
Do International Activities Influence Firms' Profitability?

The Case of the Portuguese Furniture Industry

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Abstract

The scarcity of studies relating profitability with exports gives the initial whistle for this work. Hence, the aim of this study is to analyse whether the involvement of the Portuguese furniture firms on international trade activities influence their profitability and at what extent. In order to study the relationship between international involvement – importing, exporting and two-way trading – and profitability, we use detailed financial and trade data from SABI database of 1042 Portuguese furniture companies. Using OLS, Fixed Effects and Random Effects models, we estimate two measures of firm profitability: rate of profit and profit margin. We find that the relation between companies' profitability and their international involvement (exporting, importing and both importing and exporting) is positive and statistically significant, especially for two-way trading, when estimating for the profit margin. Additionally, we find that firms' international activities have also a positive effect on the rate of profit, when controlling for unobserved firm heterogeneity, using a Random Effects model. These findings contribute to managerial decision making regarding the engagement of firms in international trade activities, especially for the Portuguese manufacturing industry, as well as suggesting a consistent measure of firms' profitability for future studies on this topic.

Keywords: profitability; profit margin; firm performance; furniture industry; international trade; exports; imports.

JEL Classification: D22; F14; L68

Resumo

O ponto de partida para a realização deste trabalho prende-se com a escassez de estudos cujo objeto de estudo se centra na relação da lucratividade com as exportações. Assim, o objetivo deste estudo é analisar se o envolvimento das empresas portuguesas do setor mobiliário em atividades de comércio internacional influencia a sua lucratividade e em que medida. Para estudar a relação entre o envolvimento internacional – isto é, importação, exportação e trocas comerciais nos dois sentidos – e a lucratividade das empresas, foram analisados dados financeiros e do comércio internacional, recolhidos pela base de dados SABI, de 1042 empresas de mobiliário portuguesas. Recorrendo a modelos OLS, de efeitos fixos e aleatórios, estimamos duas medidas de lucratividade: taxa de lucro – semelhante à utilizada em estudos anteriores - e margem de lucro - medida calculada pela base de dados SABI. Os resultados empíricos obtidos demonstram que a relação entre a margem de lucro das empresas e seu envolvimento internacional (seja exportando, importando ou ambos) é positiva e estatisticamente significativa, em particular para o comércio bilateral. Quanto à taxa de lucro, os resultados obtidos demonstram igualmente uma relação positiva entre as atividades internacionais das empresas e a sua lucratividade, quando controlando a heterogeneidade não observada da empresa, usando um modelo de efeitos aleatórios. Estes resultados contribuem para a área da Gestão, não só por sugerirem uma medida consistente da lucratividade das empresas para futuros estudos sobre este tópico, mas, sobretudo, para as decisões de gestão acerca do envolvimento das empresas nas atividades de comércio internacional, em especial para a indústria transformadora portuguesa.

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1. Introduction

The “maximization of profits (and not of productivity) is usually considered as a central goal for firms”, even though the way it is achieved is intrinsically related to the enhancement of productivity (Wagner, 2012b, p. p. 253). Also, profitability is a measure of competitiveness (OECD, 1992), and so, a key element that enables the comparison between companies. Hence, the study of how firms’ profits are affected by international activities (e.g. imports and exports) appears to be a relevant topic, specially within the area of Business Management.

Does the involvement in international trade activities make firms more profitable than purely domestic ones? According to a large number of studies, firms engaged in any kind of international activities are larger and more productive than those who are not engaged (Bernard, Jensen, & Lawrence, 1995). But when it comes to profitability, the empirical work focused on this topic is much scarcer since specific additional information is needed to accurately determine whether the firms’ international activities will increase their profitability ratio (van den Berg, van Marrewijk, & Tamminen, 2018).

As highlighted by Wagner (2012b, p. p. 253), “The number of studies on exports and profits is still small”, and results are not conclusive, as whether trading firms - companies that trade internationally, as only importing, only exporting or both - were more profitable than non-trading ones. In fact, from the nine empirical studies on exports and profits contemplated in Wagner’s survey, all from the European Union, the majority (four) found no statistical significant relationship between the two variables, a third (three) found that there was a positive relation, and the rest (two) found a negative one.

More recent studies, such as Amador, Cabral, and Ringstad (2019) on Portuguese Services companies, and Hornok and Muraközy (2019) regarding Hungarian manufacturing firms have also investigated on this topic. As for the first, the authors found a positive relation between firms’ engagement in international trade and its markup premium, and as for the last, a “non-existent exporter premium”.

In view of the mixed results obtained in the existing studies, the present work seeks to clarify the type of relationship between firms’ involvement in importing and/or exporting activities and their profitability, focusing on a sample of Portuguese manufacturing firms from the furniture sector

But why study this particular industry? First, to the best of our knowledge, there is no study focusing on this specific sector. Second, the Furniture Industry is considered an important sector for the Portuguese economy, representing 3.3% of total exports, which accounts for almost 2.000 million euros, according to AICEP (2018). It has also contributed positively to the Portuguese Trade Balance over recent years, averaging 810 million euros per year in net terms, over the last 5 years, becoming the fifth largest contributor in net terms, one place above the wine industry. Furthermore, in recent years we have witnessed a big improvement in this industry towards export, by modernizing its techniques in order to compete with countries with tradition in this sector. In fact, despite the decrease in companies of this sector between 2011 and 2015, both turnover and gross value added increased from 2013¹. On the other hand, according to SABI database, there were 4241 Portuguese firms in the Manufacture of Furniture sector² in 2019.

The objective of this study is to disclosure whether the activities of the Portuguese furniture companies in the external markets influence their profitability and at what extent. To do so, we will follow the methodology proposed by Temouri, Vogel, and Wagner (2013), this way contributing to the comparison of results between studies.

The rest of the paper is structured as follows. In Section 2, a literature review is presented, regarding both the Key Concepts to this topic (Section 2.1) and the Determinants of Profitability (Section 2.2). Then, a review of similar empirical studies is exhibited in Section 2.3. In Section 3, the Methodological aspects of the study are described, comprising both the Model Specification (Section 3.1) and the data collection process (Section 3.2). A descriptive analysis of firms' variables is then carried out in Section 3.3. Section 4 presents the empirical analysis of the correlations (Section 4.1), followed by the discussion of the estimation results (Section 4.2). Finally, Section 5 concludes.

¹ DGAE (2017): Synopsis - Furniture Industry

² Section C - Division 31 - Manufacture of furniture and mattresses, of the CAE (Classification of Economic Activity)

2. Literature review

This section will be organized in three subsections. In section 2.1, it will be described the main concepts used in this study. Secondly, we will present the determinants of profitability in section 2.2. Finally, in section 2.3 we will present a few similar studies, relevant to this work.

2.1 Concepts

Firstly, it is necessary to assess the term that is pivotal to this study: profitability. Profitability is a dimension of firm performance that can be measured using different indicators, such as Return on Assets (ROA), EBITDA Margin, or Net Revenue, to name a few (Selvam, Gayathri, Vasanth, Lingaraja, & Marxiaoli, 2016). Different authors use different measures (as seen in Table 1), since a homogenization on profitability measurement has not yet been established. Authors often resort to a custom rate of profit that can be more or less complex, depending on the financial data available for the countries they are analysing (Temouri et al., 2013). As an example, Temouri et al. (2013) used a more simple ratio of profit compared to Wagner (2012a), due to the lack of availability of firms' financial data on all three countries they were analysing

Throughout this study, we will take the terminology used by van den Berg et al. (2018, p. 2150), where “profit level refers to total firms profits in a certain period. (...) profit margin refers to relative profits (...) relative to some other economic variable, like firm revenue or firm employment” and “profitability is used in a vague way and can refer to either the profit level or the profit margin”.

2.2 Determinants of profitability

Ponikvar and Tajnikar (2012, p. 47) propose that “the factors determining markup size can be classified in three general groups”, those being: Firm-specific factors; Industry-specific factors; and Environmental and Institutional factors. These factors are synthetized in fig. 1. Firm-specific factors are the outcome of the plans and actions led by the firm. They are characteristics linked to the firm's “market power, its cost efficiency and/or productivity of its production factors, and to the technological characteristics of a firm's production

process” (Ponikvar & Tajnikar, 2012, p. 47). Also as for the second set of factors, Industry-specific factors “represent the characteristics of an industry with regard to the concentration of firms, entry barriers, product differentiation, technological characteristics of the industry’s production, and demand dynamics” (Ponikvar & Tajnikar, 2012, p. 47). These factors are particular to a certain industry and are responsible for the influence that firms wield over the price within that industry. Therefore, Industry-specific factors “determine the average industry markup” (Ponikvar & Tajnikar, 2012, p. 47). Finally, the Environmental and Institutional factors comprise “governmental antitrust policy, the role of workers’ and employers’ organizations, and also general economic trends”, since they are “time-specific as they influence all the firms in a particular economy in a similar fashion” (Ponikvar & Tajnikar, 2012, p. 47).

Therefore, although some factors determining profitability may be external to the firm, the ones influencing firms’ profitability the most (in the sense of “main source of heterogeneity”) are firms’ “organizational structures and management practices” (Goddard, Tavakoli, and Wilson (2005, p. 1271)).

On the other hand, Goddard et al. (2005, p. 1269) advocate that “internal resources specific to the firm [are seen] as determinants of variations in profitability”, as “organizational structures and management practices represent the main source of heterogeneity in performance between firms”. The paper, which investigated the determinants of profitability of both manufacturing and services firms by analysing empirical models in five European countries, evidenced the conclusions already established in previous studies: 1) a negative relationship between firms’ size and its profitability, which may have been caused by a) an increase in market competitiveness; b) anti-monopolistic regulatory measures; c) limitations on the capabilities of the management team when trying to expand into new markets (Goddard et al., 2005). 2) a negative relationship between the firm’s gearing ratio and its profitability, partly attributed to the increasing competitive pressure, which “placed downward pressure on profit margins” (Goddard et al. (2005, p. 1278)) for the period analysed, therefore worsening the more highly geared firms’ health. In the paper’s empirical model, the explanatory variable ‘Gear’ represents the ratio of non-current liabilities plus loans to shareholder funds. Thus, more highly geared firms may suffer, as a bigger percentage of profits can be allocated to servicing debt, rather than distributed to shareholders. On the

other hand, results revealed a positive relationship for both the firms' market share (stronger for manufacturing firms) and the firms' liquidity ratio, and its profitability.

Figure 1 - Determining factors of markup size

Firm-specific	Industry-specific	Environmental and Institutional
<ul style="list-style-type: none"> • Firm's market power • Cost efficiency of the production factors • Technological characteristics of the production process 	<ul style="list-style-type: none"> • Market concentration • Entry barriers • Product differentiation • Production's technological advances • Demand dynamics 	<ul style="list-style-type: none"> • Governmental antitrust policy • Worker's unions • Economic trends

Source: own elaboration based on Ponikvar and Tajnikar (2012)

Regarding the specifics of firms' international involvement, do international activities of firms – exports, imports or both – affect their profitability? Although some theoretical models that analyse the impact of international activity on firms' performance, such as Melitz and Ottaviano (2008), advocate the existence of a positive relation between export and profitability, that is not always the case. Fryges and Wagner (2010), do find a positive relation between firms' exports and profitability ratio in their study of German manufacturing companies. However, firms with a higher exports to sales ratio may have lower profitability ratios when compared to firms with medium ratios due to additional costs of exporting, caused by either higher costs of management or increased geographical distance from foreign markets the firm might have entered. The authors also demonstrated that the increase in labour productivity may be the result of export activity, but this increase is then eaten up by higher costs of exporting and higher wages. Wagner (2012a) also refers that productivity gains of trading firms are absorbed by the extra costs of selling and buying on foreign markets. Grazzi (2012), however, mentions harsher international competition, compared to domestic one, as a factor of decreasing profit margins.

On the contrary, learning-by-exporting hypothesis seems to verify in some of other studies, as Amendolagine, Capolupo, and Petragallo (2010) find that “[n]ewly exporting firms exhibit productivity improvements after entry” for Italian manufacturing companies (Amendolagine et al., 2010, p. 21). Fryges and Wagner (2010) suggest that “learning from foreign customers and competitors is relevant and the positive effect of learning-by-exporting is not completely absorbed, e.g. by higher wages or by the costs of entry into a foreign market, even if firms carry out only limited export activities” (Fryges & Wagner, 2010, p. p. 416), as they find that export activity contributes positively to the profitability of German manufacturing firms.

2.3 Empirical studies on international trade and profitability

As depicted above, the literature on the relation between firms’ profitability and their involvement in international trade activities is still somewhat scarce. In Table 1 we present some important characteristics, such the measure of profitability or the econometric methods used, of a set of empirical studies on the relation between exports and profitability of manufacturing and services firms, gathered by Wagner (2012b), complemented with four more recent studies, two of which analyse countries from outside the European Union.

Table 1 – Studies on International Trade and Profitability

Author (year)	Country	Period Covered	Sample	Measure of International Involvement	Measure of Profitability	Impact of International Activity on Profitability	Estimation Method	Control Variables
Amendolagine et al. (2010)	Italy	1995-2003	<5.000 Manufacturing firms	Percentage of exports in total sales and export status	Gross Profits per worker	No significant relation	OLS	Firm size and productivity industry effects
Fryges and Wagner (2010)	Germany	1999-2004	≈18.000 Manufacturing firms	Share of exports in total sales, its squared and cubic values; and a dummy variable	Rate of profit	Positive	GPSM	Firm size and share of employees in R&D
Vogel and Wagner (2010)	Germany	2003-2005	N/A Business Services Firms	Percentage of exports in total turnover	Rate of profit	Negative	GPSM	Firm size and 4-digit industry dummies
Grazzi (2012)	Italy	1989-2004	60.000 Manufacturing firms	Firm status regarding international activities	Gross Margins	No significant relation	OLS	Firm size and innovation activity, proxied by a patents' dummy
Wagner (2012a)	Germany	2003-2006	<10.000 Manufacturing firms	Firm status regarding international activities	Rate of profit	No significant relation	OLS and fixed enterprise effects	Firm size and industry dummy variables
Temouri et al. (2013)	France, Germany, and United Kingdom	2003-2007	N/A (Several thousands) Business Services Firms	Percentage of exports in total turnover	Rate of profit	No significant relation for all three countries	OLS	Firm size and 4-digit industry dummies

Table 1 (cont.) – Studies on International Trade and Profitability

Author (year)	Country	Period Covered	Sample	Measure of International Involvement	Measure of Profitability	Impact of International Activity on Profitability	Estimation Method	Control Variables
Srithanpong (2014)	Thailand	1999-2001; 2003; 2007	N/A Manufacturing firms	Firm status regarding international activity	Operating profit; Sales profit and rate of profit	Positive	OLS; Robust OLS and Quantile regression	Industry; region and firm size
Esmeray and Esmeray (2016)	Turkey	1993-2014	500 largest Turkish companies	Firm status regarding international activity	Profits (as measured by the Istanbul Chamber of Industry)	Positive	OLS	Firm size
van den Berg et al. (2018)	Finland and The Netherlands	Finland: 2005-2010 The Netherlands: 2002-2010	Finland: 34.941 firms (all sectors) The Netherlands: 139.160 firms (all sectors)	Firm status regarding international activity	Gross profit margins and Net profit margins	Positive for both countries	OLS	Export share in total sales; dummy variable for exporters; firm size; dummy variable for firm's foreign control; capital- labour ratio; industry and year specific dummy variables
Mutascu and Murgea (2020)	France	2013-2015	704 cosmetic business firms	Volume of exports in Euros	ROA and ROCE	Positive	Static (OLS) and dynamic (GMM) panel model estimations	Capital intensity; credit period; debt period; debt structure; firm size; economic climate and regulation

Legend: OLS – Ordinary least squares; GPSM – Generalised Propensity Score Method; ROA – Return on Assets; ROCE – Return on Capital Employed.

These studies are ordered by year of publication. Note that two of the studies analyse more than one country. By analysing Table 1 we verify that different authors use different measures of international involvement as well as different measures of profitability. Regarding the measure of profitability, Temouri et al. (2013) use the rate of profit as gross value added minus gross wages, divided by total sales. Fryges and Wagner (2010), Vogel and Wagner (2010) and Wagner (2012a) use the same measure in which “The rate of profit of a firm is computed as a rate of return, defined as gross firm surplus (computed as gross value added at factor costs minus gross wages and salaries minus costs for social insurance paid by the firm) divided by total sales (net of VAT) minus net change of inventories” (Fryges & Wagner, 2010, p. 8). Both Amendolagine et al. (2010), and Grazzi (2012) resort to gross margins as measure of profitability, with the first dividing them per number of workers. Srithanpong (2014) uses three types of profit measures: 1) operating profit, as the difference of total operating receipts and total expenses of business and operation; 2) sales profits, as total sales minus total production costs; and 3) a rate of profit, as the ratio of gross value added minus total remunerations to total sales minus net change of inventories. Esmeray and Esmeray (2016), on the other hand, recurs to firms’ profits already determined by the ICI – Istanbul Chamber of Industry. van den Berg et al. (2018) use both gross profit margin, as revenue minus variable costs, divided by revenue, and net profit margin, as revenue minus variable costs, cost of production and fixed costs of exporting, divided by revenue. Mutascu and Murgea (2020) make use of both return on assets and return on capital employed as their measure of profitability.

As for the the international involvement, only three of the studies presented on Table 1 focused on all three forms of international trade (exporting, importing and both way trading), those being Wagner (2012a), Esmeray and Esmeray (2016) and van den Berg et al. (2018), whereas the rest of the papers studied the relation between exporting and profitability. As for the measure of international involvement, authors often use a dummy variable related to the firm commercial status, which is usually given by the database they are using, or a minimum percentage of international trade (exports, imports or both) over total sales. Mutascu and Murgea (2020) resort to the volume of exports. On the other hand, Fryges and Wagner (2010) use a dummy variable that takes the value of one if a firm is an exporter (and zero if not), the share of exports in total sales and its squared and cubic values as measure of export activity. Regarding the estimation methods used, most of the authors used an OLS estimation and only three resort to the Generalised Propensity Score Method (GPSM).

Lastly, all authors included firm size as a control variable, although van den Berg et al. (2018) and Mutascu and Murgea (2020) resorted to a more comprehensive set of control variables, such as capital-labour ratio, capital intensity or debt structure.

To sum up, we observe that despite being mainly positive, results of the impact of international activity on profitability differ between studies, and even within countries. In this case, different studies on German firms give us contradictory results, although different methods of analysis and different datasets were used. We therefore conclude that there is no clear answer to the question we ask in the first place, as results may be different from case to case, which justify further research on the topic.

Alongside the literature relating international commercial activity with profitability, we identify a more specific strand of the literature relating the firms' international involvement with their markups. Hornok and Muraközy (2019) find that "importing is strongly positively correlated with markup measures, both across and within firms", on one hand, and a "non-existent exporter premium" when controlling for importing, on the other hand, for Hungarian manufacturing firms. Ponikvar and Tajnikar (2012) show that "domestic and foreign competition put a downward pressure on markups" for Slovenian manufacturing firms. Martín and Rodríguez (2010) on Spanish manufacturing firms find that "nonexporters have smaller margins than persistent exporters and firms that entered foreign markets" early on. However, "larger export ratio is negatively associated with margins for persistent exporters".

3. Methodological aspects

This section is divided in three parts. Subsection 3.1 describes the econometric model applied in this study and respective variables. In subsection 3.2, both collection of data and sample are described, followed by subsection 3.3 where a brief descriptive analysis is carried out.

3.1 Model specification

The methodology used is based on Temouri et al. (2013) and Wagner (2012a) (presented in Table 1).

Regarding the estimation process, it is based in the following econometric model.

$$Profitability_{it} = \beta_0 + \beta_1 international_{it} + \beta_2 control_{it} + year_{Dummies} + e_{it}, \quad (3.1)$$

where i is the index of the firm, t is the index of the years between 2010 and 2018 and e is the error term. The dependent variable, *Profitability*, will be measured through two proxies. First, we will measure the rate of profit (computed as a rate of return), obtained as indicated by equation (2), similarly to Temouri et al. (2013), defined by gross firm surplus (computed as gross valued added minus gross wages) divided by turnover.

$$\text{rate of profit} = \frac{\text{gross value added} - \text{gross wages}}{\text{turnover}} \quad (3.2)$$

The second proxy of *Profitability* will be the profit margin³, calculated as the sum of the EBIT plus the financial balance (computed as financial revenues minus financial expenses), divided by turnover.

$$\text{profit margin} = \frac{EBIT + \text{financial balance}}{\text{turnover}} \quad (3.3)$$

International is the main explanatory variable, related to the firms' international involvement. This vector contains both export and import intensity as proxies, measured as exports to sales ratio, and imports to purchases ratio, respectively. In alternative, three dummy variables— *Importer*, *Exporter* and *Importer/Exporter* — were used to measure the international involvement status of firms. That is, the *Importer* dummy will take the value of one if the firm's status is set as 'Importer', and zero otherwise; the *Exporter* dummy will take the value

³ Calculated by SABI database.

of one if the firm’s status is set as ‘Exporter’, and zero otherwise; and the *Importer/Exporter* dummy will take the value of one if the firm’s status is set as ‘Importer/Exporter’.

Finally, following the approach of Temouri et al. (2013), the vector *Control* comprises some control variables, namely firms’ size (measured by the log number of workers and its squared value), firms’ capital intensity (measured as the ratio between tangible fixed assets to total assets), firms’ indebtedness (measured as the sum of short-term debt with medium and long-term debt, divided by total assets), and year specific dummies to control for macroeconomic effects. The independent variables, their proxies and expected impact on profitability are summarized in Table 2.

Table 2 – Summary of the model’s independent variables

Variable	Proxy	Expected impact on profitability
Export Intensity	Exports/Total Sales	+/-
Import Intensity	Imports/Total Purchases	+/-
Size	Log number of workers Log number of workers squared	+/-
Capital Intensity	Tangible Fixed Assets/Total Assets	+/-
Debt	Short-term debt + medium and long-term debt/Total Assets	+/-

Although Nunes (2014) findings on her survey to Portuguese furniture firms showed that exporting had a positive effect on profitability, results of the impact of export intensity on profitability are mixed. As Temouri et al. (2013) findings’ show that export intensity had a negative impact on turnover profitability for German firms, suggesting that the gains of exporting activity were being eaten by its costs. Fryges and Wagner (2010), in turn, find a positive effect of export intensity on profitability for German Manufacturing firms, as “intense export activities are (...) associated with a higher mean rate of profit” (Fryges & Wagner, 2010, p. 406).

Regarding Import Intensity, Ponikvar and Tajnikar (2012) argues that both the differentiation and lower cost of imported products “influence pricing and markup

decisions” (Ponikvar & Tajnikar, 2012, p. 48), which may result in a positive impact on profitability. On the other hand, however, foreign firms may compete in the domestic market, attracted by the higher markups importing firms are getting, which may result in a negative impact on importing firms’ profitability (Ponikvar & Tajnikar, 2012).

Regarding control variables, Mishra and Dasgupta (2019) find a positive effect of debt on profitability for frontier economies companies, consistent with the “trade-off” theory, as well as a negative effect of debt on profitability for German, French and Japanese firms, arguing that the excess of debt the firms present in these economies incur, potentiate troubles between the debt-holders and managers. Lee and Xiao (2011) finds a U-shaped effect of capital intensity on firm’s profitability for US hotels and restaurants, suggesting that firms’ activities expansion (and their tangible fixed assets to total assets ratio) have a negative effect on performance at first, but turn to a positive effect after a certain level of capital intensity. Lastly, Becker-Blease, Kaen, Etebari, and Baumann (2010) find that size affects US manufacturing firms’ profitability in a inverted-U shape, which is consistent with both theories of firm size (regarding the reduction of costs associated with economies of scale) and “with a theory that firms possess certain competencies that allow them to offset the advantages such as economies of scale often attributed to large firms.” (Becker-Blease et al., 2010, p. 22)

3.2 Collection of data, database and sample

As depicted above, the nonexistence of a single report that comprises both the profitability and international activities of firms, in the majority of countries, is one of the main reasons that so few studies relating trade activity and firm performance can be found in the literature. In this study, however, the database that will be used - SABI database - contains complete financial information of Portuguese companies, as well as their external trade statistics. Consequently, the sample that will be look at will comprise 1042 Portuguese firms in the Manufacture of Furniture sector during the nine-year period, from 2010 to 2018.

The initial database of 4241 furniture firms was screened for companies which were established before 2010⁴ and that had complete records for Turnover, Gross Value Added,

⁴ Similar to Forte and Botelho (2020), we eliminated companies created after the year 2009 from our sample, in order to limit our sample to firms that were at least one-year old at the start of the period analysed.

Gross Wages, and Number of Workers for at least eight of the nine-year period analysed⁵. Non-active, temporarily inactive, dissolved, insolvent, in liquidation and acquired firms were also excluded from our sample. In consequence, only 1042 firms were analysed, representing 9378 firm/year observations. Table 3 shows the distribution of companies by type of international involvement.

Table 3 – Percentage of firms by type of international involvement

Type of international involvement	Nº of firms	Nº of observations	%
Domestic firms	396	3,564	38.00
Importers	77	693	7.39
Exporters	193	1,737	18.52
Importers/Exporters	376	3,384	36.08

As can be seen from Table 3, the majority (62%) of firms is involved in international trading, being it only importing, only exporting, or both.

3.3 Descriptive analysis

To get a comprehensive look on the variables that will be used in our econometric model, Table 4 presents values for the mean, standard deviation, minimum and maximum of the “All Sample”. Then a division between “International Firms” (firms that are considered to be only exporters, only importers and both exporters and importers) and “Domestic Firms” (firms that are not engaged in any international activity) is made. A second division is proceeded, as “International Firms” unfolds in three levels: “Exporting Firms”, “Importing Firms” and “Exporting and Importing Firms” (see Table 5).

⁵ It should be noted that SABI database present several missing values for some variables. Thus, firms that were missing values on two or more years, for the same or for different indicators were eliminated from the sample. For example, if a firm were missing a value for Gross Wages in 2011 and another value for Turnover in 2016, that firm got eliminated from the sample. Also, two firms that presented absurd profit margin values, and thus completely altering profit margin mean values for both domestic and exporting firms, were considered inconsistent and therefore were eliminated from the sample. As an example, one exporting firm presented a value of -957714% for its profit margin on the year 2010, making the average profit margin of exporting companies equal to -555,45% for the nine-year period (compared to the mean value of -2.52% presented below for exporting firms without this company).

Table 4 shows that international firms have a higher volume of business (average turnover of 1.6 Million € vs. 0.28 Million €) and higher gross value added (506 thousand € vs. 99 thousand €), employ more workers (26.18 vs. 6.79), and have higher costs in gross wages (355 thousand € vs. 86 thousand €), on average, than domestic companies. Both measures of firm profitability are positive for international companies (2.83% mean rate of profit and 0.01% mean profit margin), whereas both the rate of profit (-10.30%) and profit margin (-14.39), are on average, negative for domestic firms. International firms also present a slightly higher capital intensity (25.04%) and a lower level of indebtedness (66.66%) than domestic ones (19.58% and 192.45%, respectively). These mean differences are statistically significant (as the p -value < 0.01 for the t -student test).

Table 4 – Descriptive statistics of the model’s variables

Variable	All Sample					International Firms			Domestic Firms		
	N° obs.	Mean	Std. Dev.	Min.	Max.	N° obs.	Mean	Std. Dev.	N° obs.	Mean	Std. Dev.
Turnover (thousand Euros)	9,284	1,102	5,625	0	183,945	5,774	1,598	7,003	3,510	286	1,399
Size (n° of workers)	9,275	18.85	65.38	1	1,617	5,768	26.18	80.91	3,507	6.79	17.46
Gross Value Added (thousand Euros)	9,289	352	1,552	-1,421	48,681	5,775	506	1,929	3,514	99	388
Gross Wages (thousand Euros)	9,275	253	966	0.031	27,826	5,768	355	1,184	3,507	86	338
Rate of profit (%)	9,270	-2.13	173.05	-10,315.58	5,338.80	5,767	2.83	167.37	3,503	-10.30	181.76
Profit Margin (%)	9,288	-5.44	53.23	-2,915.03	1,468.36	5,775	0.01	25.19	3,513	-14.39	79.49
Export Intensity (%)	8,564	18.48	28.56	0.00	100.00	5,577	26.26	31.21	2,987	3.95 ⁷	13.96 ⁷
Import Intensity (%)	9,275	4.26	10.91	0.00	100.00	5,768	6.42	12.85	3,507	0.69 ⁷	4.80 ⁷
Capital Intensity (%)	9,292	22.97	20.38	0.00	98.53	5,776	25.04	19.31	3,516	19.58	21.60
Debt (%)	9,292	114.25	1,425.48	0	102,596.72	5,776	66.66	37.23	3,516	192.45	2,314.94

Table 5 – Statistics of the model’s variables considering firms’ international status

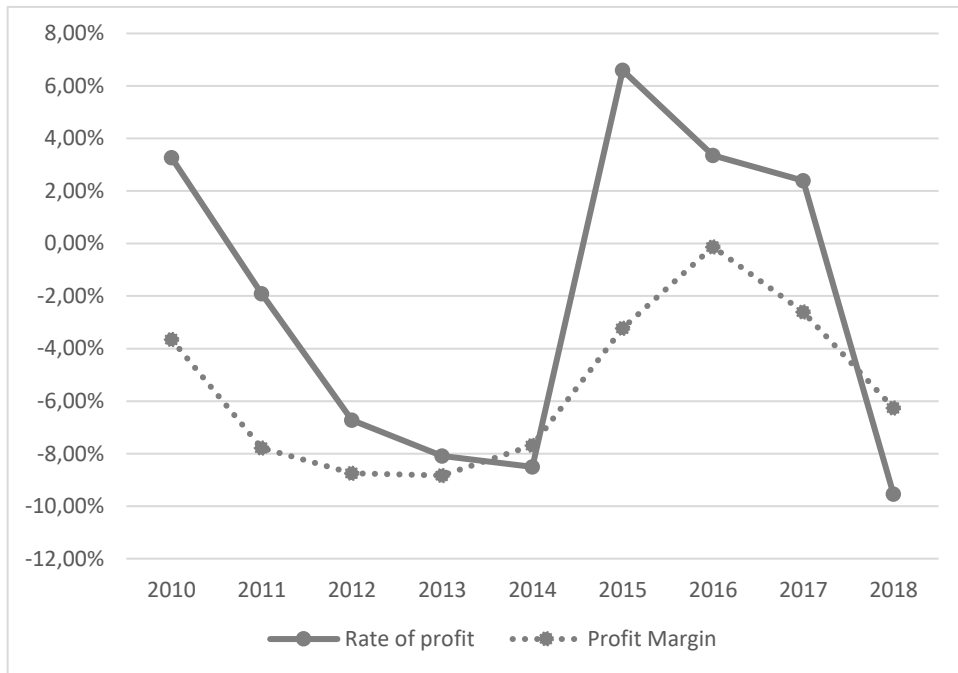
Variable	Exporting Firms		Importing Firms		Exporting/Importing Firms		Domestic Firms	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Turnover (thousand Euros)	621	1,944	495	1,128	2,323	8,981	285	1,397
Size (n° of workers)	12.35	19.99	10.29	24.05	36.50	103.20	6.78	17.44
Gross Value Added (thousand Euros)	199	427	168	418	732	2,476	99	388
Gross Wages (thousand Euros)	148	271	133	297	506	1,515	86	338
Rate of profit (%)	3.01	21.13	-20.52	483.46	7.47	18.39	-10.31	181.57
Profit Margin (%)	-2.52	26.54	-4.81	33.72	2.28	21.99	-61.52	2,790.87
Export Intensity (%)	22.18	29.23	4.39 ⁷	15.86 ⁷	32.40	32.17	3.95 ⁷	13.95 ⁷
Import Intensity (%)	1.47 ⁶	6.36 ⁷	5.34	12.73	9.19	14.46	0.69 ⁷	4.80 ⁷
Capital Intensity (%)	20.94	18.67	22.96	21.18	27.55	18.82	19.54	21.59
Debt (%)	72.69	51.76	71.39	34.12	62.61	27.03	192.17	2,311.99

⁶ Due to some inconsistencies of the SABI database regarding the firms’ international status, some firms presented values, for some years, for exports, although they were domestic or importing firms during the nine-period of analysis. The same goes for exporting firms. This resulted in small, but nonetheless, statistically significant values for both export and importing intensities.

In Table 5 we can observe that both exporting and importing firms are on average, bigger, both in turnover and in size, in line with the findings of Wagner (2012a) on German manufacturing enterprises. These group of companies also present the highest averages for the profit rate and profit margin, this time contradicting the findings of Wagner (2012a). In terms of export and import intensities, firms that are engaged in both importing and exporting present a higher exports to total sales ratio than only exporting firms (32.40% mean vs. 22.18%) , as well as a higher imports to total purchases ratio than only importing firms (9.19% vs 5.34%). Regarding the intensity of capital, both exporting and importing firms present a higher tangible fixed assets to total assets ratio than the remaining three groups of firms. On the other hand, the indebtedness is the lowest for companies engaged in both importing and exporting activities (62.61%), similar between only exporting and only importing firms, and is the highest for domestic ones (192.17%).

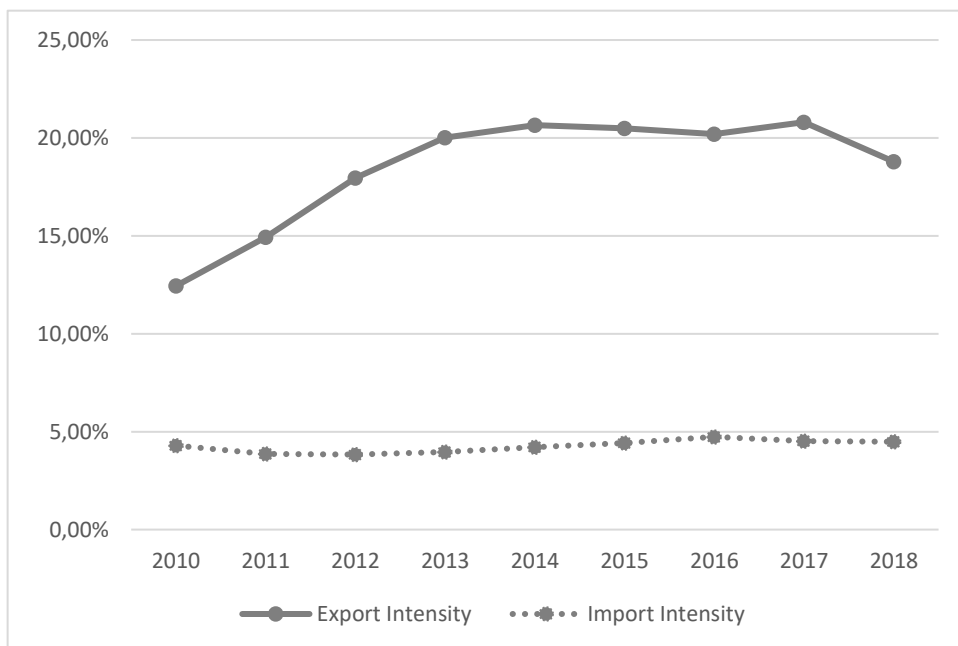
As we analysed the mean values for our variables for the nine-year period, we shall now perform a brief analysis of the annual evolution of the variables: rate of profit, profit margin, export intensity, import intensity, capital intensity, debt and size. Analysing Graphic 1, we observe that for our sample of firms, the rate of profit tends to be higher than the profit margin for most of the years (except for 2014 and 2018), as the profit margin presented a negative average value for all of the nine years. The negative trend of both profit rates between 2010 and 2013 suggests that furniture firms were affected by the economic recession that followed the financial crisis of 2008 (Forte & Botelho, 2020), having recovered in the following two years, to then, again, initiate a negative trend in 2016.

Graphic 1 – Annual evolution of Rate Profit and Profit Margin, 2010-2018



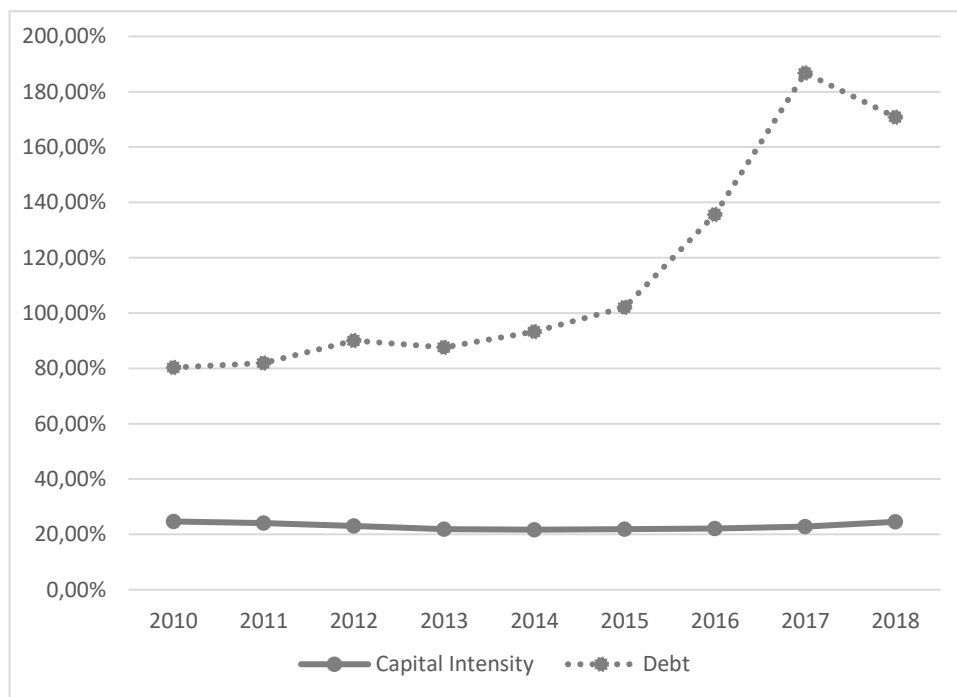
Regarding Graphic 2, export intensity increased steadily during the first four years considered, reaching its peak (20.80%) in the year 2017. This suggests that firms intensified their activity in foreign markets due to the economic recession that hit Portugal after 2008. Import intensity, on the other side, remained constant during the nine-year period, averaging above 4%.

Graphic 2 – Annual evolution of Export and Import intensities, 2010-2018



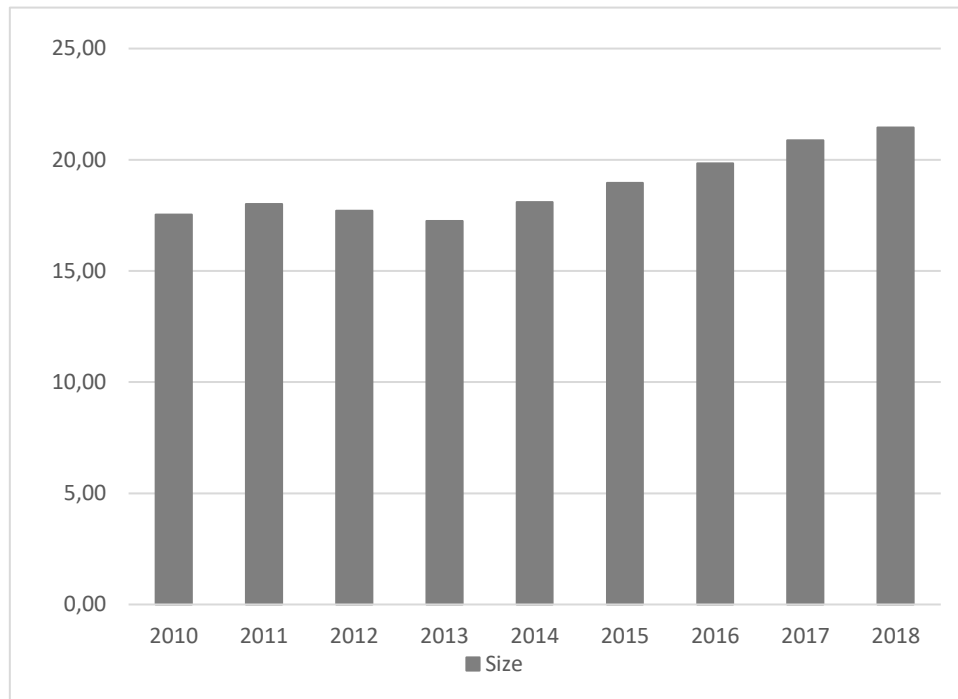
Graphic 3 presents the annual evolution of both capital intensity and debt. Capital intensity, although having decreased in the first five years, surpassed (albeit slightly) its starting value (24.49% in 2018 vs. 24.66% in 2010). Debt, on the other hand, more than doubled, from 80.31% in 2010 to 170.81% in 2018. This big increase on the debt to total assets ratio suggests, again, the difficult times that firms went through in the Portuguese economy, having to resort to external credit in order to fulfil their financing needs.

Graphic 3 – Annual evolution of Capital Intensity and Debt, 2010-2018



Lastly, the average number of workers increased during the nine-year period, as presented in Graphic 4, from the mean value of 17.53 in 2010 to 21.44 in 2018. This denotes that Portuguese furniture companies are, on average, mostly, small sized, which reflects the reality of the Portuguese business environment.

Graphic 4 – Annual evolution of Size, 2010-2018



4. Empirical analysis

In subsection 4.1 a brief correlation analysis will be carried out. Then, the estimation results will be presented and discussed in subsection 4.2.

4.1 Correlation analysis

Analysing the Pearson's Correlation Coefficients in Table 6, we observe that both export and import intensities are positively correlated with the rate of profit variable. On the other hand, however, there is a stronger, positive correlation between both two variables and profit margin. Size is also positively correlated with profit margin, whereas debt is negatively correlated with this profitability measure.

Regarding the correlations between independent variables, correlation coefficients are low, and thus, it does not constitute a problem for the estimation of the model.

Table 6 – Pearson’s Correlation Coefficients

Probability	Rate of Profit	Profit Margin	Size	Export Intensity	Import Intensity	Capital Intensity	Debt
Rate of Profit	1.000000	-					
Profit Margin	-	1.000000					
Size	0.014635 (0.1589)	0.034925 (0.0008)	1.000000 -----				
Export Intensity	0.032347 (0.0028)	0.095243 (0.0000)	0.250157 (0.0000)	1.000000 -----			
Import Intensity	0.020774 (0.0457)	0.048244 (0.0000)	0.246362 (0.0000)	0.253689 (0.0000)	1.000000 -----		
Capital Intensity	-0.005295 (0.6102)	0.011731 (0.2583)	0.118413 (0.0000)	0.130840 (0.0000)	0.072032 (0.0000)	1.000000 -----	
Debt	-0.017170 (0.0983)	-0.058368 (0.0000)	-0.009709 (0.3498)	-0.021148 (0.0503)	-0.014826 (0.1534)	-0.030548 (0.0032)	1.000000 -----

4.2 Estimation results and discussion

We start to estimate by OLS our model (3.1) for both of our profitability measures (rate of profit (3.2) and profit margin (3.3)), and using export and import intensities as measures of international involvement (see Table 7). As we observe in Table 7, estimation results regarding international involvement are more statistically significant when using *Profit margin* as the dependent variable. Both coefficients of *Export Intensity* and *Import Intensity* are positive and statistically significant (although at different significance levels) when estimating the *Profit Margin* model, which is in accordance with Fryges and Wagner (2010). This means that, ceteris paribus, an increase in the international involvement activities induces, on average, an increase in the profit margin.

Table 7 – Estimation results of the OLS model

Variable	Dependent variable: Rate of profit	Dependent variable: Profit margin
Size	-175.664***	-79.510***
Size (squared)	82.329***	37.794***
Debt	-0.001	-0.002***
Capital Intensity	-0.234**	-0.003
Export Intensity	0.112	0.069***
Import Intensity	0.136	0.072*
Year dummies	YES	YES
R2	0.0134	0.0650
Number of observations	8,550	8,551

Notes: All estimates were made using Stata; Size and Size (squared) variables are expressed in logarithms; *, ** and *** represent significance at 10%, 5% and 1%, respectively.

Considering the control variables, we see that both models are highly negatively affected by *Size*, although in a much larger level for the *Rate Of Profit* model. *Size squared*, on the other hand, is positive for both models, which indicates a convex underlying relationship. The smaller *Size squared* coefficient implies that the increase in the number of employees in bigger firms will have a ceteris paribus smaller decrease in profitability, when compared to smaller enterprises, as well as denoting that the residual sum of squares (RSS) was minimized. As for *Capital Intensity* (although not statistically significant for the *Profit Margin* model), the negative coefficient of the tangible fixed

assets to total assets is higher (in absolute terms) for the model whose dependent variable is the *Rate Of Profit*. This indicates that, ceteris paribus, the increasing percentage of tangible fixed assets (regarding total assets) in a firm will negatively affect its rate of profit. *Debt*, although only statistically significant for the *Profit Margin* model, presents a tiny, negative coefficient for both measures of profitability.

In a second step, we resort to three dummies to attend the international involvement of firms: a dummy for import activity of a company that takes the value of one if a company is an importer (and zero otherwise); a dummy for export activity of a company that takes the value of one in case the company is an exporter (and zero otherwise); and a dummy for both import and export activity that takes the value of one if the firm is both importer and exporter (and zero otherwise). Table 8 presents the estimation results for the total sample. Models were also estimated using one year lagged explanatory variables, with the outcome results being relatively similar to the ones obtained here.

Table 8 – Estimation results of the OLS model for trader profitability premia

Variable	Dependent variable: Rate of profit	Dependent variable: Profit margin
Size	-147.931***	-64.500***
Size (squared)	69.673***	30.896***
Debt	-0.002	-0.002***
Capital Intensity	-0.182**	-0.068**
Importer	-16.598**	6.314***
Exporter	1.841	6.043***
Importer/Exporter	3.909	8.859***
Year dummies	YES	YES
R2	0.0126	0.0445
Number of observations	9,267	9,273

Notes: All estimates were made using Stata; Size and Size (squared) variables are expressed in logarithms; *, ** and *** represent significance at 10%, 5% and 1%, respectively.

Analysing Table 8, we observe that control variables have a negative effect on both profitability variables (except for *Debt*, which coefficient is not statistically significant for *Rate Of Profit*), as the coefficients for *Size* and *Capital Intensity* are higher for the *Rate Of Profit* dependent variable. This means that, ceteris paribus, the increase in the number of employees will induce to a decrease in firms' profitability, whereas the increase of the tangible fixed assets to total assets ratio will also lead to a ceteris paribus decrease of both firms' profitability rates.

In relation to the estimation of the model with *Profit Margin* as the dependent variable, coefficients regarding trader profitability premia are positive, consistent (above 5%) and statistically significant (at a significance level of 1%). This means that only importing firms, only exporting firms and both importing and exporting firms possess a profitability advantage compared to firms that do not engage in international activities, with the latter group of firms displaying the higher coefficient (8.86%). As for *Rate Of Profit*, estimation results regarding international activities are not so consistent, although the value for the *Importer* coefficient is surprisingly low (at a significance level of 5%), which may indicate that the two profitability measures are quite distinctive.

In a third step, the model is estimated controlling for unobserved firm heterogeneity. This approach follows the likes of Wagner (2012a) and Temouri et al. (2013), since OLS estimation results can only account for the observed characteristics of the firms, present in the empirical model (Wagner, 2012a). Two models can be used to control for unobserved firm heterogeneity: the fixed effects model and the random effects model. To decide on the most suitable model, we used the Hausman test, whose results are favourable to the fixed effects model in case profitability is measured through the profit margin, but suggest the random effects model in the case of the profit rate. Therefore, Table 9 presents results for both Rate of Profit model estimated by Random Effects, and Profit Margin model estimated by Fixed Effects.

Table 9 – Estimation results controlling for unobserved firm heterogeneity

Variable	Rate of profit (Random Effects)	Profit margin (Fixed Effects)
Size	-168.442**	-27.844
Size (squared)	79.143**	12.863
Debt	0.001***	0.003***
Capital Intensity	-0.292	-0.157***
Export Intensity	0.140**	0.081**
Import Intensity	0.108**	0.065
Year dummies	YES	YES
R2	Within = 0.0034	Within = 0.0220
Hausman Test (p-value)	0.5655	0.0000
Number of observations	8,550	8,551

Notes: All estimates were made using Stata with robust standard errors; Size and Size (squared) variables are expressed in logarithms; *, ** and *** represent significance at 10%, 5% and 1%, respectively.

Observing Table 9, we start by analysing the Rate of Profit model. The random effects estimation results concerning the international involvement variables are now more statistically significant than the ones obtained by the OLS estimation. Both *Export Intensity* and *Import Intensity* have a positive effect on firms' *Rate of Profit*, indicating that the increase of exports to total sales ratio, as well as the imports to total purchases ratio, will, ceteris paribus, positively affect the *Rate of Profit* of firms. *Size* coefficient, on the other hand, remained negative, meaning that the increase in the number of employees will have a negative effect on firms' *Rate of Profit*. Lastly, the *Debt* coefficient is now positive, albeit very small, indicating that the increase of the debt to total assets ratio will result in a slight increase of the *Rate of Profit*.

Regarding the Profit Margin model, we observe that *Debt* coefficient is no longer negative, although still quite small, which may indicate that its effect on both profitability measures is affected by the estimation method used. *Capital Intensity* coefficient, on the other hand, preserves its negative value, though this time is statistically significant (at a significance level of 1%). Regarding the international involvement variables, only *Export Intensity* presents a statistically significant value, which is positive, and therefore, we can conclude that exporting activities have a positive effect on the *Profit Margin* of firms.

Contrary to Wagner (2012a), international involvement can indeed have a positive effect on firms' profits. Using the same profit measure of Temouri et al. (2013) (which is similar, though simpler, to the one used by Wagner (2012a)), we found a statistically significant effect of both importing and exporting activities on firms' profitability when estimating by the random effects model. We also find strong, positive effect of exports when using a different measure of profitability – profit margin. And, although not being corroborated by our fixed effects model, estimation results of the OLS model also point to a positive effect of import activity on enterprises' *Profit Margin*. This suggests that the profitability gains related with companies' international activities more than offset the costs associated with those.

5. Conclusion

The main purpose of this empirical study was to investigate upon the relation between profitability and all three forms of international trade, resorting to a specific sector of the Portuguese manufacturing industry. Throughout this study, we analysed 1042 furniture companies' financial and international trade data. We find that all three forms of international involvement (exporting, importing and both exporting and importing) significantly contribute to a higher firm profitability when estimating for the firm's profit margin, especially for both exporting and importing firms. Regarding the rate of profit – a measure used in previous studies (on whose this work was based), such as Temouri et al. (2013), Wagner (2012a) and Vogel and Wagner (2010) used a similar one –, and opposedly to these studies, results also showed a positive effect of firms' international activities on profitability, when controlling for unobserved firm heterogeneity. Contrary to the referred studies, however, a random effects model was used, rather than a fixed effects one. We may, therefore, conclude that the use of different estimation models to control for unobserved firm heterogeneity may result in different outcomes for the relation between the firm international involvement and its profitability.

We contribute to the Management field by, not only suggesting a good measure of firms' profitability for future studies on this topic, but particularly to managerial decisions regarding the engagement of firms in international trade activities, specially for the Portuguese manufacturing industry.

This study constitutes a first step to a broader, more comprehensive analysis on the study of the relationship between firms' international involvement and profitability for the Portuguese manufacturing industry, as the extant empirical literature is still somewhat scarce, in part due to the inexistence of a single dataset that comprises both financial and international trade datas of firms for some countries. This, however, is not an issue for the Portuguese case, as SABI database provides both complete financial and international trade data for all Portuguese firms in a single report.

The biggest limitation of this study, nonetheless, was, not only missing data for certain companies, but also the smaller than expected number of firms, due to some inconsistencies of the SABI database. The initial number of firms was scanned for active status, which resulted in a much lower number of furniture enterprises. Another limitation of the database was the unchanged international trade status of companies during the nine-year period, resulting in less accurate results regarding export and import activities. Future research should investigate further into other sectors

of the manufacturing industry, and even business services firms, as well as incorporate the role of direct foreign investment on firm's profitability.

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