in its turnover.

This lack of empirical works may be due to two factors. First, trademark offices have only recently began to make trademark data public. National offices have paid little attention to collecting such data in any homogeneous form, and only now do we have standard analytical techniques to pool all the available data and analyze them. Second, it seems that compared to patents, trademarks have only been considered marginally important, and therefore less worthy of empirical attention The main reason is that patents are seen as very much related to technological progress and therefore to economic growth, while trademarks are not. Another possible reason is that, as noted by Greenhut (1957), a trademark ensures its owner a much lower monopoly rent than a patent does, at least potentially. In actual fact, in recent years there has been an intense trade in trademarks, whose prices have sometimes reached very high levels. Moreover, it is well known that the sale of a firm often means only the sale of a word or figurative trademark. In the last few years the availability of national and international trademark data has increased substantially. There is thus room for empirical studies that may shed some light on a practice that so far has been partially neglected by the economic literature.

In this paper we describe the characteristics of deposited and/or registered trademarks in Italy and European Union[2]. Our work is only exploratory, because the focus is on a limited geographical area, and because the application of theoretical and statistical tools to trademarks is still in an experimental phase. In addition, the results presented in this paper will have to be verified once a larger and "deeper" database is available. Our overall aim is to verify whether the protection of trademarks reflects the structure of real economies. Intellectual property rights

[2] A deposited trademark is protected against unfair use only after it has been registered by the competent office.

have recently received great attention since international institutions and policymakers have highlighted their importance for economic development. It thus seems useful to investigate the relationship between tangible and intangible assets in developed countries.

The paper is organized as follows. In the next section we make some general remarks on the relationship between trademarks and product differentiation, in order to suggest a theoretical interpretation of observed phenomena. As will become clear, the use of trademarks as an indicator of product differentiation implies some problems. However, we hope our approach and its possible pitfalls will stimulate the debate on trademark practices. In Section 3 we present some stylized facts about the evolution of GDP, added value and trademarks in force within Italy, and we measure the importance of trademark registrations in various economic sectors. In Section 4 we analyze the patterns of "trademark specialization". First, we study the product and service classes "covered" by national, EU, and international trademarks deposited by Italian firms. Secondly, using export data we compare, for some large European economies, the trademark specialization to the economic specialization. We thus show that trademark specialization substantially reflects export specialization. In the last section we make some final comments and suggest areas for future research.

## 2. Trademarks and product differentiation: some theoretical considerations

A trademark is a legally protected name, word, symbol, or design (and combinations of these) used by a manufacturer or seller to identify a product or service and distinguish it from other goods. The economic function of a trademark is to facilitate consumer decisions, because it indicates the inherent quality or other distinguishing features of identified products: if these features are constant, the consumer costs of searching for preferred quality characteristics are lowered. This gives firms an incentive to maintain quality over time in order not to erode the value of their marks (Economides, 1987). Other authors claim that trademark protection also induces firms to improve quality over time (so the average quality of products increase) and generates further product differentiation (Maskus, 2000).[3]

Our aim is to study the characteristics of the recourse to trademarks and its relation to the characteristics of the "real" economy. Therefore we will investigate whether this form to protect a firm's intellectual property rights reflects the production and sale of goods and services. We

[3] The function of the trademark in competitive markets was recently re-discussed by De Alessi, Staaf (1994), who assert that a trademark not only ensures the provenance and the quality of a product: a trademark guarantees, to customers and to the trademark owner, also the specific performance, that is the fulfillment of the specific terms of the contract. By using this expanded version of the trademarks function, De Alessi, Staaf (1994) explain some stylized facts, regarding primarily negative events in which brand products have incurred.

will focus on Italy and Europe, and use the number of trademarks deposited by the firms in a country as an approximate measure of product differentiation in that country. So far, works on the variety and quality of goods produced and exported by an economy have used data on international trade[4]. We believe that trademark data can be used along with export and import data in order to analyze the variety of an individual country's goods and services.

It is well known that a trademark does not define a certain good, but, rather, the productive or commercial source of one or more goods and services. Therefore measuring product variety by counting the number of trademarks may seem misleading. However, if the aim is to examine the degree of differentiation *perceived* by consumers, trademarks have an important role, because they indicate the variety of offers that consumers are faced to. In fact a trademark distinguishes a seller's product from those of other sellers, and it is this differentiation that is first perceived by consumers. In addition, firms often create and deposit a trademark in order to link it to a single product. In recent years the phenomenon of brand extensions, i.e. where a certain brand relates to several goods and services, has become intense. In actual fact, most registered trademarks correspond to a specific product. It should be noted that some firms deposit trademarks that will never be used, while other firms produce and sell products without depositing any trademarks. This implies that trademarks, like patents, may greatly vary in their value and ability to represent the real economy. However both phenomenon, trademarks without goods and goods without trademarks, are marginal with respect to the global economy. Generally speaking, counting the number of trademarks can reveal as much valuable information about the application of intellectual property laws as counting patents does.

An advantage of using trademarks to measure product variety is its simplicity. The number of total trademarks registered (or deposited) by the firms of a certain country indicates the actual differentiation in the markets of goods and services, and this feature is important if we assume that product differentiation affects consumer welfare.

A trademark does not provide any direct information concerning the degree of vertical product differentiation, that is, information regarding the quality of a country's products. For this, we will consider counts of trademarks only as a general indication of horizontal product differentiation[5]. Some recent contributions found a positive relationship between the size of economies and product variety (Hummels, Klenow, 2003). This result is obtained by using the composition of international trade flows to estimate the variety and quality of the goods

[4] See the recent study of Hummels, Klenow (2003), where the main theoretical studies about product variety and quality across countries are discussed and empirically tested.

[5] Note that the usual measures of product quality, for example price-cost margins, are often questionable. Aiginger (2001) proposes, discusses and applies more elaborate measures of product quality across countries.

produced and exported by an economy. Therefore, at a national level, one could conjecture that there is a positive historical relation between GDP and product variety. If we assume that a trademark deposit reflects the intention of a firm to differentiate its products and services, then a positive relation between the number of trademark deposits and the general course of the economy should emerge.

The above remarks should be taken into account when interpreting the empirical observations presented in the next sections, where the link between trademarks and product variety will not always be explicit, though it will still be useful in explaining the general results.

## 3. Some stylized facts about trademark and economic activity in Italy

Figure 1 shows the percentage variations of the total stock of national trademarks in force in Italy and of the GDP constant prices (base year 1990), in the years 1981-2001. The data before 1981 are not reliable since only some of the local Chambers of Commerce, where firms can deposit a trademark, were able to transmit all the relevant information regarding the applications. The number of trademarks in force is computed by adding to total stock the new registered trademarks and subtracting the trademarks not renewed. The two time series are strongly related, above all since 1986. The annual variations of trademarks are always higher than those of GDP, and the variation of trademarks in force (new registrations minus not renewed trademarks) is always positive. In general, the impression is that the real economy and the protection of trademarks is somewhat correlated. If we assume that the number of trademarks in force is a reliable indicator of product variety within Italy, then Figure 1 shows that GDP and product variety are positively correlated. This would confirm the results of recent empirical studies cited in Section 2.

Insert figure 1

Clearly, the data reported in Figure 1 are highly aggregated, and we could get more information if we observed the evolution of trademarks in force and economic activity for each economic sectors. This would highlight in which sectors the deposit of trademarks is particularly intense, and therefore where product variety is presumably high.

Unfortunately the Nice Classification of products and services adopted by all Trademark Offices does not correspond to the standard classification of economic activities used by Statistics Offices for analyzing the main economic aggregates. Hence, it is difficult to compare the observations deriving from the two classifications, and the characteristics of trademark

deposits can principally be analyzed "within" the context of the Nice Classification. Only in a few cases can we combine some product classes and make them match sectors or sub-sectors of economic activity. This does not lead to a perfect matching, but it may be useful in clarifying the relationship between the protection of intellectual property rights and the structure of production. Table 1 shows the product classes and the ATECO 2002 sectors that may be matched[6].

Insert table 1

Since the product classes and economic sectors described in Table 1 do not match perfectly, the data should be analyzed with caution. Consider, for instance, the ratio (hereafter W) between the national trademarks registered in these classes and their added value. Table 2 describes the value of W for the three "sectors" in the years 1992-2001 in Italy, as well as for total sectors.

Insert table 2

The three sectors under review present a change in W higher than that computed for total classes and value added. The greatest increase is observed in the case of transportation (class 39). The financial intermediation sector (class 36) also shows a significant change in W over ten years. The reorganization and redefinition of activities carried out in the sector of financial intermediation (commercial banks, financial intermediation societies, insurance companies), probably also caused a revision of marketing strategies, and a redefinition of intellectual property rights. Note that transportation and financial intermediation present a very low W compared to beverages and tobacco products. These classes exhibit a very high W (7 in 2001), probably due to the great fragmentation of beverage industries, in particular those firms producing goods that are included in class 33, such as wine.

The degree of perceived product differentiation for the sectors under review is likely to increase, given the change in the registered trademarks/value added ratio. There are probably other sectors where the change of W is lower, that is, sectors where the perceived product differentiation has grown slowly. The distribution of firm size in the industries may be responsible for different Ws but, unfortunately, we have no established theory about the relationship between the size of firms and product variety, here measured by counting the number of trademarks. A single large company as well as many small firms can deposit and use many different trademarks, and the degree of perceived product differentiation will be the same.

[6] For the complete classification of goods and services used in trademarks procedures see the Appendix.

Although the facts reported in Figure 1 seem to confirm a positive relationship between economic activity and product variety as measured by registered trademarks, one could argue that the order of causality is unclear. If we adopt the trademark as a proxy of product differentiation, a greater added value leads to higher product differentiation. This result is consistent with Hummels, Klenow (2003), who show that large economies exhibit a large variety and quality of exported goods. Is it absurd to hypothesize an inverse order of causality? In other words, can many trademarks generate high added value? Some models of endogenous growth theory include product variety among the factors that affect growth differentials across countries. See, for example, Jones (1998) and the empirical analysis of Feenstra et al. (1999), and Funke, Ruhwedel, (2001). These empirical studies show that there is a positive and significant correlation between product variety measured by using export data and growth rates. It would be useful to replicate these analyses by using trademark data as a proxy of product variety. This will be possible when data about trademarks registrations within several countries (that is, about national trademarks) is available.

## 4. Trademark specialization

### 4.1 Italy

In order to analyze in more detail the characteristics of Italian trademarks, we will consider the community and international trademarks registered by Italian firms. The international trademark (hereafter, WIPO trademark) is protected by the World Intellectual Property Organization within 50 countries adhering to the Madrid Treaty. These countries do not form a homogeneous economic and geographical area, and the USA is not included. In relation to the community trademark (hereafter, OHIM trademark), since 1996 firms have been able to deposit their trademarks at the Office for Harmonization in the Internal Market, which guarantees the protection of trademarks within EU member states. Actually, a group of countries have extensively used the OHIM trademarks: the first four (USA, Germany, UK and Italy) accounted for 63.79% of total registered trademarks by the end of 2002. The first language is, for 41.90% of registrations, English, while German is the first language for 20.06%. Looking at the type of deposited trademarks, word marks make up 63.20% of total trademarks while figurative marks account for 36,20%[7]. In relation to the product classes covered by registrations, the first classes are 9 (various technical and scientific apparatus, accounting for 11,85% of registrations), 42 (various services, 9.02%), and 16 (paper products, 6.76%). However, most trademarks are

[7] There three-dimensional, color and sound marks can also be deposited.

deposited over multiple classes. Although the Nice Classification covers 45 product classes, there were only 42 until the end of 2001, and hereafter we will always refer to 42 classes[8].

The following graph shows the distribution of Italian trademarks according to their type: National (that is, deposited at the UIBM, the Italian Patents and Trademarks Office), OHIM, and WIPO, in the years 1997-2002, in relation to the most cited classes in the application procedure, and sorted by citations in the OHIM trademarks.

Insert figure 2

Some product classes are well cited in all three types of trademark, although there are substantial differences in the system of protection (for instance, an OHIM trademark is in force within Italy, a National trademark is not protected in the European Union, but it may be protected in those countries adhering to the Madrid Treaty). A test on contingency tables (chi square) reveals that there are significant differences between the patterns of class specialization in Italy, European Union, and WIPO environment (with alpha=0.001, theoretical chi-square=127.32, observed chi-square=9048.6). Which classes are most responsible for these different patterns of class specialization? Excluding classes 9 and 42 apart, which are too heterogeneous to draw any definitive conclusions, the greatest differences are in classes 25 (clothing, footwear, headgear), 33 (alcoholic beverages, excluding beers), 29 (fresh and preserved food), 18 (leather products), whose percentage contributions to chi-square are, respectively, 17.9, 9.7, 6.5, and 6.0. For all these classes, which are usually considered "typical" of the Italian economy (class 33 contains wine), the WIPO trademark has hardly been used. Therefore, it seems that what is considered typical in Italy is not adequately protected outside Europe. This is probably due to the fact that the WIPO trademark is not a specific kind of trademark, like the OHIM trademark, but it is an aggregation of national trademarks, and this set is not homogeneous from a geographical point of view.

We carried out a chi-square test by distinguishing between the product (1-34) and service (35-42) classes. Again, the three types of trademarks show, in aggregate, significant differences in class specialization (with alpha=0.001, theoretical chi-square=13.82, observed chi-square=340.51). As expected, the OHIM and WIPO trademarks, that is, the trademarks protected abroad, mainly regard product classes, while national trademarks focus on services.

[8] The eighth edition of the classification of goods, wares and services for the registration and the renewal of trademarks has been in force since 1 January 2002. In the new edition, class 42 has been amended and three new classes 43, 44 and 45 have been added, with the result that some of the services formerly in class 42 are now distributed in the three new classes. In our analysis the product classes 42, 43, 44, and 45 for the year 2002 will be aggregated in the "old" class 42.

Broadly speaking, even assuming that trademarks reflect the productive structure of countries (a question that will be discussed shortly), we can observe different patterns of class specialization according to the geographical extent of trademark protection.

Now let us analyze the distribution of product and service classes across the OHIM trademarks deposited by Italian firms, to find out if there is a relationship between trademark deposits and the make up of the Italian economy.

Table 3 reports the most cited classes in the OHIM trademark registrations by Italian firms in the years 1996-2002, services excluded. In the same table there are those sectors where Italy could be considered as being specialized according to the Balassa index in 1996, when this was higher than 1.50[9]. The year 1996 describes the situation of Italian specialization when the OHIM trademark was adopted.

Insert table 3

There are some sectors that seem to be well represented in both classifications. For example, trademarks often regard apparatus and equipment of various types (9), machinery and machine-tools (7), and this corresponds to intense exports of generic machine-tools, machine tools for special purposes, and machine-tools for metallurgy. Another example is that on one side we have leather products, bags and umbrellas (18), and on the other leather goods and luggage products. There are many trademarks deposited for clothing, footwear and headgear (25), and intense exports of footwear, clothing and textile products. A correspondence also emerges for trademarks for equipment in lighting, heating, cooking etc. (11) and exports of sanitary and heating equipment. Finally, a strong trade in furniture and parts is reflected by many trademarks deposited in the class of furniture (20). For all these economic sectors and classes, Italian firms are specialized and deposit many trademarks. Therefore a positive relationship emerges between economic specialization as measured by exports, and product variety as measured by trademarks.

For other sectors, for example the fresh and preserved food, the Balassa index does not reveal a particular competitive advantage (the food industry was not included in the top 30 sectors for export specialization), although the use of OHIM trademarks for food products is frequent. This confirms what we reported in Section 3 regarding many national trademarks deposited in product classes concerning beverages industries with respect to the added value of this sector. Furthermore, the paper sector was ranked only 21st according the Balassa index in 1996, but

paper, paper products and photographs (16) is a class that is often cited in the OHIM trademark applications.

The partially imperfect matching between trademarks and export data may be explained by the following biases. The two classifications radically differ from each other because of the different rationale of their structure. In addition, while the sectors where export specialization emerges may be determined quite easily, in the case of trademarks the distribution of classes across trademark deposits is more uniform, because it is difficult to aggregate distinct classes as is done with economic sub-sectors. Also, the Balassa index deals with total exports and therefore with global foreign markets, while the OHIM trademark is protected only within the European Union. Finally, the trademark specialization of Italian firms is computed by taking into account only the number of citations of each product class.

In the next section we will calculate an index of trademark specialization in order to provide a relative measure of trademark specialization for some large European countries. In addition, we will consider the Balassa index for export specialization at a higher degree of aggregation. This will allow us to link several product classes to the same economic sector.

### 4.2 Europe

The following table shows the top 10 classes (according to the number of citations in registrations) of OHIM trademarks deposited by some member states in the years 1996-2002, that is, in the first six years of OHIM trademark enforcement. Any firm in the world can deposit an OHIM trademark, which, if registered, is then protected within the EU. We consider only European countries because they belong to a homogeneous geographical and economic area.

Insert table 4

For all the countries under review, the top 10 classes make up more than 50% of total citations (not of total trademarks, since each trademark application is usually registered over several classes). This high "concentration ratio" may be due to strong specialization patterns, however it may actually depend on the number of goods or services contained in each class. A chi-square analysis is useful to evaluate the independence of the distribution of classes across countries. The test shows that there are patterns of strong trademark specialization (with alpha=0.001, theoretical chi-square=225.70, observed chi-square=17927.85).

[9] The Balassa index in Table 3 compares the share of a given sector in national exports with the share of this sector in world exports. Values above 1 indicate that the country is specialized in the sector under

In order to qualify the trademark specialization for major European countries, we have calculated an index inspired by the Balassa index for export specialization. The index of trademark specialization of country *i* in the class *j* is given by

$$I_{ij} = \frac{C_{ij} / \sum_{j=1}^{42} C_{ij}}{\sum_{i=1}^{n} C_{ij} / \sum_{j=1}^{42} C_{ij} \sum_{i=1}^{n} C_{ij}}$$

where $C_{ij}$ is the total number of citations of class *j* in the trademarks deposited by country *i*. In the computation of this index for the five countries under review we took into account the trademarks deposited by all *n* countries in the world. Thus the index compares the share of a given class in a country's trademark applications with the share of this class in total trademark applications. The following table reports the product classes that have a specialization index higher than 1.1. Table 5 does not show the specialization index for classes of services, which will be analyzed later.

Insert table 5

Table 5 shows that each country exhibits a trademark specialization in several classes, which is different for each country. Spain, France and Italy present more evident patterns of trademark specialization than Germany and UK. The usual question is whether these specialization figures are linked both to the real economic structure and to the economic extent of each class within countries. The latter can be deduced from export data. Table 6 shows the economic specialization (Balassa index) of major European countries for some macro sectors. Here we consider 1997-2001 for a higher homogeneity with respect to trademark data.

Insert table 6

Again, the comparison between trademark and economic specialization is biased due to the divergence between product classes and economic sectors. However, the following observations can be made by analyzing Tables 5 and 6 together.

In Germany the export specialization seems to be adequately reflected in the number of trademarks deposited. The export specialization in basic manufactured items (1.17) may explain

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review.

the trademark specialization in classes 8 (1.39), 19 (1.34), 17 (1.31), 6 (1.27), 27 (1.24), 34 (1.14) and 22 (1.11). The export specialization in chemicals (1.31) fits the trademark specialization in classes 2 (1.44), and 1 (1.17), that in non-electronic machinery (1.68) can be related to the trademark specialization in classes 7 (1.24) and 11 (1.22). Also the export specialization in transport equipment (1.74) may account for many trademark deposits in class 12 (1.32). The trademark specialization in class 20 (1.18) does not seem sufficiently justified by the export specialization in wood products (0.94), although in this sector Germany has the highest level of specialization of the five nations under review, with a Balassa index close to 1.

In Spain too the relationship between trademark and export data is on the whole consistent. The strong export specialization in transport equipment (2) might appear scarcely reflected by trademark specialization, but the class of services 39 (transportation), which is not reported in Table 5, has an index of trademark specialization equal to 3.70. The export specialization in fresh food (2.07) and processed foods (1.60) explains the trademark specialization in classes 31 (2.60), 29 (1.87), 33 (1.90), 30 (1.39) and 32 (1.15). The partial specialization in chemicals (1.07) may go with the trademark specialization in class 23 (2.12), while that in basic manufactured goods (1.37) fits the specialization in class 13 (1.60). Finally, the export specialization in textiles (1.05) is reflected in the trademark specialization in classes 26 (1.29) and 24 (1.25), as well as the trademark specialization in class 18 (1.13) which is related to the export specialization in leather products (1.31). The trademark specialization in classes 19 (1.41) and 25 (1.19) do not find an immediate explanation in export data. However, note that Spain and Germany exhibit quite a high export specialization in wood products (respectively, 0.93 and 0.94) if compared to other European countries. In addition, in the case of clothing and footwear, the low export specialization of Spain (0.59) is the highest, after Italy, of the countries under review.

In France there is a greater inconsistency between trademark and export data. However, the export specialization in chemicals (1.42) matches the trademark specialization in classes 3 (1.78) and 23 (1.68). In addition, the export specialization in fresh food (1.01) and processed foods (1.78) accounts for the trademark specialization in classes 31 (1.63), 29 (1.54), 30 (1.31), and 33 (2.50). Finally, a partial export specialization in basic manufactures (1.07) may explain the trademark specialization in classes 13 (2.10), 22 (1.34), 14 (1.16), and 4 (1.15). The data which are not totally consistent are the following. First, France shows a good export specialization in transport equipment (1.60) and non-electronic machinery (1.11) that has no correspondence in trademark data. On the other hand, the trademark specialization in classes 18 (1.43), 24 (1.42), 25 (1.31) and 26 (1.22) is not completely justified by the structure of exports. Note that all the last four classes are connected with the fashion sector.

The Italian export specialization in non-electronic machinery (1.88) can be associated with the trademark specialization in classes 11 (1.90) and 7 (1.82), while the specialization in basic manufactured goods (1.49) justifies the multiple trademarks deposited in classes 14 (1.74), 21 (1.55), 17 (1.54), 22 (1.53), 8 (1.28), and 28 (1.26), although the latter is very heterogeneous. Furthermore, the strong export specialization in leather products (4.29), clothing (1.79), and textiles (1.99) is congruous with the trademark specialization in classes 18 (1.82), 25 (1.45) and 24 (1.30). Finally, the specialization in processed food (1.13) matches the trademark specialization in classes 30 (1.27) and 33 (1.16). The trademark specialization in classes 12 (1.83) and 9 (1.63) is not fully explained by export data, although class 9 includes goods produced in both high and low technology sectors. Also the trademark specialization in class 20 (1.36) has no correspondence in export data: note, however, that no country has a Balassa index greater than 1 in wood products. Finally, the partial trademark specialization in classes 3 (1.28), 5 (1.20) and 23 (1.15) is quite singular, even though the Balassa index for chemicals is close to 1.

The data about UK are probably the most difficult to interpret. The export specialization in IT & consumer electronics (1.43) may explain the trademark specialization in class 9 (1.43), while the specialization in non-electronic machinery (1.46) matches the trademark specialization in class 7 (1.29). The export specialization in chemicals (1.38) accounts for the trademark specialization in classes 1 (1.23) and 2 (1.15). The trademark specialization in class 10 (1.18) is not easily comparable with export data, because it contains goods that are classified both in chemicals and non-electronic machinery. The specialization in class 27 (1.40) is not well explained by export data; however the goods of this class belong to a small and isolated subsector of basic manufactured goods, which is more typical of the UK than other countries. The trademark specializations that are not apparently correlated with export specialization regard classes 16 (1.50), 25 (1.24), 28 (1.50) and 21 (1.10), although class 28 is quite heterogeneous. Finally, a partial export specialization in processed foods (1.14) is not reflected by trademark data.

To sum up, Germany and Spain present a substantial consistency between trademark and export specialization, while in the case of Italy it seems that many Italian firms exploit the OHIM trademark. There is a good agreement between trademark and export data in France. However, on the one hand, the sectors linked to fashion appear to be well represented by OHIM trademark registration although they do not represent a relevant share of exports, and, on the other hand, some important economic sectors are not well represented by OHIM trademarks. The case of the UK is more complex, since there is a partial non-homogeneity between

trademark and export data, and, also, the trademark specialization emerges in classes of products which are difficult to link to macro-economic sectors.

Since some goods are exported outside the EU, the incentive to use the OHIM trademark may, in some economic sectors, be less strong than imagined. On the other hand, it is unlikely that firms that export their products to Asia and United States decide not to protect their marks also within the EU. In fact, depositing a trademark is often seen as a defensive tool, to protect nearby markets from distant potential competitors (counterfeiting and imitation of European goods by Asian firms is a long debated issue).

Our observations may thus give some indication about which sectors in a country are particularly important from the point of view of exports, but they are rather weak when the international protection of trademarks is considered. On the other hand, our analysis may suggest that there are classes of products which are frequently cited in trademark applications but do not constitute significant shares of export flows. Therefore, in each country there may be sectors that are characterized by a strong differentiation expressed by deposited trademarks, even though they might not be very representative of the internal economic structure. Other sectors, which on the other hand are considered as being "typical" of a particular economy, present a low degree of product differentiation. A high specialization may not correspond to an equally strong product differentiation, even if this seems to be an exception.

Finally, we can analyze the trademark specialization patterns by splitting the classes covered by OHIM trademarks into products (classes 1-34) and services (classes 35-42). Table 7 shows, for all Member States (excluding Luxembourg), the share of citations regarding services contained in the registered trademarks at the end of 2002, and the share of exports represented by commercial services in 2000.

Insert table 7

The share of services in the total citations is similar for many countries, but there are some states for which the share is low (Greece, Portugal, Denmark, and Italy). If we assume that the OHIM trademark is deposited by those firms that export goods and services, it is useful to consider the structure of exports of each country. For some countries the share of services in trademarks and exports is close (Italy, Denmark, Portugal, and Austria), but in others (France, the Netherlands, Germany, Sweden, Ireland, Belgium, and Finland) a high share of services in trademarks is not reflected by an equally relevant share in exports. With respect to Greece, a strong export specialization in services is not associated with a correspondingly strong trademark specialization.

The data reported may nevertheless provide further information about the ability of firms to differentiate their commercial services. Broadly speaking, other economic variables might be used along with export data to explain different patterns of trademark specialization (for example data about profitability of economic sectors, which, in any case, one would expect to be correlated with export specialization).

## 5. Conclusions

Economics literature has partially neglected issues concerning the use of trademarks, particularly in terms of empirical studies. This is primarily due to the lack of data and to the greater importance given to patents. A trademark is one of the most important intangible assets of firms, and since more data is now available on trademarks, a detailed analysis of the evolution of their deposits is required. Another reason for the scarcity of empirical studies is the absence of an established theory about the role and the meaning of trademarks in real markets. In this paper we have interpreted trademarks as a form of product differentiation. In a supermarket, the name, the packaging, and thus the brand-trademark are the first means to perceive product differentiation across several goods. Clearly, a trademark is an imperfect measure of product differentiation perceived by consumers, but our approach may stimulate the debate about the role played by trademarks in real markets (apart from the mere protection of intellectual property rights), and thus give rise to alternative interpretations.

Data on Italian trademarks would seem to show that trademark applications and registrations "follow" quite closely the structure of the economy and its evolution. There may thus be a positive relationship between the "size" of economic activity, at different levels of aggregation, and product differentiation, when the latter is estimated by the use of trademarks.

In relation to European data, trademark specialization seems to substantially reflect economic specialization as measured by export flows, although we have found some exceptions. Comparing trademark specialization with export specialization allows us to identify for each country the sectors where the use of international trademarks is scarce, and those where firms decide to protect extensively their marks abroad.

These empirical observations may be an important tool to explore the various dimensions of a firm's competitiveness. Product differentiation is usually seen as a means to build and maintain a competitive advantage. If trademarks are used as an indication of product differentiation, the differences in the intensity of trademark deposits across countries and sectors may provide new data on the factors affecting the magnitude and the direction of economic growth. Our analysis has some significant limitations and pitfalls, given the divergence between the classification of

trademarks and economic activities. However, this may give national institutions an incentive to harmonize the methods of classification, a process that has already started in the case of patents.

Future research needs to address the following questions. First, it would be helpful to analyze the relationship between GDP variations and trademarks in force in several countries, because the link between the two variables seems to be quite strong in the case of Italy. Should a positive correlation be observed in other countries, the hypothesis of a significant relation between trademark applications and product variety would acquire more appeal. In fact some recent empirical studies show that larger economies exhibit greater product differentiation in exports, while other works have verified a positive and significant correlation between growth rates and product variety.

Secondly, does the total number of firms and their size distribution affect the recourse to trademark deposits? Empirical observations could be useful since there is no established theory that studies the relationship product differentiation and a firm's size.

Finally, the information regarding the structure of exports could be integrated with data about the specialization in internal production. This might help to explain some of the observed inconsistencies between trademark and export specialization across countries. Broadly speaking, additional information about the economic and institutional structure of various economies could be used to provide a better explanation of the patterns of trademark specialization.

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**Appendix. Nice classification.**

***Classification of Products***

***Class 1*** Chemicals used in industry, science and photography, as well as in agriculture, horticulture and forestry; unprocessed artificial resins, unprocessed plastics; manures; fire extinguishing compositions; tempering and soldering preparations; chemical substances for preserving foodstuffs; tanning substances; adhesives used in industry.

***Class 2*** Paints, varnishes, lacquers; preservatives against rust and against deterioration of wood; colorants; mordants; raw natural resins; metals in foil and powder form for painters, decorators, printers and artists.

***Class 3*** Bleaching preparations and other substances for laundry use; cleaning, polishing, scouring and abrasive preparations; soaps; perfumery, essential oils, cosmetics, hair lotions; dentifrices.

***Class 4*** Industrial oils and greases; lubricants; dust absorbing, wetting and binding compositions; fuels (including motor spirit) and illuminants; candles, wicks.

***Class 5*** Pharmaceutical, veterinary and sanitary preparations; dietetic substances adapted for medical use, food for babies, plasters, materials for dressings; material for stopping teeth, dental wax; disinfectants; preparations for destroying vermin; fungicides, herbicides.

***Class 6*** Common metals and their alloys; metal building materials; transportable buildings of metal; materials of metal for railway trucks; non-electric cables and wires of common metal; ironmongery, small items of metal hardware; pipes and tubes of metal; safes; goods of common metal not included in other classes; ores.

***Class 7*** Machines and machine tools; motors and engines (except for land vehicles); machine coupling and transmission components (except for land vehicles); agricultural implements; incubators for eggs.

***Class 8*** Hand tools and implements (hand operated); cutlery; side arms; razors.

***Class 9*** Scientific, nautical, surveying, electric, photographic, cinematographic, optical, weighing, measuring, signalling, checking (supervision), life-saving and teaching apparatus and instruments; apparatus for recording, transmission or reproduction of sound or images; magnetic data carriers, recording discs; automatic vending machines and mechanisms for coin-operated apparatus; cash registers, calculating machines, data processing equipment and computers; fire-extinguishing apparatus; cash registers, calculating machines, data processing equipment and computers; fire-extinguishing apparatus.

***Class 10*** Surgical, medical, dental and veterinary apparatus and instruments, artificial limbs, eyes and teeth; orthopaedic articles; suture materials.

***Class 11*** Apparatus for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, water supply and sanitary purposes.

***Class 12*** Vehicles; apparatus for locomotion by land, air or water.

***Class 13*** Firearms; ammunition and projectiles; explosives; fireworks.

***Class 14*** Precious metals and their alloys and goods in precious metals or coated therewith, not included in other classes; jewellery, precious stones; horological and chronometric instruments.

***Class 15*** Musical instruments.

***Class 16*** Paper, cardboard and goods made from these materials, not included in other classes; printed matter; bookbinding material; photographs; stationery; adhesives for stationery or household purposes; artists' materials; paint brushes; typewriters and office requisites (except furniture); instructional and teaching material (except apparatus); plastic materials for packaging (not included in other classes); playing cards; printers' type; printers blocks.

***Class 17*** Rubber, gutta-percha, gum, asbestos, mica and goods made from these materials and not included in other classes; plastics in extruded form for use in manufacture; packing, stopping and insulating materials; flexible pipes, not of metal.

***Class 18*** Leather and imitations of leather, and goods made of these materials and not included in other classes; animal skins, hides; trunks and travelling bags; umbrellas, parasols and walking sticks; whips, harness and saddlery.

***Class 19*** Building materials (non-metallic); non-metallic rigid pipes for building; asphalt, pitch and bitumen, non-metallic transportable buildings; monuments, not of metal.

***Class 20*** Furniture, mirrors, picture frames; goods (not included in other classes) of wood, cork, reed, cane wicker, horn, bone, ivory, whalebone, shell, amber, mother-of-pear, meerschaum and substitutes for all these materials, or of plastics.

***Class 21*** Household or kitchen utensils and containers (not of precious metal or coated therewith); combs and sponges; brushes (except paint brushes); brush-making materials; articles for cleaning purposes; steelwool; unworked or semi-worked glass (except glass used in building); glassware, porcelain and earthenware not included in other classes.

***Class 22*** Ropes, string, nets, tents, awnings, tarpaulins, sails, sacks and bags (not included in other classes); padding and stuffing materials (except of rubber or plastics); raw fibrous textile materials.

***Class 23*** Yarns and threads, for textile use.

***Class 24*** Textiles and textile goods, not included in other clauses; bed and table covers.

***Class 25*** Clothing, footwear, headgear.

***Class 26*** Lace and embroidery, ribbons and braid; buttons, hooks and eyes, pins and needles; artificial flowers.

***Class 27*** Carpets, rugs, mats and matting, linoleum and other materials for covering existing floors; wall hangings (non-textile).

***Class 28*** Games and playthings; gymnastic and sporting articles not included in other classes; decorations for Christmas trees.

***Class 29*** Meat, fish, poultry and game; meat extracts; preserved, dried and cooked fruits and vegetables; jellies, jams, fruit sauces; eggs, milk and milk products; edible oils and fats.

***Class 30*** Coffee, tea, cocoa, sugar, rice, tapioca, sago, artificial coffee; flour and preparations made from cereals, bread, pastry and confectionery, ices; honey, treacle; yeast, baking powder; salt, mustard; vinegar, sauces (condiments); spices; ice.

***Class 31*** Agricultural, horticultural and forestry products and grains not included in other classes; live animals; fresh fruits and vegetables; seeds, natural plants and flowers; foodstuffs for animals, malt.

***Class 32*** Beers; mineral and aerated waters and other non-alcoholic drinks; fruit drinks and fruit juices; syrups and other preparations for making beverages.

***Class 33*** Alcoholic beverages (except beers).

***Class 34*** Tobacco; smokers' articles; matches.

**Classification of Services**

***Class 35*** Advertising, business management; business administration; office functions.

***Class 36*** Insurance; financial affairs; monetary affairs; real estate affairs;

***Class 37*** Building construction; repair; installation services.

***Class 38*** Telecommunications.

***Class 39*** Transportation; packaging and storage of goods; travel arrangement.

***Class 40*** Treatment of materials.

***Class 41*** Education; providing of training, entertainment; sporting and cultural activities.

***Class 42*** Providing of food and drink; temporary accommodation; medical, hygienic and beauty care; veterinary and agricultural services; legal services; scientific and industrial research; computer programming; services that cannot be placed in other classes.

**Nice classification, eighth edition**

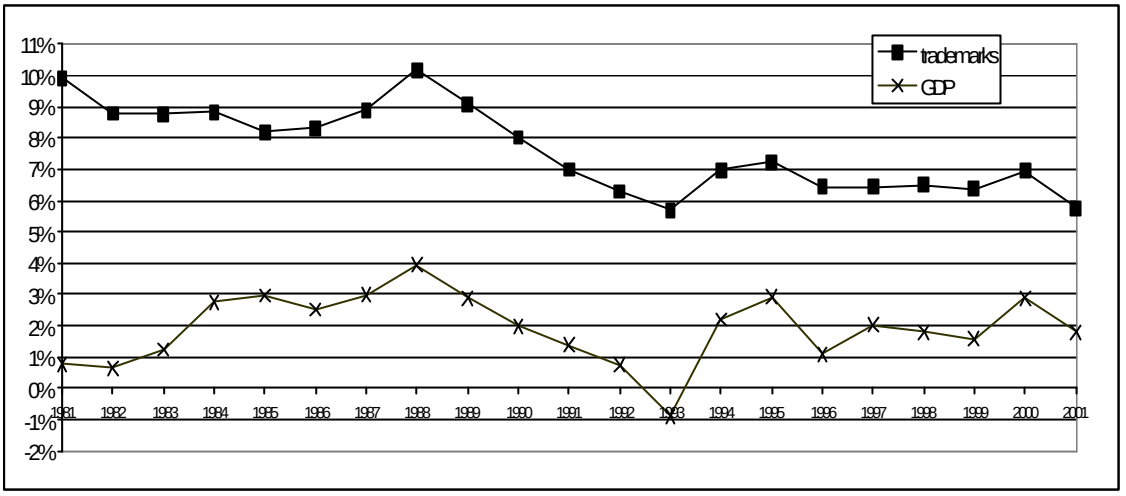
***Class 42*** Scientific and technological services and research and design relating thereto; industrial analysis and research services; design and development of computer hardware and software; legal services.

***Class 43*** Services for providing food and drink; temporary accommodation.

***Class 44*** Medical services; veterinary services; hygienic and beauty care for human beings or animals;

***Class 45*** Personal and social services rendered by others to meet the needs of individuals; security services for the protection of property and individuals.

**Figure 1. Trademarks in force and GDP in Italy, % variations 1981-2001.**




Source: Italian National Statistics Office (ISTAT), Italian Trademarks and Patents Office (UIBM).

**Table 1**

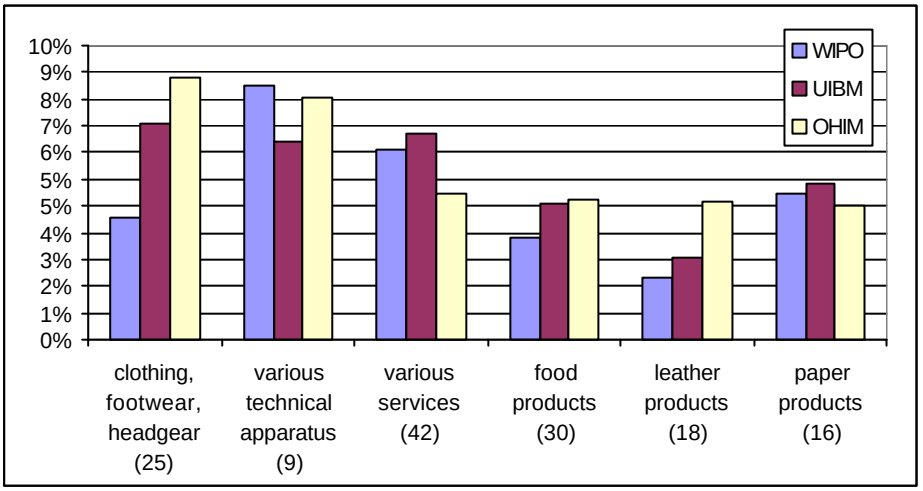
| Nice Classification | | ATECO 2002 Classification |
|---|---|---|
| **Beverages and tobacco products (classes 32, 33, 34)** | ⇔ | • D 155 - MANUFACTURE OF BEVERAGES<br>• D 16 - MANUFACTURE OF TOBACCO PRODUCTS |
| **Insurance and financial affairs (class 36)** | ⇔ | • J 65 - FINANCIAL INTERMEDIATION SERVICES, EXCEPT INSURANCE AND PENSION FUNDING SERVICES<br>• J 66 - INSURANCE AND PENSION FUNDING SERVICES, EXCEPT COMPULSORY SOCIAL SECURITY SERVICES<br>• J 67 - SERVICES AUXILIARY TO FINANCIAL INTERMEDIATION |
| **Transportation, packaging, storage and travel arrangement (class 39)** | ⇔ | • I 60 - LAND TRANSPORT; TRANSPORT VIA PIPELINES<br>• I 61 - WATER TRANSPORT SERVICES<br>• I 62 - AIR TRANSPORT SERVICES<br>• I 63 - SUPPORTING AND AUXILIARY TRANSPORT SERVICES; TRAVEL AGENCY SERVICES |

**Table 2. Trademarks in force/Value Added (millions of Italian lira), Italy.**

| Classes/year | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | var 92-2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **32, 33, 34** | 3,85 | 4,01 | 4,19 | 4,63 | 5,08 | 5,59 | 6,03 | 6,41 | 6,56 | 7,00 | 81,53% |
| **36** | 0,16 | 0,17 | 0,18 | 0,21 | 0,22 | 0,25 | 0,27 | 0,31 | 0,33 | 0,38 | 130,43% |
| **39** | 0,21 | 0,23 | 0,25 | 0,28 | 0,32 | 0,35 | 0,38 | 0,44 | 0,50 | 0,54 | 152,06% |
| **Total classes (1-42)** | 0,50 | 0,53 | 0,56 | 0,58 | 0,61 | 0,64 | 0,67 | 0,70 | 0,73 | 0,76 | 50,70% |

Source: UIBM, Istat.

**Figure 2. Registered Italian (UIBM, OHIM, WIPO) trademarks by classes. Top 6, %, 1997-2002.**




Source: WIPO, OHIM, UIBM.

**Table 3. Most cited product classes in Italian OHIM trademark applications (1996-2002) and export specialization (1996).**

| Product class | citations | Economic sector | Balassa Index |
|---|---|---|---|
| Various technical and scientific equipment (9) | 2669 | Leather and leather goods | 3.24 |
| Clothing, footwear, headgear (25) | 2640 | Footwear | 3.16 |
| Paper products, photos (16) | 1537 | Furnitures and parts | 2.86 |
| Leather products, bags, umbrellas (18) | 1455 | Sanitary and heating equipment | 2.55 |
| Preserved food (30) | 1445 | Luggage, handbags and the like, saddlery and harnesses | 2.23 |
| Fresh and preserved food (29) | 1258 | Machine-tools | 1.85 |
| Machines and machine tools, motors and engines (7) | 1219 | Special purpose machinery | 1.82 |
| Alcoholic beverages, except beers (33) | 1145 | Textiles | 1.66 |
| Cleaning products (3) | 1139 | Clothing | 1.59 |
| Equipment for lighting, heating, cooking, etc. (11) | 1012 | Machinery for metallurgy | 1.51 |
| Furnitures (20) | 867 | Non-metallic mineral products | 1.50 |

Source: UIBM, World Bank, Istat.

**Table 4. Top 10 classes by country, OHIM trademark registrations 1996-2002.**

| | Spain | | France | | Italy | | UK | | Germany | |
|---|---|---|---|---|---|---|---|---|---|---|
| rank | class | % | class | % | class | % | class | % | class | % |
| 1 | 39 | 8,09 | 9 | 9,14 | 9 | 8,15 | 9 | 13,08 | 9 | 10,45 |
| 2 | 35 | 7,80 | 42 | 8,85 | 25 | 8,06 | 42 | 9,64 | 42 | 10,19 |
| 3 | 42 | 6,32 | 38 | 6,67 | 42 | 5,51 | 16 | 8,52 | 35 | 6,04 |
| 4 | 16 | 5,81 | 35 | 5,97 | 16 | 4,69 | 41 | 5,80 | 16 | 5,69 |
| 5 | 25 | 5,58 | 16 | 5,70 | 18 | 4,44 | 35 | 5,61 | 41 | 4,91 |
| 6 | 9 | 5,00 | 41 | 5,07 | 30 | 4,41 | 25 | 5,05 | 38 | 4,08 |
| 7 | 38 | 4,61 | 3 | 4,40 | 35 | 4,08 | 36 | 3,63 | 7 | 3,50 |
| 8 | 29 | 4,01 | 25 | 4,07 | 29 | 3,84 | 38 | 3,25 | 5 | 3,45 |
| 9 | 30 | 3,48 | 36 | 2,84 | 7 | 3,72 | 37 | 2,65 | 36 | 3,15 |
| 10 | 41 | 3,45 | 5 | 2,75 | 33 | 3,50 | 5 | 2,60 | 25 | 3,11 |
| tot | | 54,16 | | 55,45 | | 50,41 | | 59,83 | | 54,57 |

Source: OHIM.

## Table 5. Trademark specialization for European major countries, 1996-2002

| Germany | | Spain | | France | | Italy | | UK | |
|---|---|---|---|---|---|---|---|---|---|
| Paints, varnishes, lacquers, colorants, etc. (2) | 1,44 | Agricultural products (31) | 2,60 | Alcoholic beverages, except beers (33) | 2,50 | Apparatus for lighting, heating, cooking, refrigerating, etc. (11) | 1,90 | Paper products, photos (16) | 1,50 |
| Hand tools and implements, cutlery, etc. (8) | 1,39 | Yarns and threads, for textile use (23) | 2,12 | Firearms, ammunition, explosives, etc. (13) | 2,10 | Vehicles, apparatus for locomotion (12) | 1,83 | Various technical and scientific apparatus (9) | 1,43 |
| Building materials (19) | 1,34 | Alcoholic beverages, except beers (33) | 1,90 | Cleaning products (3) | 1,78 | Leather products, bags, umbrellas (18) | 1,82 | Carpets, rugs, mats, materials for covering floors, etc. (27) | 1,40 |
| Vehicles, apparatus for locomotion (12) | 1,32 | Fresh and preserved food (29) | 1,87 | Yarns and threads, for textile use (23) | 1,68 | Machines and machine tools, motors and engines (7) | 1,82 | Machines and machine tools, motors and engines (7) | 1,29 |
| Rubber, gum, packing, insulating materials, etc. (17) | 1,31 | Firearms, ammunition, explosives, etc. (13) | 1,60 | Agricultural products (31) | 1,63 | Precious metals, stones, etc. (14) | 1,74 | Clothing, footwear, headgear (25) | 1,24 |
| Common metals, metal building materials (6) | 1,27 | Building materials (19) | 1,41 | Fresh and preserved food (29) | 1,54 | Various technical and scientific apparatus (9) | 1,63 | Chemicals (1) | 1,23 |
| Machines and machine tools, motors and engines (7) | 1,24 | Preserved food (30) | 1,39 | Leather products, bags, umbrellas (18) | 1,43 | Household or kitchen utensils and containers (21) | 1,55 | Surgical, medical and veterinary apparatus (10) | 1,18 |
| Carpets, rugs, mats, materials for covering floors, etc. (27) | 1,24 | Lace, embroidery, ribbons, etc. (26) | 1,29 | Textiles (24) | 1,42 | Rubber, gum, packing and insulating materials, etc. (17) | 1,54 | Games and playthings, sporting articles (28) | 1,15 |
| Apparatus for lighting, heating, cooking, refrigerating, etc. (11) | 1,22 | Textiles (24) | 1,25 | Ropes, strings, nets, etc. (22) | 1,34 | Ropes, strings, nets, etc. (22) | 1,53 | Paints, varnishes, lacquers, colorants, etc. (2) | 1,15 |
| Furniture (20) | 1,18 | Clothing, footwear, headgear (25) | 1,19 | Preserved food (30) | 1,31 | Clothing, footwear, headgear (25) | 1,45 | Household or kitchen utensils and containers (21) | 1,10 |
| Chemicals (1) | 1,17 | Beers, non alcholic drinks, etc. (32) | 1,15 | Clothing, footwear, headgear (25) | 1,31 | Furniture (20) | 1,36 | | |
| Tobacco, smokers' articles (34) | 1,14 | Leather products, bags, umbrellas (18) | 1,13 | Lace, embroidery, ribbons, etc. (26) | 1,22 | Textiles (24) | 1,30 | | |
| Ropes, strings, nets, etc. (22) | 1,11 | | | Precious metals, stones, etc. (14) | 1,16 | Cleaning products (3) | 1,28 | | |
| | | | | Industrial oils, greases, etc. (4) | 1,15 | Hand tools and implements, cutlery, etc. (8) | 1,28 | | |
| | | | | | | Preserved food (30) | 1,27 | | |
| | | | | | | Games and playthings, sporting articles (28) | 1,26 | | |
| | | | | | | Pharmaceutical, veterinary and sanitary preparations (5) | 1,20 | | |
| | | | | | | Alcoholic beverages, except beers (33) | 1,16 | | |
| | | | | | | Yarns and threads, for textile use (23) | 1,15 | | |

**Table 6. Export specialization by country, 1997-2001.**

| **Sector** | ***Germany*** | ***Spain*** | ***France*** | ***Italy*** | ***UK*** |
|---|---|---|---|---|---|
| Chemicals | 1.31 | 1.07 | 1.42 | 0.97 | 1.38 |
| Transport equipment | 1.74 | 2 | 1.60 | 0.79 | 0.78 |
| Non electronic machinery | 1.68 | 0.75 | 1.11 | 1.88 | 1.46 |
| Leather products | 0.38 | 1.91 | 0.84 | 4.29 | 0.42 |
| IT & consumer electronics | 0.59 | 0.37 | 0.66 | 0.31 | 1.46 |
| Basic manufactures | 1.17 | 1.37 | 1.07 | 1.49 | 0.88 |
| Textiles | 0.78 | 1.05 | 0.86 | 1.99 | 0.61 |
| Electronic components | 0.94 | 0.53 | 0.81 | 0.66 | 0.92 |
| Processed foods | 0.84 | 1.60 | 1.78 | 1.13 | 1.14 |
| Wood products | 0.94 | 0.93 | 0.88 | 0.70 | 0.46 |
| Clothing | 0.40 | 0.59 | 0.57 | 1.79 | 0.43 |
| Fresh food | 0.34 | 2.07 | 1.01 | 0.51 | 0.32 |
| Minerals | 0.18 | 0.27 | 0.22 | 0.14 | 0.96 |

Source : UNCTAD, WTO.

**Table 7. Citations of classes of services (%, 1996-2002), and exports of commercial services (%, 2000)**

| **Country** | **% cl. of services** | **% exports of services** |
|---|---|---|
| Spain | 37,1 | 31,5 |
| France | 34,6 | 21,5 |
| Netherlands | 34,6 | 20,2 |
| Germany | 34,1 | 12,7 |
| Sweden | 33,7 | 18,6 |
| UK | 33,5 | 26,1 |
| Ireland | 33,5 | 18,5 |
| Belgium | 33,2 | 20,5 |
| Austria | 33,1 | 31,7 |
| Finland | 33,1 | 11,6 |
| Greece | 26,6 | 64,9 |
| Portugal | 25,5 | 25,1 |
| Denmark | 25,5 | 28,9 |
| Italy | 22,5 | 19,2 |

Source: OHIM, WTO.