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[1] The views are those of the authors and do not necessarily coincide with those of the institution.

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Assessing the Competitiveness of the Portuguese Footwear Sector

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Abstract:

This paper aims to find a set of variables that explain the success of Portuguese footwear in a global market. The Portuguese footwear industry is a success story, thanks in no small part to exports. Using micro-level data from the universe of firms in the Portuguese footwear industry from 2004 through 2014, we find that financial health, wages, investments in tangible and intangible assets, labour productivity and diversity and persistence in the firm's participation in export markets are positively related with a firm's competitiveness.

JEL Classification: D22

Keywords: Footwear, Exports, Competitiveness, Firm-level data.

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1. Introduction

The footwear sector is a success story for the Portuguese industry. Even in the face of economic adversity, this sector goes from strength to strength, being the greatest positive contributor to the Portuguese trade balance. This paper investigates the predictors of competitiveness in the Portuguese footwear sector. Our paper is innovative for its scope, encompassing firm-level data for the universe of registered firms in the production of footwear, its components and leathers, and wholesale commercialization between 2004 and 2014.

This study contributes to our understanding of this particular success story, which is particularly interesting for its differentiation from low-cost competitors, mainly in China and the Southeast Asia region. It is known that Portugal has the second highest export price in the world (APICCAPS; 2015) directing their footwear products essentially to a wealthy segment, located in countries with high average wages such as France, Germany and Netherlands. In the next chapters we will present in-depth analysis on why the Portuguese footwear sector has enjoyed such sustained growth.

Competitiveness is defined in the literature by a balance between exporting and revenue. This motivates our two-model approach that uses both turnover per worker and export intensity as proxies for competitiveness. In line with the literature, we find that average wages, investment in both tangibles and intangibles and persistent participation in export markets, including outside the EU, are large predictors of improved competitiveness. We also find that the competitiveness of smaller firms is more vulnerable to poor financial health than that of larger firms.

After this brief introduction, we will address the recent national and international trends in the footwear sector, namely the evolution of exports, imports, production, employment and the main trade partners of the Portuguese footwear sector. Still in the same chapter, we briefly discuss the Portuguese sector's market strategy which allows it to grow in spite of fierce competition. We then review the literature on competitiveness and its determinants, as well as surveying other papers about the Portuguese footwear sector. Chapter 4 characterizes the data extracted from our database (SCIE) and presents the variables at study and a battery of descriptive statistics. Chapter 5 presents the methodology, and Chapter 6 presents and discusses the empirical findings of our two models. We conclude by reviewing our results and offering some policy recommendations and suggestions for further research.

2. Overview of the Sector

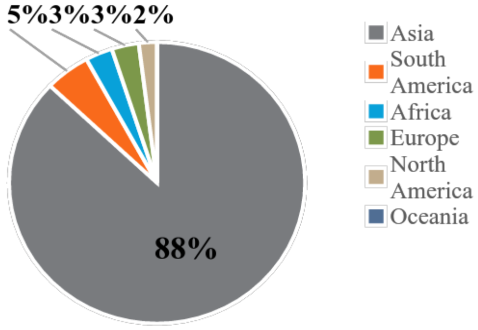
In this section, we will chart a brief overview of the footwear industry at an international level and within Portugal since the beginning of the century.

2.1 International Overview

2.1.1 Production

In 2014, the total amount of production in the world reached 24.3 billion pairs, a growth of 8% in comparison with the previous year. Asia is by far the biggest producer of footwear in the world as seen in Chart 1. Europe has been losing market share and Africa moves in the opposite direction, with both continents producing the same amount of pairs at this point in time.

Chart 1 – Distribution of Footwear Production by Continents (Quantity), 2014.

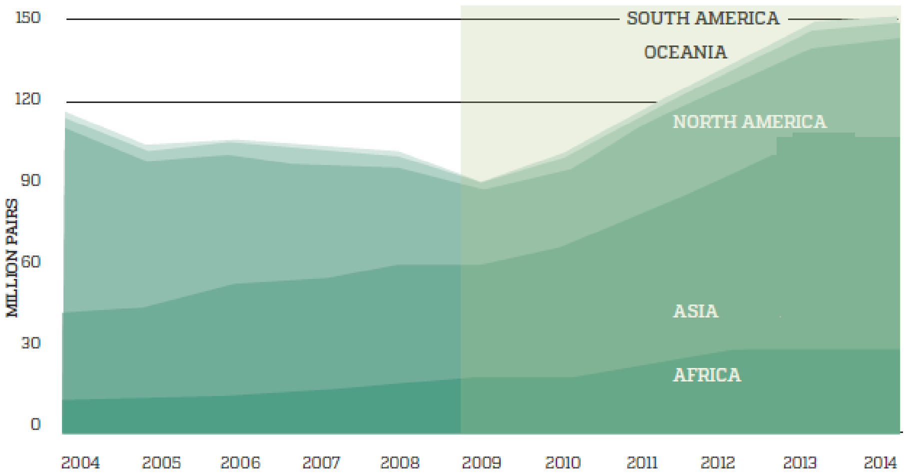


Source: World Footwear 2015 Yearbook

2.1.2 Exports

Footwear exports by the European Union are counter-cyclical, as Chart 2 demonstrates. Contrasting the periods before and after the eruption of the 2008 Global Financial Crisis (GFC), we observe that the GFC coincided with an inversion in the downwards trend in EU member countries' footwear exports. The reduction in footwear exports of 30 million before the GFC resulted mostly from a contraction in the North American market. Conversely, exports to Africa grew by 212% since 2004, doubling its share of EU footwear exports to 20% over the 10 years. The real catalyst of this export success was, however, the Asian market with exports to this market more than doubling. Nevertheless, it is important to note that over 90% of EU footwear exports are within the EU.

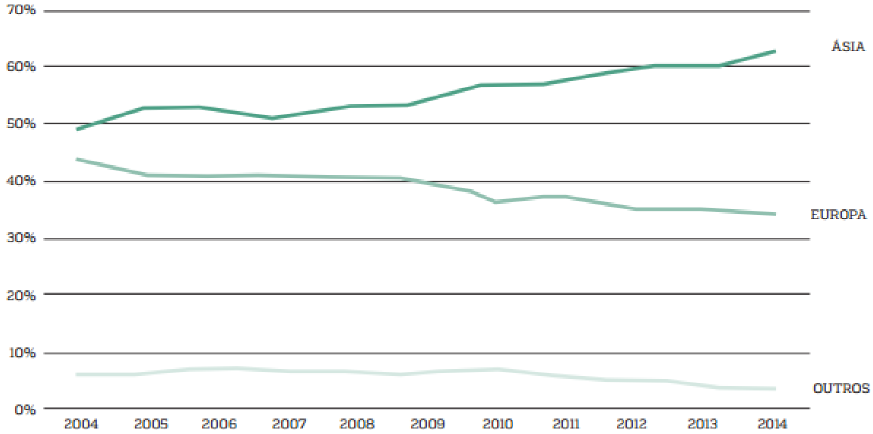
Chart 2- Footwear exports (quantity) by the European Union countries to other continents, 2004-14.



Source: Monografia Estatística 2015 - APICCAPS.

However, as Chart 3 illustrates, while Europe has increased the quantity of pairs it exports, its share of worldwide footwear exports (in value) has been falling, corresponding to 34% of global footwear exports in 2014. This contrasts with growth in Asia's market share – currently at a record high 62%, consolidating its position as the world's leading exporter of footwear. When we consider quantities exported rather than export value, Asia is an even more dominant footwear exporter, with 86% of market share compared to 11% by Europe.

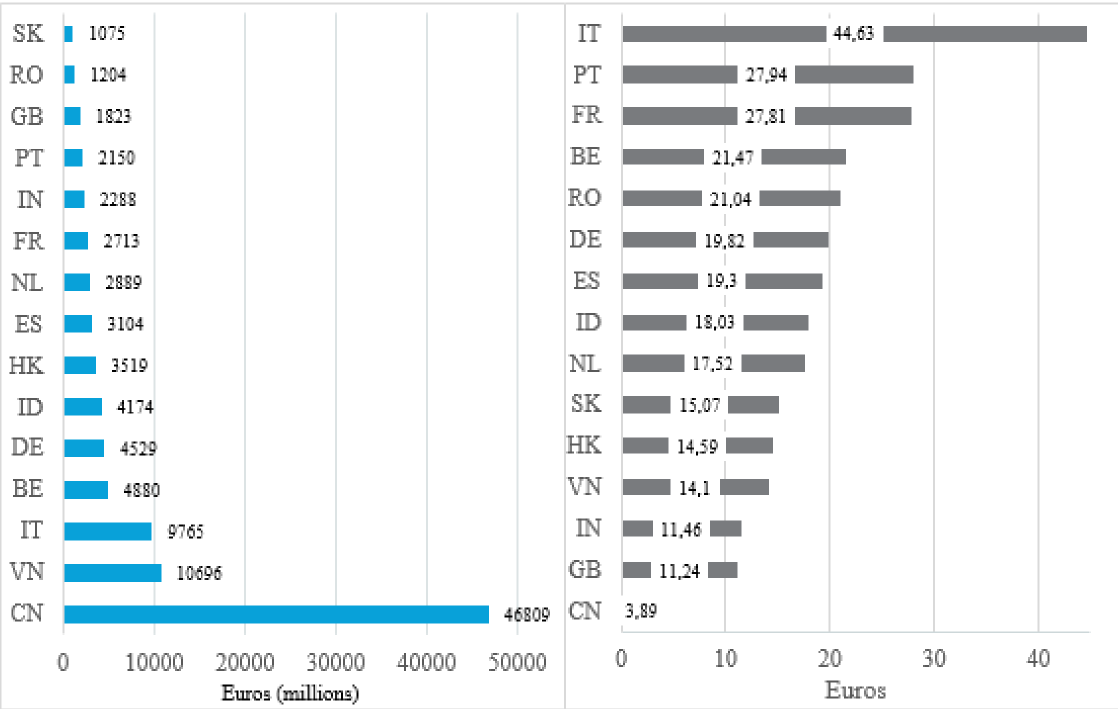
Chart 3 - Continental market shares of worldwide exports (in value), 2004-2014.



Source: Monografia Estatística 2015 - APICCAPS.

Within Asia, China is far ahead in terms of exports, with 40.5% worldwide market share and more than 45 billion euros traded with foreign countries, as shown in Chart 4. Italy is the biggest European exporter in terms of value with just under 10 billion euros and a share of 8.4% of the worldwide footwear market. Of the top 15 exporters in 2014, ten are European Union (EU) countries and the remaining five are Asian countries. Among these top 15 exporters, EU countries have the highest export prices, as Chart 5 illustrates. This is particularly so for Italy, with an average of almost 45 euros, followed by some distance by Portugal and France with almost 28 euros on average. China is in the opposite position, exporting footwear at a very low price (3.89 euros).

Chart 4 & 5 – Top Footwear exporters in the World (value), 2014 & Average export price of Footwear (Top 15 exporters), 2014.



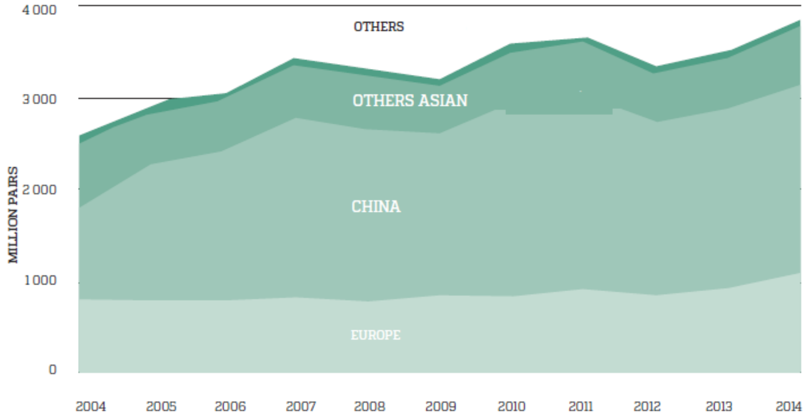
Label: CN – China, VN – Vietnam, IT – Italy, BE, Belgium, DE – Germany, ID – Indonesia, HK – Hong Kong, ES – Spain, NL – Netherlands, FR – France, IN – India, PT – Portugal, GB – United Kingdom, RO – Romania, SK – Slovakia.

Source: World Footwear 2015 Yearbook.

2.1.3 Imports

Asian countries, mainly China, are clearly the main origin of EU footwear imports – as Chart 6 shows. China alone reached a maximum of 2.121 million pairs imported by the EU in 2011. The weight of Asian producers in the total of all EU imports is 71% in 2014, and China is the biggest producer with a market share of 54%.

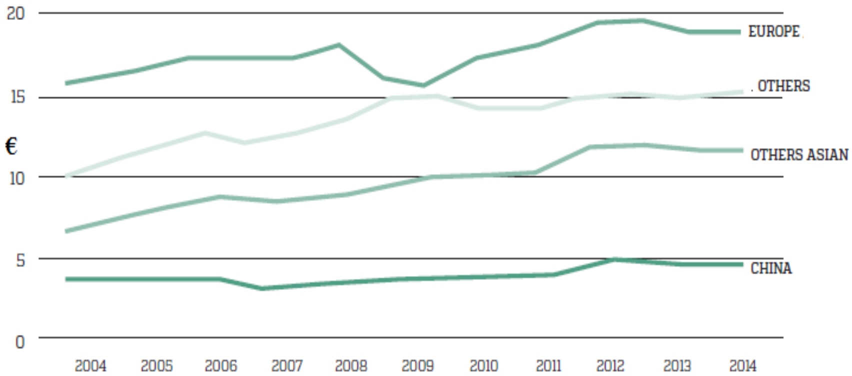
Chart 6 – Origin of footwear imports from members of the European Union (in quantity), 2004-14.



Source: Monografia Estatística 2015 - APICCAPS.

Europe is competitive worldwide essentially because of its quality and design, while other markets try to be price-competitive. China is the most obvious case - its footwear products arrive to Europe with an average price inferior to 5€. Even the average price by other Asian countries is more than two times higher than China. This chart (Chart 7) confirms China's low-price strategy, identified as one of the leading causes for it being the worldwide leader in exports (Rua & França, 2014).

Chart 7 – Average import price of footwear from members of EU according to the origin, 2004-14.



Source: Monografia Estatística 2015 - APICCAPS.

2.2 Portuguese Overview

2.2.1 Market Strategy and Recent Trends

Footwear supply is characterized by its huge segmentation and variety. In the past decade, the sector's strategy has been focused on the international market. This orientation to export has encouraged the creation of synergies, with the sharing of innovation and know-how.

As shown above, Asian countries have a high share of world's footwear production which has consistently grown since the 1980s. These countries, including China, Taiwan, Vietnam and Thailand, compete through an aggressive pricing strategy, made possible by extraordinary low production costs. According to

APICCAPS, in 2015, while the European exports average price of a regular pair of shoes is around 19 euros, in China it is around 5 euros.

Since it is implausible for Europe to have lower production costs than China and other Asian competitors, European producers such as Portugal and Italy pursue a different strategy based on quality-competition, technological innovation and product differentiation. Differentiation is a key factor for the entire fashion cluster, including of course the footwear industry, due to quick changes in the consumer preferences and fashion trends. These changes reduce the lifecycle of footwear design, with consequences to the firms' strategy and productive process, which is forced to be more flexible.

In order to face differentiation and quality competition, the Portuguese footwear industry rearranged their strategy. Innovation played an important role in increasing value added and implementing new production processes. This shift was possible due to investment in know-how, specialization and skills to work with new technologies. Product innovation bolsters competitiveness as it can efficiently delay the end of a product's life cycle, by 'recreating' a newer and trendy product.

Together with modernization of processes, the high-skilled human capital is also very important for this specific sector. Design and quality are determined by the capacity of the existing human capital that is need to work with modern technologies. During the second-half of the twenty century many innovations where introduced along the productive process, such as waterjet cutting, digital recognition of raw materials, computerized systems and new quality control equipment. The combination of these process innovations forced firms to adopt a strategy focused on specialization and qualification of human capital.

This investment in technology is observable through a decrease in the size of firms, as they become less labour-intensive and more capital-intensive. According to APICCAPS, the introduction of computers and new mechanical processes decreased the average number of employees per firm; from 44 workers in 1995 to 26 workers in 2012. The assistance by computers across the different steps of the production process, from conception to distribution, and the introduction of new equipment are contributing a lot to a faster and more effective response to the customers' needs by Portuguese footwear companies.

During the past decades, the sector was able to grow also due to the entry of foreign capital that settled in firms in northern Portugal. These firms are generally characterized by a rigorous but flexible management style and an export-oriented market strategy. While much of this foreign capital has since divested, the industrial practices and market strategy they brought with them have had a lasting impact on the sector.

Regarding quality competition, the Portuguese footwear industry has much room to improve internationally. The "Made in Portugal" brand is not as valuable as "Made in Italy" in what concerns luxury footwear and high-involvement products. This is something that the Portuguese footwear industry is trying to overcome, increasing their investment on marketing, while seeking to better protect their industrial property through patents, trademarks and registered designs.

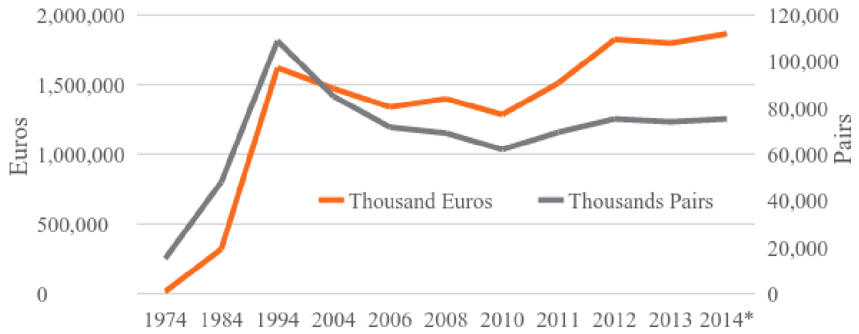
However, beyond the above-mentioned strategy of technological innovation, differentiation and quality-competition, the relations between producers and customers (including business customers for intermediate producers) must not be forgotten as they contribute to the value chain. A global network of suppliers, with the best price/quality of raw materials and short delivery times, is essential for producer firms to meet consumers' needs and preference changes. The proximity with customers and knowledge about market demand are possible due to the focus on marketing, which some Portuguese footwear's companies are investing in.

The Portuguese footwear cluster is relevant in the European footwear industry context, employing (in 2014) almost 38 thousand people and producing annually more than 75 million pairs. The industry exhibits strong and accelerating growth. This industry success contrasts with the other sectors of the Portuguese economy, where between 2011 and 2013 the GDP declined 15%. This success is not only in value produced but also in quantity produced and people employed, both of which continued to grow in that period, with exports reaching a new maximum. This success is even more impressive given that Portuguese footwear has the second highest average export price in the world. All these results were possible because the industry focused on not only high-quality production and fast delivery and response to orders, but likewise design, product quality and marketing.

2.2.2 Production and Employment

The production and employment in the Portuguese footwear industry increased in line with the number of enterprises through 1994, as depicted in Charts 8 and 9. The better performance of the value of produced footwear relative to quantity produced is consistent across the series and reflects a sustained increase in the border price of Portuguese footwear. In 2012, Portugal overcame its previous peak value of produced footwear (€1.62 million in 1994, €1.82 million in 2012) with 31% fewer shoes produced than in 1994.

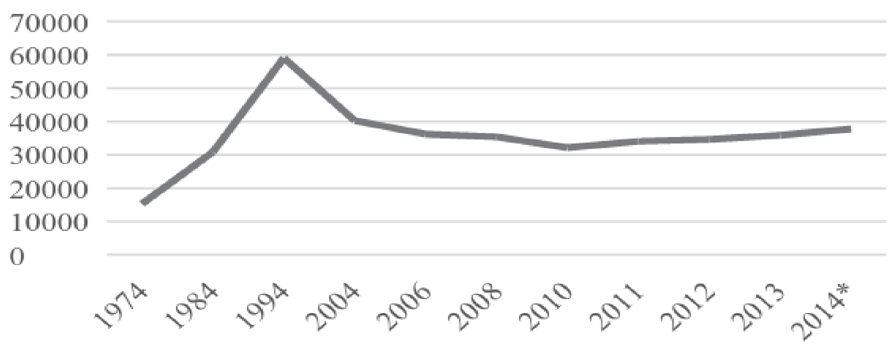
Chart 8 – Production of footwear in Portugal (Value and Quantity), 1974-2014.[5]



Source: Monografia Estatística 2015 - APICCAPS.

Like the number of enterprises, quantity produced and employment in the Portuguese footwear industry has been stable since the mid-2000s, with an average of 71 thousand pairs and 35,000 people employed. The transformation of the footwear industry from labour-intensive to capital-intensive is also clear from Chart 8 and Chart 9. Labour productivity, measured as average pairs of shoes per worker per year, has grown significantly from 980 pairs per worker in 1974 to 1842 pairs per worker in 1994 and reaching a peak in 2012 with 2171 pairs per worker. While productivity improved a lot until 1994, it does not present statistically significant growth since 1994.

Chart 9 – Employment in the footwear industry in Portugal (Number of persons), 1974-2014.[6]



Source: Monografia Estatística 2015 - APICCAPS.

[5] 2014 data are estimates.
[6] 2014 data are estimates.

2.2.3 Exports and Imports

APICCAPS (2015) says that more than 90% of production by the Portuguese footwear enterprises is destined to export. In the last five years, exports grew 20% reaching a new maximum of 1.9 billion euros (Table 1), while imports also increased 20%, resulting in a corresponding increase of 20% in the Portuguese trade surplus for the footwear industry, totaling 1.2 billion euros in 2015 up from 1 billion euros in 2011.

This industry is important for the Portuguese economy, representing 3.9% of all national exports in 2015. Other indicators confirming the relevance of footwear industry to the Portuguese economy include the coverage rate – where it is the second highest, after the Works of Art and Antiques industry - and trade balance, where it has the greatest surplus.

Two products within the footwear industry are responsible for the trade surplus: women's footwear (721 million euros surplus) and men's footwear (560 million euros). On the other hand, textile uppers and other plastic footwear (despite a growth over 100% in exports in the last five years) still represent a trade deficit for Portugal. This shows that Portugal's main specialization is in producing the final good, rather than intermediate goods in which it still depends heavily on imports. The exports of the two end-user product types, women's and men's footwear, continue to grow at a rate of 45% and 67%, respectively, even though they already register enormous surpluses. Furthermore, the variation in imports in this two segments since 2008 is negative, showing that the Portuguese are consuming fewer imported shoes and possibly more Portuguese shoes.

Table 1 – Footwear, Portuguese Trade Balance, 2011-2015 (Millions of Euros).

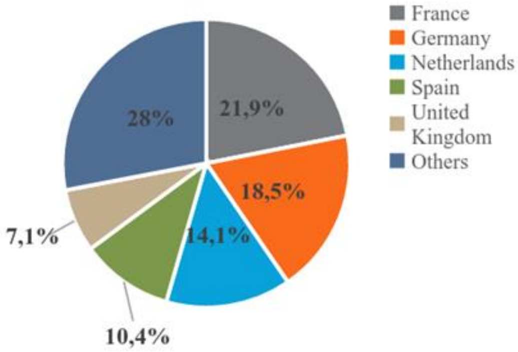
	2011	***2012***	***2013***	***2014***	***2015***
Exports	1.587.046	1.644.688	1.779.065	1.899.597	1.904.795
Imports	576.196	526.551	550.305	654.652	691.682
Balance	1.010.850	1.118.137	1.228.760	1.244.945	1.213.113
Cov. Rate	2,75	3,12	3,23	2,90	2,75

Source: INE & AICEP, Portugal: Comércio Internacional da Fileira da Moda.

The European market is the main market of destiny, absorbing more than 90% of all national footwear exports, though its preponderance has been falling in the last years. Portuguese footwear industry has been exploiting other markets in recent times, such as the American market (3.9% market share), particularly North America. Asian markets, particularly China, have also been growing rapidly, reaching 2.2% of Portuguese exports in 2014. Finally, Angola remains the main destination for Portuguese footwear in Africa.

If we inspect the main destinations of footwear exports by country (Chart 10), it is perceptible that the main importers in Europe are countries with high purchasing power, that look for products with high-quality and modern design, and therefore are willing to pay more. This follows from the fact that Portugal has the second highest average export price in the World (cf. Chart 5).

Chart 10 – Destination of Portuguese footwear exports by country (value), 2015.



Source: AICEP, Portugal: Comércio Internacional da Fileira da Moda.

Another point worth mentioning is that Portugal has been increasing its total number of export destinations from 137 countries[7] in 2011 to 155 countries in 2015. This growth also reflects the success and the greater reputation this industry has with foreigners, increasing the diversification of exports' destinations.

3. Literature Review

Competitiveness is the central subject of analysis in this paper. Several authors define and approach competitiveness in different ways. While Krugman (1996) rejects the concept of national competitiveness, he views competitiveness as experienced at firm level, which is the level at which our study is focused. While Altomonte et al. (2012) discuss a country's competitiveness, they suggest that a dynamic export sector be seen as measure of a country's competitiveness. Likeiwse, Porter (1990) explains that competitiveness is obtainable when entrepreneurs exploit the comparative advantage of a certain region. This indicates that a measure of export dynamics is a suitable proxy for competitiveness. The relevance of exports in economic growth has been a subject of many studies. Salomon & Shaver (2005) approached exports as the most common form of international expansion, and having a fundamental role stimulating economic growth and general productivity in a country. Bernard & Jensen (1999) noted that exports are positively related with economic growth, contributing to a general increase in a country's productivity.

The OECD (2005) refers to competitiveness as the ability to trade goods, under free and fair conditions in global markets, while at the same time preserving a sustainable growth in the real income over the long term. This highlights the importance of balancing export growth with growth in income, thereby precluding a so-called "rat race" where firms attain more exports but do not grow their turnover or profits. This suggests that measures of turnover can also be used as proxies for competitiveness.

Another definition of competitiveness is related to the total factor productivity (TFP). TFP is described by Comin (2010) as "…the portion of output not explained by the amount of inputs used in production. As such, its level is determined by how efficiently and intensely the inputs are utilized in production." Melitz (2003) demonstrated that greater market competition contributes, through knowledge spillovers into productivity, to the least productive enterprises leaving the market and a growing market share of the most productive. Alcala & Ciccone (2004) in fact admitted that the output generated from any given supply of inputs is related directly to economic growth.

According to European Commission (2014), SME's growth is determined by internationalization. Capacity for internationalization, in turn, is driven by both individual characteristics, and external factors such as tariffs

[7] Number of portuguese export destination Markets, 2011-2015, AICEP, Portugal: Comércio Internacional da Fileira da Moda

or transportation costs. At a firm level, authors point out that access to credit, innovation, R&D, human capital, among others, are factors extremely relevant to explain a firm's competitiveness.

The literature is assertive in saying that exporting firms are more efficient than the non-exporting ones. For example, firms can benefit from exporting to foreign markets by improving their productivity. Greater competition, exposure to a larger number of markets, to new technologies, new customers, and foreign suppliers and competitors, as well as economies of scale and incentives for specialization all explain why exporting improves productivity. (Castellani, 2002; Fabling & Sanderson, 2013). However, presence in new markets abroad can be very costly. This is the reason given by Rodríguez et al. (2013) to claim that exports are the consequence of an increase in productivity, and not the cause. Alvarez & López (2008), Bombardini et al. (2012) and Bernard & Jensen (1999) all determine that the most productive firms are more likely to export.

On the other hand, Mariasole et al (2013) demonstrate that through experience in external markets, Italian SME's were able to access shared knowledge in those global value chains, and so increase their competitiveness. This is an empirical example of what the literature calls learning economies. Ortega et al (2014) studied the causality between exports and productivity in Chile. They found that causality flows from exports to productivity rather than the other way around, which corroborates Mariasole et al (2013) and the learning-by-exporting hypothesis.

Bellone et al (2010) find that better financial health improves the likelihood for a firm to become an exporter. Financial pressure and indebtedness can limit a firm's' overall capacity and performance, and through it, its competitiveness could be harmed. Moreover, innovation through R&D expenditures had a significant impact on exports. The positive relationship between exports and innovation is also found by Chadha (2009), DiPietro & Anoruo (2006), and Correia & Gouveia (2016).

Correia & Gouveia, analyzing microdata for Portuguese firms, also found that higher wages increase a firm's likelihood to export, something that Greenaway & Kneller (2004) also find for the United Kingdom. This effect can be from wages themselves or due to an inverse causality of more competitive firms paying higher wages, rather than wages driving competitiveness.

However, empirical literature is not consensual at all relative to the effect of firm size in its competitiveness. For instance, Caloff (1994) found evidence that size is in fact a significant variable, in light with Correia & Gouveia (2016), but not consistent with Monteiro (2013) and Moen (1999), with the last one suggesting that the Norwegian SME's have different competitive advantages than larger firms, not being necessarily less competitive.

Another non-consensual idea is related to Subsidies, where Safi (2010) claims that the effect of subsidies on exports are always negative in the cases of perfect competition, but if the competition is imperfect the trend may be positive. Haq & Kemal (2007) in the long term found a negative relationship between indirect and direct subsidies on export promotion and Panagariya (2000) found a little but positive impact in India export subsidies.

While there is not a significant amount of literature relating to competitiveness in the footwear sector and in particular in the Portuguese case, the authors have surveyed three articles to this effect.

Marques (2013) refers to this industry as essential to the Portuguese economy for being one of the biggest contributors to the Portuguese trade balance and therefore being fundamental to comprehend what determines the export success of this particular industry. The author tries to define the determinants of trade competitiveness, analyzing the footwear industry between 2008 and 2011 from firm and industry data and based on financial and economic indicators. The results, from a sample of 31 firms, indicate that within the chosen variables (equity, debt, firm size, average cost per employee and productivity) the ones positive related with the export level are the average cost per employee and the firm size. This leads to the conclusion that competition in this industry is not focused on decreasing labour costs.

Rua & França (2014) proposed a model to analyze the relationship between the competitive advantage and export performance but also analyzed how the competitive advantage can influence the strategy of a firm in the Portuguese footwear industry in foreign markets. The authors concluded that the competitive advantage in this industry must be based on value added products and that these are developed through innovative manufacturing processes and differentiation to take advantage of economies of scope. Another key point made in this paper is that firms cannot be competitive in all value chain activities. This implies firms should specialize in the core business lines that lead to their competitive advantage. To achieve this goal, firms should be keen to develop synergies with other firms, through vertical and horizontal integration and collaboration.

Pacheco (2014) also looked over to the Portuguese footwear industry in terms of the evolution of the competitiveness of the sector. The empirical study covering the period between 1995 and 2008 shows that Portugal is improving in terms of competitiveness in comparison with emerging market countries (e.g. Asian countries with lower labor and production costs), particularly with regard to the calculation of unit values. Despite this, innovation fell comparing to the level in the mid-90's. In addition, the author analyzed the industry's trend in several aspects, such as product quality upgrading (unit value as a proxy) - where a general increase was identified – and product innovation (patents, trademarks and industrial designs as proxies) – with the trend in the opposite direction. Likewise, other two phenomena were studied like process upgrading (using as proxies capital formation, machinery and/or software acquisition and productivity) and organizational innovation and functional upgrading (with proxies here being wages and the percentage of hours per level of qualification). In both indicators, results were mixed.

Table 2 – Literature Review summary.

Variable	Author	Beta
Export Persistence & Diversity	Mariasole et al (2013), Castellani (2002), Fabling & Sanderson (2013)	**+**
Financial Pressure	Bellone et al (2010), Marques (2013)	**-**
Productivity	Ortega et al (2014), Rodriguez et al (2013), Alvarez & Lopez (2008), Bombardini et al (2012), Bernard & Jensen (1999)	**+**
R&D and Innovation	Ortega et al (2014), Chadha (2009), DiPietro & Anoruo (2006), Correia & Gouveia (2016), Rua & França (2014)	**+**
Wages	Correia & Gouveia (2016), Greenway & Kneller (2004), Marques (2013)	**+**
Equity	Marques (2013)	**- / +**
Size	Marques (2013), Caloff (1994), Correia & Gouveia (2016), Monteiro (2013), Moen (1999)	**- / +**
Subsidies	Safi (2010), Haq & Kemal (2007), Panagariya (2000)	**- / +**

4. Database description

4.1 The dataset

This study used the SCIE – *Sistema de Contas Integradas das Empresas* (System of Integrated Firm Accounting) database from the Portuguese National Statistical Institute (INE). SNCIE results from the compilation of data from the annual *Informação Empresarial Simplificada* survey (2010-2014) and from its predecessor, the Annual Survey to Firms (IAE), which ran from 2004 to 2009. Using more complete data from IES and the partial picture obtained from the IAE, INE was able to retropolate and revise 2004-2009 observations.

Our final panel consists of 40.383 observations, representing 7.729 firms, with an average of 3.671 firms in each given year. There are, on average each year, 728 exporting firms in the footwear sector. We also observe export participation (number of exporters/number of firms) in this sector remained stable (Table 3), with an increasing number of exporters. Furthermore, it is important to note that 3.802 firms "died" and 3.971 firms were "born" during this period, corresponding to 49,1% and 51,3% of our sample. 1.728 firms were both born and died during our sample, while 1.643 neither opened nor closed in the 2004-2014 period. This reveals the large extent to which our dataset is unbalanced.

Table 3 – Export Dynamics and firms present in the footwear sector.

Year	*Nr of Firms*	*Nr of Exporters*[8]	*Annual rate of change of exporters (%)*	*Export participation (%)*
2004	4,061	-	-	-
2005	3,952	-	-	-
2006	3,783	-	-	-
2007	3,740	-	-	-
2008	3,729	-	-	-
2009	3,530	-	-	-
2010	3,257	665	-	20%
2011	3,472	705	6,02%	20%
2012	3,531	737	4,54%	21%
2013	3,619	755	2,44%	21%
2014	3,709	779	3,18%	21%

Source: Author's calculations.

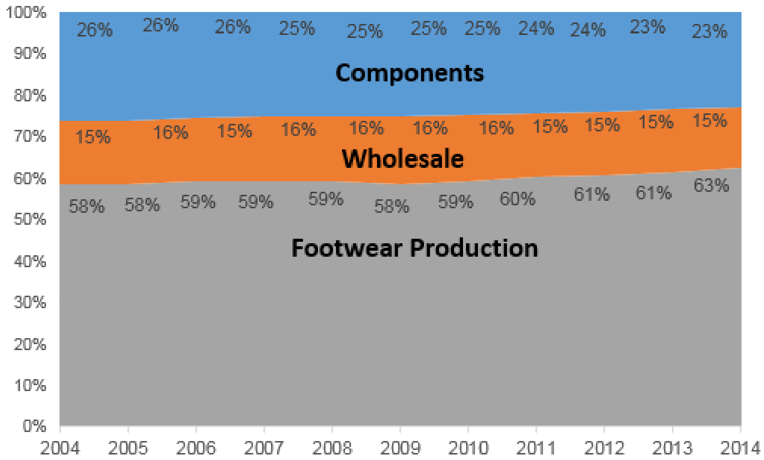
SCIE is available for the entire population of firms operating in Portugal. Our sample was selected using the CAE economic classification code. This study will assess the predictors of competitiveness for the entire footwear value chain. Supply chain ranges from firms that produce footwear (CAE-15201), leather (CAE-15100) and footwear components (CAE-15202), including for rubber and plastic shoes (CAE-22191 and CAE-22291 respectively).

Consultation with the industry's trade association alerted us to the segmentation of commercialization into spin-offs. Thus, while a firm may be producing footwear for export, this footwear may be registered as a domestic sale to such a spin-off, which in turn is the exporter of the same pair of footwear. Including footwear commerce in our sample carries risks. One is that we will be including in our sample the phenomenon of re-exporting. While this could be addressed by excluding importing firms or firms with imports above a certain threshold of its export values, this might also exclude firms with an actual stake in the Portuguese footwear sector. Another is that we will be including local retailers and street shops. Conveniently, the classification of economic activities distinguishes between wholesale and retail commercialization (CAE-46422 and CAE-47721, respectively). With an export participation rate of 6.3% and an export intensity rate of 1.5%, as

[8] According to the definition of Portuguese Republic Central Bank (Banco de Portugal) a firm is considered an exporter if at least 50% of annual turnover is from exports or at least 10% of annual turnover is from exports with a value superior to 150.000€.

opposed to 30.7% and 22% in wholesale, it was clear that street shops and such like were duly classified as retail rather than wholesale. This was corroborated by advice from the industry association regarding the sector's organization. Furthermore, the large number of retail firms in the footwear sector would double our sample and, in the likely event of having different determinants of competitiveness than producers and exporters, significantly bias our analysis. Thus, to mitigate this risk, footwear retail firms were excluded from the sample. While this could be further refined by excluding non-exporting wholesale firms, this would add unquantifiable selection bias. On the other hand, not all partners and spin-offs within the footwear value-chain will be included in our sample. For instance, firms in other classification codes which do not pertain exclusively to the footwear industry are not included in our sample, for instance design and trade outposts.

Chart 11 – Composition of firms in the Footwear sector.



Source: Author's calculations.

The most relevant economic activity (Chart 11) in the footwear sector is by far the production of footwear, being the main activity of 60% of firms and it is the second activity with the largest export participation rate, only surpassed by leather production. On the other hand, footwear components correspond to 24.8% of firms on our sample and the wholesale trade of footwear represents 15.5% of the firms. 85% of the firms in our sample are located in the northern region of Portugal.

In terms of size, our footwear sector firm data shows that 70% of firms are micro-firms (Table 4), with the other third composed mostly by small - and medium-sized firms. Large firms are only 0.29% of our sample. A reduction in the number of firms is visible in the years following the GFC, with the exception of medium-sized firms.

Table 4 – Total of firms by size.

Year/Size	*Micro*	*Small*	*Medium*	*Large*
2004	2,922	888	237	14
2005	2,843	875	222	12
2006	2,659	907	206	11
2007	2,656	873	200	11
2008	2,634	882	202	11
2009	2,490	833	197	10
2010	2,209	830	210	8
2011	2,385	854	225	8
2012	2,421	875	225	10
2013	2,484	893	232	10
2014	2,545	915	236	13

Source: Author's calculations.

4.2 Choice of Variables

The main goal in this paper is to illustrate and explain the competitiveness in the footwear sector in Portugal. As amply discussed in the literature review, many researchers associate export success with competitiveness (Porter 1990, Castellani, 2002; Altomote 2012, Fabling & Sanderson 2013, Mariasole et al. 2013, European Commission 2014). OECD (2005) raises the provision that competitiveness, which they equate with export capacity, should not weaken real income growth.

While the Portuguese footwear sector exports 98% of its production[9] (APICCAPS 2014), export intensity varies greatly within our sample. It therefore remains interesting to study why some firms obtain a greater share of their Turnover from exporting than others. Further, in order to consider the OECD provision, we have also developed a model explaining variations in turnover. Thus, we will employ export intensity (measured as the share of turnover originating from exports) and turnover per worker as proxies for competitiveness. The division of turnover by the number of employees allows us to obtain a model that is not scale-dependent. Moreover, this last dependent variable provides for a model where firms can be competitive in the domestic market, without having to export. This is particularly relevant given the business structure of the footwear sector, with exporting usually taking place in spin-offs, as explained above.

Our database provides us with vast information from firm's accounts. Using turnover and the number of employees, we calculated firm size according to European Commission definitions.[10] We label a firm a persistent exporter if it exports for more than one year.[11] We also label a firm to be a diverse exporter if it exports outside the EU. 50.9% of exporting firms do not export at all outside the EU, therefore this distinction may reveal different implantation in global export markets. These two labels are used as indicators of the persistence and breadth of a firm's internationalization experience. Labour productivity was constructed by dividing the gross value added by the number of workers in the firm. Financial pressure was measured as the weight of interest paid on turnover. We also use a measure of average wages, constructed by dividing wage costs by the number of employees. Gouveia & Correia (2016) and Greenaway & Kneller (2004) found

[9] This data accounts only for the firms associated with Portuguese Footwear, Components, Leather Goods Manufacturers' Association.

[10] European Commission size firm definition is determined by staff headcount and either turnover or balance sheet total. If a firm has less than 10 employees and a turnover and balance sheet total less than 2 million euro is considered Micro. If a firm has less than 50 employees and a turnover and balance sheet total less than 10 million euros is considered Small. If a firm had less than 250 employees and less than 50 million euros turnover and 43 million euros balance sheet total is considered medium-sized.

[11] Here, our criteria is not the Bank of Portugal's definition, but rather that exports are greater than zero.

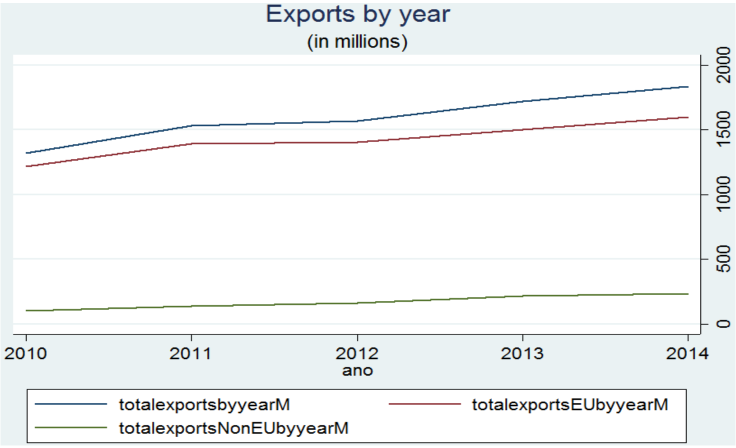
a positive association between wages and competitiveness. Variations in average human capital is also incorporated into average wage differentials across firms, and as the European Commission (2014) argues, human capital may also be a driver of competitiveness. A dummy variable indicating whether the firm received subsidies was also applied, with 56.4% of our firms receiving a subsidy at some point in time. Likewise, dummy variables were created indicating if a firm has negative equity or is making a loss (i.e. negative operational profits).

Literature largely point to innovation, research and development (R&D) and human capital as drivers of competitiveness. (European Commission 2014, Ortega et al 2013, Chadha 2009, DiPietro & Anoruo 2006) In order to measure investments, multiple choices were available. Firstly, we could have chosen between flow (investments) and stock (assets) measures. Flows were used in our model explaining export intensity, as it is expected that exposure to global export markets may require a more rapid relation with investment, which using stock measures might conceal. Our model explaining turnover per worker, conversely, used stock measures in order to consider the accumulated effect of investments on competitiveness. Secondly, authors had to choose how to normalize these variables, nominally as shares of turnover or per employee. Choice of normalization method matched the normalization of the dependent variable – namely, shares of turnover for the export-intensity model, and per employee for the turnover model.

4.3 Descriptive Statistics

The Portuguese footwear sector's export performance has been showing good results, with continuous growth since 2010 (Graph 1). Exports grew in the European Union market but also with the rest of the world. The European Union countries are the main destination of Portuguese footwear exports, reaching 1.6 billion euros in 2014 (31% growth since 2010), while the exports for the rest of the world reached 237 million euros in 2014 (130% growth since 2010).

Graph 1 – Exports in the footwear sector (Total and by destination).



Source: Author's calculations.

In the table 5, we have listed the most important and relevant variables on our paper to help us evaluate the mean difference for several indicators in a case of an exporter and non-exporter firm. As expected, there are significant difference between exporting and non-exporting firms, especially in terms of turnover, operational profits and production. We also observe in our sample that the non-exporters are the most indebted firms, corroborating Bellone et al's (2010) arguments about an indebted company having more difficulties to become an exporter and therefore be competitive.

Table 5 – Mean Differences between Export and Non-Export firms.

	Non-exporter (0)	Exporter (1)	Mean Differences
Turnover	473.584	2.810.200	+1.201.291***[12]
Operational Profits	15.747	97.452	+41.193***
Production	391.288	2.550.149	+2.158.861***
Production / Turnover	97,29%	88,16%	-9,14%
Average Wage	7.907	8.405	+498***
Average Labour Costs	9.821	10.607	+786***
Employees	12	39	+27***
% PMEs	100%	98,7%	-1,34%***
% Micro	60,02%	37,38%	-23,34%***
% Subsidy Recipient	8,2%	19,5%	+11,3%***
Assets Per Worker	60.874	119.577	+58.703***
Equity Per Worker	13.457	8.794	-4.663
Markup Margin	3,41%	6,24%	+2,82%***
Labour Productivity	13.532	16.954	+3.422***
Inv. Intangible Assets (% Turnover)	0,44%	0,31%	-0,13%
Inv. Tangible Assets	16,6%	4,15%	-12,5%**
Inv. R&D	0,2%	0,04%	-0,16%
Inv. Software	0,06%	0,21%	+0,16%
Leverage (L/E)	17.5	8.37	-9.1*
Financial Pressure (Interest/Turnover)	1,29%	1,03%	-0,26%
% Equity <0	18,3%	15,3%	-3,0%***

Source: Author's calculations.

The export participation rate is the percentage of firms which are exporters. Table 6 provides a comparison of the export participation rate between the footwear, components and wholesale sectors. With 34.4% and 35.6% respectively, the production and wholesale commercialization of footwear are the two stages of the footwear value chain with the highest export participation rate. With 18.9% exporting firms in the components stage, we can observe that Portuguese component production appears to be mainly sold nationally.

Table 6 – Percentage of Exporting Firms by type of economic activity.

% Exporting Firms	*Not in Group (0)*	*In Group (1)*	*Mean Differences*
Footwear	26,1%	34,4%	+8,3%***[13]
Components	34,6%	18,9%	-15,7%***
Wholesale	30,2%	35,6%	+5,3%***

Source: Author's calculations.

The same happens with export intensity (table 6), with the footwear production and wholesale having the highest exporting intensity values (22,1% and 21,8% respectively). On the other hand, components show a small exporting intensity (7,6%), compared to the average 22.0% in the remaining stages of the footwear value chain. Tables 6 and 7 allow us to conclude that the production of footwear and wholesale commercialization are export-oriented while the components sub-industry produces to a larger degree for domestic consumption.

[12] *** if p [0; 0,009], ** if p [0,01; 0,049] and * if p [0,05;0,1]
[13] *** if p [0; 0,009], ** if p [0,01; 0,049] and * if p [0,05;0,1]

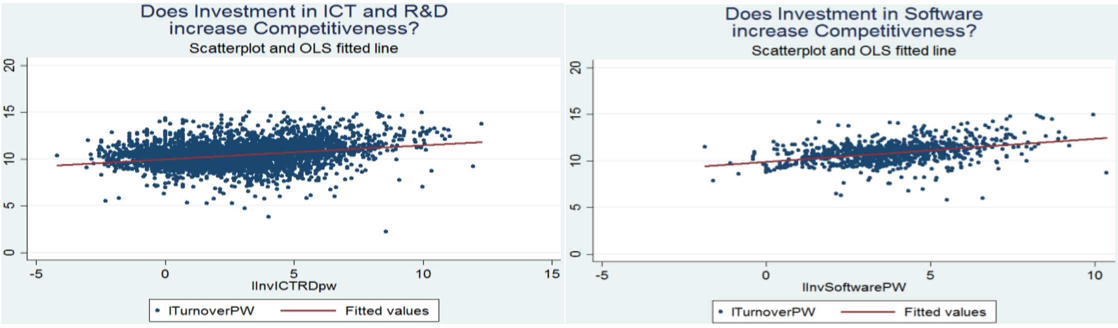
Table 7 – Export Intensity by type of economic activity.

% Export Intensity	*Not in Group (0)*	*In Group (1)*	*Mean Differences*
Footwear	13,5%	22,1%	+8,5%***
Components	22,0%	7,6%	-14,4%***
Wholesale	18,2%	21,8%	+3,6%***

Source: Author's calculations.

As an illustration of the linear least squares on graph 2 and 3, we can observe two similar behaviors, with investment in Information and Communication Technology (ICT) and Research and Development (R&D) having roughly the same positive correlation on competitiveness (logarithm of turnover per worker) than the investment in Software. These results agree with Ollo-Lopez & Aramendia-Muneta's (2012) conclusions.

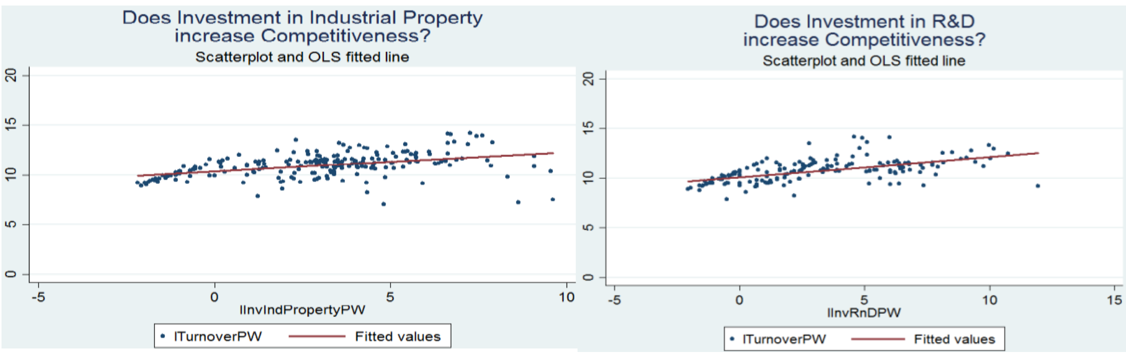
Graph 2 & 3 – Correlation between competitiveness and investment in ICT and R&D & Correlation between Investment in Software and competitiveness.



Source: Author's calculations.

Graph 4 and 5 shows the relationship between investment in industrial property and R&D with competitiveness, obtaining the same results as the previous graphs. This suggests that investment in Industrial Property and R&D is correlated with a firm's competitiveness, in line with the findings of the European Commission 2014, Ortega et al 2013, Chadha 2009 and DiPietro & Anoruo 2006.

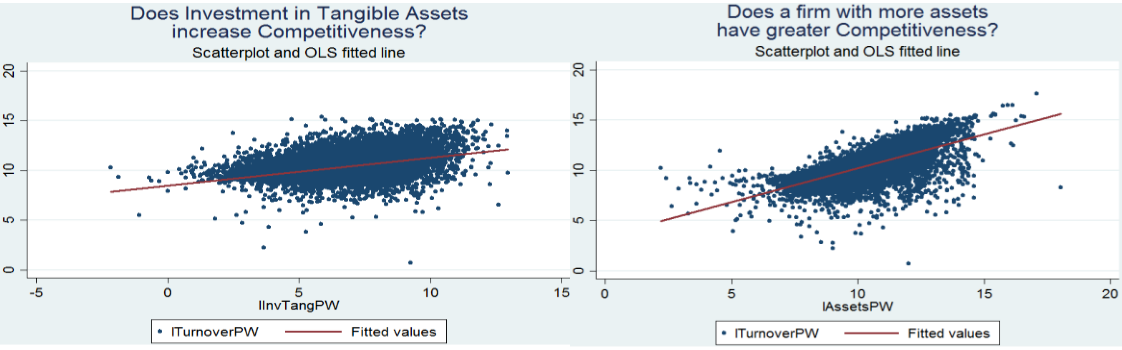
Graph 4 & 5 – Correlation between investment in Industrial Property and competitiveness & Correlation between investment in R&D and competitiveness.



Source: Author's calculations.

Finally, in graphs 6 and 7, when we observe the relationship between assets and competitiveness within the Portuguese footwear sector the correlations are yet again positive but stronger than in the cases of R&D, ICT, software and industrial property. If we take a look at the correlation of investment in tangible assets with competitiveness, the relationship is positive. Yet, if we consider all assets in a firm (tangible and intangible) the correlation is stronger, suggesting an important correlation between intangible as well as tangible assets, and corroborating previous research under this subject (European Commission, 2014; Mariasole et al, 2013; Pacheco, 2014). This also ratifies the narrative presented by the trade association, APICCAPS, concerning the evolving focus of structural funds for the footwear sector.

Graph 6 & 7 – Correlation between investment in Tangible Assets and competitiveness & Correlation between assets and competitiveness



Source: Author's calculations.

5. Methodology

In this paper, we investigate the determinants of competitiveness within the Portuguese footwear industry. To do so we use firm-level data of Portuguese footwear industries, from 2004 to 2014, in order to estimate a Panel OLS Model. We will present two models explaining variations in two different proxies for competitiveness, turnover per employee - ln(TurnoverPW) - and the weight of exports on the firm's turnover - ExportIntensity. A natural logarithm was applied to the first to account for a non-normal distribution of turnover and to simplify the interpretation of coefficients. For these reasons, we have also applied a natural logarithm to other variables.

As different phases in the value chain may well have different determinants of competitiveness, we have controlled for the type of industry, both with main effects and interaction effects where relevant. Our control for types of industry aggregates across components industries and leathers, distinguishing 3 phases of production: intermediate goods, final goods and commerce (i.e. wholesale).

Box 1. Autoregressive components

Consider a simple linear regression with a vector of regressors X on y:

(1) $y_t = \alpha + \beta \boldsymbol{X}_{t-1} + \mu_t$

Some or all of X are endogenous. They depend on lagged values of y.

(2) $\boldsymbol{X}_{t-1} = \gamma + \theta y_{t-2} + \varepsilon_t$

By simple manipulation, we obtain:

(3) $\boldsymbol{X}_{t-1} - \theta y_{t-2} = \gamma + \varepsilon_t$

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In its original form, without an autoregressive component, substituting (2) into (1) we obtain a biased and inconsistent estimate of Beta:

$$(1)\ y_t = \alpha + \beta \boldsymbol{X}_{t-1} + \mu_t$$

$$(4)\ y_t = \alpha + \beta(\gamma + \Theta y_{t-2} + \varepsilon_t) + \mu_t$$

If we add an autoregressive component to our model, we isolate the effect of lagged values of y, thereby obtaining a more accurate result. The model with an autoregressive componente is written:

$$(5)\ y_t = \alpha + \beta \boldsymbol{X}_{t-1} + \eta y_{t-2} + \mu_t$$

As eta is a parameter to be estimated, let eta be the negative value of the product of Beta and Theta:

$$(6)\quad \eta = -\beta\theta$$

Thus, we can rewrite (5) as:

$$(7)\quad y_t = \alpha + \beta \boldsymbol{X}_{t-1} - \beta\theta y_{t-2} + \mu_t$$

Factoring out Beta, we obtain:

$$(8)\quad y_t = \alpha + \beta(\boldsymbol{X}_{t-1} - \theta y_{t-2}) + \mu_t$$

Recall equation 3:

$$(3)\quad \boldsymbol{X}_{t-1} - \Theta y_{t-2} = \gamma + \varepsilon_t$$

Substituting 3 into 8, we observe that this new model is estimating Beta on the exogenous variations of X, and accounting for endogeneity:

$$(9)\quad y_t = \alpha + \beta(\gamma + \varepsilon_t) + \mu_t$$

In both models, an autoregressive component is included in order to control for some endogeneity in explanatory variables. If these variables depend on past values of the dependent variable, then controlling for them will allow us to control for some endogeneity in our regressors. This is explained in detail in Box 1: By including an autoregressive component, we control for endogenous variation in dependent variables and therefore obtain exogenous variation in it.

Lags have been used in some cases to approximate causal effects. In the case of investments, and in line with customary practice, various lag specifications were tested, with an optimal parsimonious specification selected for the final model and for presentation in this paper.

There are a variety of different types of models which can be used to analyze panel data. The two main types are Fixed Effects (FE) models and Random Effects (RE) models. Fixed Effects models estimate a fixed effect for each firm in our sample, as if each firm was used as a control. This allows us to account for specific unobserved features of each individual firm, which could introduce bias into our econometric model. Organizational culture, CEO's skills, marketing and HR management or willingness to participate in international fairs are some examples of these individual characteristics relevant to the footwear sector. Fixed effects models also allow for correlation between errors and predictors, i.e. corr(ui,Xi) ≠ 0. In other words, the model allows for heteroscedasticity, which tests confirmed is present in our model. Besides that, one should alert for the fact that in presence of heteroscedasticity, standard errors should be robust in order to allow for correct statistical inference. As we find heteroscedasticity even after employing the FE framework, we have made inference from and present robust standard errors for all of our regressions.

To confer that our models best fit with FE rather than RE, a Hausman test was performed for each model. These tests provided evidence that using a random effects model would produce inconsistent point-estimates and that a fixed-effects model is more reliable. The tests' results are presented in the next section.

Interaction effects were also employed selectively to reveal how the effect of our explanatory variables differ by firm size and by type of industry. Where interaction effects merely created noise, they were not applied. In our model with turnover, due to a more extensive use of interactions, the model is presented with and without interaction effects.

Our first model aims to explain variations over time within and across firms in turnover per employee. We regress turnover on average wages, tangible and intangible assets, and our dummy variables for negative equity, loss-makers and persistent exporting. Size and phase in the value-chain are also included as control variables. For ease of interpretation, micro and small firms are grouped, and conversely, medium and large firms are grouped together as well. The following equations describe our first model:

$$Turnover_{t,i} = \alpha + \beta Insolv_{t-1,i} + \gamma Loss_{t-1,i} + \zeta lAvgWage_{t,i} + \eta TangAss_{t,i} + \theta IntangAss_{t,i} + \sum_{SubI}^{all} \varphi SubI_{t,i} \cdot MedLarge_{t,i} + \chi PersX_{t,i} + \sum_{n=2}^{3} \rho Turnover_{t-n,i} + \varepsilon_{t,i}$$

$$Turnover_{t,i} = \alpha + \sum_{SubI}^{all} \sum_{MedLarge}^{all} \beta SubI_{t,i} \cdot MedLarge_{t,i} \cdot Insolv_{t-1,i} + \sum_{SubI}^{all} \sum_{MedLarge}^{all} \gamma SubI_{t,i} \cdot MedLarge_{t,i} \cdot Loss_{t-1,i} + \sum_{MedLarge}^{all} \zeta MedLarge_{t,i} \cdot lAvgWage_{t,i} + \eta TangAss_{t,i} + \theta IntangAss_{t,i} + \sum_{SubI}^{all} \varphi SubI_{t,i} \cdot MedLarge_{t,i} + \sum_{SubI}^{all} \sum_{MedLarge}^{all} \chi SubI_{t,i} \cdot MedLarge_{t,i} \cdot PersX_{t,i} + \sum_{n=2}^{3} \rho Turnover_{t-n,i} + \omega_i + \varepsilon_{t,i}$$

The second model presented in this paper explains variations in export intensity over time within and across firms. We regress export intensity on labour productivity, financial pressure, investment in tangible and intangible assets, and on our indicator variables for being a persistent exporter, a diverse exporter, and a subsidy recipient. As in the first model, we control for firm size and phase in the value-chain. The grouping of micro and small businesses and medium and large businesses is also maintained. This model is described by the following equation:

$$XInt_{t,i} = \alpha + \sum_{SubI}^{all} \sum_{MedLarge}^{all} \beta SubI_{t,i} \cdot MedLarge_{t,i} \cdot PersX_{t,i} + \gamma DivX_{t,i} + \zeta lLabProd_{t,i} + \eta FinPress_{t-1,i} + \theta SubR_{t-1,i} + \sum_{n=1}^{3} (\rho IshareIntang_{t-n,i} + \tau IshareTang_{t-n,i}) + \delta t + \sum_{SubI}^{all} \varphi SubI_{t,i} \cdot MedLarge_{t,i} + XInt_{t-2,i} + \omega_i + \mu_{t,i}$$ [14]

It should also be noted that given our ample use of indicator variables, the R-squared estimated using the fixed-effects panel regression command is incorrect. Stata's fixed-effects panel regression command does not include group effects in calculating fit. Instead, the estimates of R-squared from the absorption regression (areg) command are displayed.[15]

[14] $XInt_{t,i}$ = Export Intensity; $PersX_{t,i}$ = PersistentExporter; $SubI_{t,i}$ =Sub-industry; $MedLarge_{t,i}$ = MediumLarge; $DivX_{t,i}$= Diverse Exporter; $lLabProd_{t,i}$ = ln(LabourProductivity); $FinPress_{t,i}$= Financial Pressure; $SubR_{t,i}$ = Subsidy Recipient; $IshareIntang_{t,i}$ = Share of Turnover invested in Intangible Assets; $IshareTang_{t,i}$ = Share of Turnover invested in Tangible Assets; $Turnover_{t,i}$ =ln(Turnover per worker); $Insolv_{t,i}$ =Insolvent; $Loss_{t,i}$ =Loss-maker; $lAvgWage_{t,i}$=ln(Average Wage); $TangAss_{t,i}$ =Tangible Assets per worker; $IntangAss_{t,i}$ =Intangible Assets per worker; ω_i =Fixed effect, time-invariant firm-specific

[15] Gould, W. (1996). 'Why isn't the calculation of R2 the same for areg and xtreg, fe?', [ONLINE] Available at: http://www.stata.com/support/faqs/statistics/areg-versus-xtreg-fe/ [Accessed 12 August 2016].

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6. Empirical Results

Table 8 shows the results of a fixed-effects panel regression of turnover per worker on a battery of explanatory variables. Given our unbalanced panel, it is understandable that only a third of observations can be used in a model with lags

Table 8 – Results of Model 1[16]

Dependent Variable	ln(Turnover)t									
Interaction Effects	No	Yes								
Interaction Type		No interaction	MicroSmallt	MediumLarget	Intermediatet× MicroSmallt	Intermediatet× MediumLarget	Finalt× MicroSmallt	Finalt× MediumLarget	Retailt× MicroSmallt	Retailt× MediumLarget
ln(Turnover)t-2	-.00660	.00265	--	--	--	--	--	--	--	--
ln(Turnover)t-3	-.0277	-.0296	--	--	--	--	--	--	--	--
NegEquityt-1	-.0530	--	--	--	-.000540	(omitted)	-.0876***	-.0437	-.0264	(empty)
LossMakert-1	-.0972***	--	--	--	-.0888***	-.0883	-.0876***	-0.0437	-.170*	.00337
ln(AvgWage)t	.685***	--	0.651***	1.09***	--	--	--	--	--	--
TangAssetst	1.65e-06**	1.67e-06**	--	--	--	--	--	--	--	--
IntangAssetst	2.12e-06*	2.75e-06**	--	--	--	--	--	--	--	--
Intermediatet×MicroSmallt	(base)	(base)	--	--	--	--	--	--	--	--
Intermediatet×MediumLarget	-.0477	-4.14	--	--	--	--	--	--	--	--
Finalt×MicroSmallt	-.0596	-.169	--	--	--	--	--	--	--	--
Finalt×MediumLarget	.0556	-4.02	--	--	--	--	--	--	--	--
Retailt ×MicroSmallt	.512***	.453***	--	--	--	--	--	--	--	--
Retailt×MediumLarget	.788**	-3.34	--	--	--	--	--	--	--	--
PersistentExportert	.0679***	--	--	--	.0596***	.0595	.105***	.0117	.0556	-.190
c	4.49***	4.92***	--	--	--	--	--	--	--	--
R^2	93.6%	93.7%								
F-statistic	17.22	11.98								
Number of obs.	7,854	7,854								
Number of groups	2,078	2,078								
T	3.8	3.8								
Hausman(υ,χ2)	(11, 1822.57)	(23,3131.5 6)								

16 *significant at p<0.05, **significant at p<0.005, ***significant at p<0.001.

Table 9 – Results of Model 2[17]

Dependent Variable	ExportIntensityt				
Interaction Effects	No				
Ano	-.0043**	InvIntangibleAssetssharet-1	-.0112	R^2	96.0%
ExportingIntensityt-2	-.114***	InvIntangibleAssetssharet-2	-.0143	F-statistic	293.59
PersistentExportert		InvIntangibleAssetssharet-3	.161***	Number of obs.	4,734
×Intermediatet×MicroSmallt	.0684***	InvTangibleAssetssharet-1	.0118	Number of groups	1,861
×Intermediatet×MediumLarget	.0582**	InvTangibleAssetssharet-2	-.0005	T	2.5
×Finalt×MicroSmallt	.174***	InvTangibleAssetssharet-3	.00570	Hausman(υ,χ2)	(25, 2073.05)
×Finalt× MediumLarget	.224***	Intermediatet×MicroSmallt	(base)		
×Commercet× MicroSmallt	.153***	Intermediatet×MediumLarget	.00913		
×Commercet× MediumLarget	-.0101	Finalt×MicroSmallt	-.0233		
DiverseExporter	.0649***	Finalt×MediumLarge	-.0470		
lnLabourProudcitivity	.0196***	Retailt×MicroSmallt	-.0407		
FinPressureonTurnovert-1	-.211	Retailt×MediumLarget	.0866		
SubsidyRecipientt-1	.006	c	4.39***		

[17] *significant at p<0.05, **significant at p<0.005, ***significant at p<0.001.

6.1 Average Wages

One possibly surprising conclusion to this study is the positive effect of average wages on turnover per worker. A 10% increase in average wages is associated with a 6.85% increase in turnover per worker, ceteris paribus. This effect is even larger in medium and large firms, with a 10% increase in average wage being associated with a 10.9% rise in turnover per worker. This differs from what would be expected under a textbook-case of perfect competition where firms with higher average wages are priced out of the market. One first comment is that causality may be reversed or indeed may flow in both directions – instead or as well as higher-paying firms being more competitive, it may be that more competitive firms pay higher wages.[18] Economic theory and an understanding of the indicators at hand can lend us two possible explanations for this positive elasticity.

If we assume that workers with the same level of human capital earn similar wages across different firms (as opportunities for arbitrage are exhausted), differentials in average wages can be expected to amount not to different human resource policies but instead to heterogeneous workforce compositions. From this perspective, higher average wages imply the firm has greater human capital per worker. In this case, the driver of higher turnover per worker is not wages but the human capital of workers, which the literature highlights as a driver of competitiveness. However, as human capital is unobservable, we do not know the role that wages played in either encouraging workers to invest in their human capital or facilitating recruitment of workers with greater human capital, or both. Furthermore, higher human capital can be indicative not only of more skilled or more experienced workers, but also more capital-intensive or technologically-sophisticated firms.

A second explanation translates conclusions from efficiency wage theory. Efficiency wage theory points out that turnover, training costs, and discipline costs may be reduced by higher wages. Not only is it proposed that higher average wages represent higher average human capital, higher average wages may be a cause of not just higher average human capital but higher morale and effort. This results in not only lower turnover costs, training costs and discipline costs, but improved productivity. This hypothesis is backed by ample literature, both theoretical and empirical, documenting the effort-inducing effect of higher wages.[19] Literature has also documented that this effect is larger in larger firms.[20]

6.2 Tangible and Intangible Investments

The role of investments in driving competitiveness is consistently emphasized in the literature. Both when measured in stock and flow, our model distinguishes investment in tangibles and intangibles. Investment in intangibles includes investment in software, industrial property and training. It can be thought of as a proxy for investment in R&D and human capital. Investment in tangibles contemplates investment in physical capital, namely in machinery and facilities. Both investment in tangibles and intangibles can be seen as proxies for investment in innovation.

According to our results, an investment of ten thousand euros per worker in tangible or intangible assets is associated with a 1.65% and a 2.12% increase in turnover per worker, respectively. When we look at results from the more detailed model with interaction effects, the estimated effect of investment in intangibles increases to 2.75% for each ten thousand euros per worker invested. Both of these estimates are statistically significant, though investment in intangibles has a greater variance, probably originating from increased likelihood of investments (e.g. R&D) bearing no fruit. It is relevant that investment in intangibles is greater than investment in tangibles. Not only is this corroborated by evidence presented by the trade association

[18] Schlicht, E. (2016). Efficiency Wages: Variants and Implications.
[19] For a theoretical example, see the seminal Akerlof & Yellen 1990 model. Akerlof, George A., and Janet L. Yellen. "The fair wage-effort hypothesis and unemployment." The Quarterly Journal of Economics (1990): 255-283.
For an empirical example, see the Fehr-Kirchsteiger-Riedl experiment on the fair wage-effort hypothesis. Fehr, Ernst, Georg Kirchsteiger, and Arno Riedl. "Does fairness prevent market clearing? An experimental investigation." The quarterly journal of economics (1993): 437-459.
[20] Schlicht, E. (2016). Efficiency Wages: Variants and Implications.

of decreasing importance of investment in factory machinery, but also provides pertinent insight for policy-makers. Furthermore, from an econometric interpretation point of view, given that there are much fewer intangible assets in firms and that tangible assets usually require larger investments, for there to be a discernible effect of investment in intangibles on a firm's competitiveness, it should have a larger coefficient than investment in tangibles. Thusly, our model broadly suggests a positive effect of both tangible and intangible investments on turnover per worker.

Our second model regresses competitiveness, measured as export intensity, on investments as a share of turnover. This different treatment for scale allows us to investigate the effects on competitiveness of firms investing a greater share of their turnover. The results show that only after 3 years do investments in intangibles produce statistically significant effects on export intensity. This does not mean that some intangible assets don't produce effects earlier. Other models not presented here teased out a significant effect of investment in software after one year, whereas investment in R&D while being associated with a higher export intensity had too much variation after one year to allow inference of a significant effect on export intensity. The estimated effect of investment in intangibles is, however, small. Investing 10% of one's turnover in intangibles only increases export intensity 1.6% after 3 years. Investment in tangible assets does not produce statistically significant effects on export intensity. It is relevant that, once more, investment in intangibles has a greater effect on competitiveness than investment in tangibles. Assuming investments in tangible assets improve productivity, this finding lends credence to the learning-by-exporting hypothesis.

One limitation of our model is that in both per-worker and share of turnover transformations, we are estimating the effect of investment in relative terms and not in absolute terms. It is possible that the effect of investment is not linear in relative terms but in absolute terms. For instance, it is plausible that $1 million invested will bear the same fruit regardless of whether the firm has a small or large turnover. Some (although clearly not all) investments, such as hardware or internationalization, cost the same for small and large firms. Thus, the same degree of investment will be considered smaller for larger firms, purely because they have more workers and a greater turnover. It is thus possible that our estimates are biased and do not depict the real effect of investments on competitiveness.

It should also be noted that a big part of intangible investments are directly related to tangible investments. For instance, investment in tangibles such as new technologies may then requires investment in intangibles such as training, while intangible investments like developing software first requires a tangible investment in a computer.[21] Therefore, while tangible investments may have a smaller effect on turnover, they should be considered in unison with intangible investments as well, through which they may have an indirect effect on competitiveness.

Finally, it is likely that measurement error is pervasive, particularly relating to investment in intangibles. Even assuming that firms accurately report this data - in itself a big assumption - this accounting variable may not fully capture investment in intangibles. For instance, according to the trade association, training is conducted by shared resource centers and is not accounted for at market value in investment in intangibles statistics. This suggests our estimates are biased. Paired with our findings for average wage, these findings seem to confirm the hypothesis that innovation and technological absorption are key drivers of a firm's competitiveness.

6.3 Financial Health

The financial health of a firm is of clear importance to its competitiveness. Having negative equity or being a loss-maker firm during the previous year of activity reduces turnover per worker by 5.3% and 9.7% respectively. However, only being a loss-maker is significant, producing negative effects on the dependent variable by a large amount. When interaction effects are added, a significant negative effect of negative equity on turnover per employee the following year is identified for micro and small firms of the footwear

[21] Young, A. (1998). Measuring Intangible Investment.Towards an Interim Statistical Framework: Selecting the Core Components of Intangible Investment.Paris, France: OECD.

industry. Checking the interactions for the first lag of LossMaker, we can conclude that the competitiveness of micro and small firms are more harmed by negative operational profits, on average, ceteris paribus. This is the case particularly for producers of intermediate and final goods, with point estimates significant at the 1% significance level. This corroborates the results found in the literature by Bellone et al. (2010). That larger firms' competitiveness appears to be resilient to negative equity and negative operational profits offers insights for policy-makers seeking to increase resilience to macroeconomic shocks in their exporting sector.

It is worth reflecting on how a firm can come about having negative equity. Negative equity, from a balance sheet perspective, arises from liabilities exceeding assets. It is well-known that Portuguese law allows firms to be established without significant equity, in fact with no equity. The over-reliance of Portuguese firms on debt rather than equity is also a widely established stylized fact. This motivates a finer analysis of the meaning of negative equity as the increment of liabilities without an accompanying or subsequent increase in assets. There are a variety of ways in which this could take hold. The simplest one is the accumulation of rolled-over debt as assets depreciate. However, it is also easy to conceive that firms may find themselves in a position of negative equity through inefficiencies in purchasing assets or the unproductivity of assets purchased. These are both cost-driven absorption of cash obtained from liabilities. However, there is a third sense linked concretely to turnover per worker. In this case, a firm may buy assets efficiently and in the same productive mix as competitive firms. If it cannot translate production into sales, or if it sells with smaller or even negative margins, it follows that the firm may struggle to have assets outpace liabilities.

Our second model uses the weight of interest paid on turnover as a measure of financial pressure and therefore a negative indicator of financial health. Financial pressure has an estimated negative albeit insignificant effect on export intensity. While statistical insignificant may point to heterogeneity among the footwear sectors with some exporting firms being highly-indebted and some non-exporting firms having rather low financial pressure, the point estimate suggests that higher indebtedness reduces the likelihood of a firm exporting intensively. This once again corroborates Bellone et al. (2010). When firms have a higher rate of financial pressure that means that a substantial part of its turnover is directed to repayments of credit previously granted. If a firm has a lower financial pressure, whether because indebtedness has materialized in increased turnover or because the firm did not originally leverage its position, a greater proportion of turnover is available to be directed to, for example, investments in new productive infrastructures, pay higher salaries or develop new higher quality products through R&D investment.[22] While no significant effect was estimated, our findings do not dispel the hypothesis that financial health is a positive predictor of competitiveness.

6.4 Export Persistence

Firms that export two or more years obtain on average a greater share of their turnover from exports, according to our second model. This conclusion is in line with the literature (Castellani, 2002; Fabling & Sanderson, 2013 and Mariasole et al., 2013). One of the main reasons why this happens is due to the fact that persistent exporting firms build "learning economies" abroad through which companies increase product quality, develop human capital and obtain better know-how. When participating consistently in export markets, firms need to overcome a bigger number of competitors while abroad, requiring a firm to specialize and differentiate. Furthermore, they develop business relationships with buyers that may be persistent or even facilitate future business growth. When interactions are considered, it is evidenced that this effect is particularly present in footwear producers, with a positive and significant impact, while large wholesale firms have a statistically insignificant effect. This validates the channels suggested above through which persistence in exporting can improve competitiveness. In firms where exporting and production are both done in-house, we find persistence in exporting improves competitiveness. Where these are detached, no such finding can be concluded from the evidence at hand.

[22] Askenazy, P., Caldera, A., Gaulier, G., & Irac, D. (2011). Financial constraints and foreign market entries or exits: Firm-level evidence from france.

6.5 Export Diversity

We also find a positive impact on export intensity from exporting beyond the European Union (our diverse exporter indicator). This result validates the arguments of Mariasole et al. (2013), that firms that export for different markets are more efficient and therefore competitive in comparison with those who do not. Given that the European Union is considered a 'single market', one might consider exporting outside the European Union to be the demonstration of genuine export capacity, given that capacity to export beyond the EU demonstrates capacity to export in the presence of trade barriers. It is also important to mention that not only is the number of competitors greater when competing beyond the European Union, but, indeed, the number of intermediates is also greater. Thusly, we might also consider our diverse exporter indicator to be a measure of participation in global value chains as well. Participation in global value chains can create efficiencies for participants in all phases of the value-chain, but in particular for our final good producers who benefit both up- and downstream from greater access to markets.

6.6 Labour Productivity

In the same model, we introduce labour productivity, defined as Gross Value Added per worker (in factor prices). This variable would be of limited interpretation regressed upon turnover per worker, as these are closely related. However, the relation between productivity and exports is a well-researched topic, namely regarding the direction of the causal relationship. In a theoretical competitive market, competition drives down market prices squeezing out relatively unproductive firms. Exposure to foreign markets increases the level of competition faced by firms, and therefore less productive firms will wither away and more productive firms will thrive. Exporting therefore is both a cause of productivity growth and a consequence of it, as firms have to improve their productivity both before and after exporting in order to compete globally. This hypothesis is demonstrated by Melitz (2003), Alvarez & Lopez (2008), Bombardini et al. (2012) and Bernard & Jensen (1999). Our results validate this hypothesis, though the coefficient is very small. A 10% increase in labour productivity is associated with a 0.196% increase in the export intensity, ceteris paribus. In this case too, ceteris paribus constrains our analysis as labour productivity is related with other dependent variables, reducing the size of our point estimates.

6.7 Subsidies

Subsidies are offered by governments to firms in order to promote certain objectives. It is common for governments to offer subsidies to promote business development and pursuit of certain strategic objectives which may enhance competitiveness. Among these we count internationalization and exporting. It is therefore expected that subsidy recipients be more competitive and export more than other firms. While we identify a positive coefficient, this is not statistically significant. However, conditionality or type of subsidy is unobserved. Furthermore, coefficients can only be interpreted holding all other variables constant. The effect of becoming a subsidy recipient while holding investment and productivity constant, for instance, is not particularly informative if subsidies exist for productive investment. For these reasons, the authors are skeptical about whether any particular interpretation should be drawn out from these point estimates on subsidy recipients. A more direct policy evaluation of subsidies would have to be undertaken to assess their real impact on sectorial competitiveness.

6.8 Size

It would be expected that larger firms would be more competitive than smaller firms, though it is hard to pin down a direction for causality. This hypothesis is supported not only by economies of scale but by the descriptive statistic that more competitive firms are, on average, larger. Likewise, firms operating at different levels of the value chain might well have different constants for each of our proxies for competitiveness. For instance, we know that components firms do not export significantly, while footwear and commerce firms do. While we do not find statistically significant coefficients, it makes sense to control for both size and type of economic activity when regressing other variables, addressing bias and inconsistency in our estimates. One can also note that point estimates are positive for medium and large wholesale and footwear component firms. This inconclusive result is not dissonant with a literature itself inconclusive on the impact of size to competitiveness. While Caloff (1994) and Correia & Gouveia (2016) conclude that size is important, Moen (1999) suggests otherwise that small firms are not necessarily less competitive. In this case, it is important to note that in line with the rest of the Portuguese economy, 99.7% of our database were SMEs and 93.8% of our database were either Micro or Small. This did not differ significantly in the sub-sample of exporters, with 98.6% being SMEs and 74.4% being Micro or Small firms.

7. Conclusions, Policy Recommendations and Further Research

This paper investigated the determinants of competitiveness of the Portuguese footwear industry. After presenting an overview of the sector both nationally and internationally, and reviewing relevant literature, the authors present two fixed-effects models that explore the predictors of turnover per worker and export intensity. These two variables are used as proxies for competitiveness within this specific sector.

The authors find that while determinants of competitiveness vary across firms, depending on their size and position in the footwear value chain, it is possible to identify a few characteristics which are predictors of competitiveness. Financial health and application of financial resources into tangible and intangible assets are, unsurprisingly, associated with greater competitiveness. It is interesting to highlight that in both models intangible assets offer a greater return on investment than tangibles. This, and the large and significantly positive effect we found of higher average wages on competitiveness, suggest the importance of human capital to competitiveness in this sector. We have also found that persistent participation in export markets and participation in export markets beyond the EU Single Market are good predictors of competitiveness, though it is unclear to what degree these are cause and consequence. Concretely for predictors of export intensity, labour productivity is also relevant with less productive firms obtaining a smaller amount of their turnover from exporting.

These findings give insights into how policy-makers can encourage competitiveness gains in the footwear sector. Improved resilience to losses and greater benefits from human capital suggest that policies designed to increase the average size of firms in the sector would improve competitiveness. Supporting firms to maintain exporting habits and not only persist but also diversify the markets to which they export may also be a policy measure that further improves competitiveness. Encouraging firm investment in human capital and intangible assets, as well as tangible assets, represents a third policy suggestion for improved competitiveness. While these findings largely corroborate literature, including recent focus on intangibles as a priority investment for productivity growth, readers should beware that external validity is constrained to the footwear sector and the years in question and that findings concerning competitiveness' past predictors might not accurately reflect what may impact competitiveness in the future. Furthermore, competitiveness as measured here does not fully reflect social welfare, where employment, environmental and other concerns might be relevant.

While we were fortunate to be able to use a database comprising the universe of firms classified with the selected economic classification codes, as has been pointed out above, this database did not include the entire footwear value chain and includes some firms, namely in the leather industry, that do not participate in the footwear value chain. Furthermore, data for exports were only available from 2010. While the inclusion of export-related independent variables did not reduce the number of observations in our sample, it is obvious that our results would be more robust if more years of data were available with information regarding exports. Moreover, further research would benefit from databases with better information regarding R&D spending, and with information about spending on international fairs and promotion, outsourcing and intra-industry trade as proxies for clustering and also information regarding shared resource centers. Finally, further research could focus on comparing the footwear sector to the remainder of the fashion industry in

Portugal, thereby allowing us to understand why the footwear sector was more successful than this latter sector, and understanding how drivers of competitiveness differ across these sectors.

In conclusion, while the Portuguese footwear sector may still be a relatively labour-intensive sector, our research finds that it has found success and competitiveness by exporting persistently and investing not only in their factories but also in their staff and in intangible assets which make the firm more productive.

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