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The Determinants of Competitiveness of the Portuguese Defense Industry

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The Determinants of Competitiveness of the Portuguese Defense Industry[1]

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Abstract

This paper exploits a panel data ranging from 2010 to 2019 to investigate firm-level determinants of export intensity in the Portuguese defense industry, using a fixed effects model. As in any study exploiting corporate finance panel data, it is likely that some variables are endogenous due to reverse causality. Although we address this issue, the interpretation of our results cannot be fully causal. We find evidence that learning economies, proxied by export persistence, are the largest determinants associated with export intensity at firm level. Worker productivity and firm size also play a positive and significant role. Financial indicators such as financial pressure and leverage ratio negatively correlate with export intensity, albeit not always significantly. Finally, and contrary to the literature, we cannot find evidence that the Portuguese defense industry's competitiveness rely on investment and R&D, nor is it impacted by geographical agglomeration.

JEL Classification: D22

Keywords: Exports, Competitiveness, Firm-level data, Defense industry

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1. Introduction

Small economies heavily rely on international markets, and Portugal is no exception, with 43.5% of its GDP being exported in 2019 (The World Bank, 2021). As pointed out in the literature, a country's ability to operate in international markets relies on competitiveness at the firm level (Altomonte et al., 2012). That is, the state of the Portuguese economy depends on the capacity of local firms to export. Given the central role of firms, a wide body of studies on firm-level determinants of export intensity already exists in the literature.

Following the recent decision of the European Union to increase its strategic autonomy, the European Defense Fund (EDF) has been launched in 2021, aiming at fostering competitiveness and innovativeness of the Union's defense industry (European Defence Agency, 2021). This context is an opportunity for Portugal to position itself as a strategic player in the European Defense Union, and a thorough understanding of the drivers of competitiveness of the Portuguese defense industry is thus key at this stage.

Based on panel data ranging from 2010 to 2019, this paper contributes to understanding the firm-level characteristics correlated with the export intensity of Portuguese firms operating in the defense industry.

We first review the current state of the literature on the determinants of competitiveness. Next, we present the data and some descriptive statistics of the Portuguese defense industry. We then detail our identification strategy step by step, from pooled ordinary least squares to our favorite specification: fixed effects. Finally, we present and discuss our results.

2. Literature Review

Competition in international markets is fierce. To strive in such environments, firms must display outstanding capacities. In this context, the degree of internationalization of a firm is an indicator of its competitiveness (Correia & Gouveia, 2016). A common way to measure the internationalization of a firm is by computing its export intensity: the total exports of the firm divided by its turnover. Research on the determinants of a firm's export intensity has been particularly prolific in the decade leading to 2010. The following literature review aims at providing the reader with a broad understanding of the main company-level determinants of the export intensity of a firm.

The defense industry is composed of companies that substantially differ one from another. They operate in different industries and have varied structures and characteristics. For most companies in our dataset, the defense industry generates a minor part of their turnover, while the focus of their business is elsewhere. This heterogeneity prevents us from focusing on a specific type of firms in our literature review. Instead, we base the following section on studies on varied firms, operating in distinct sectors.

The scope of the determinants discussed below is that of firm-level characteristics. Based on the literature, the role of the following aspects of a firm stand out: its financial health, its investing behavior, its productivity, the wages it pays to its employees, and its size and age. The literature also stresses the importance of a firm's past exporting behavior: its exporting persistence and the diversity of its export partners. Finally, we discuss regional and sectoral clusters.

A large body of studies observes the relationship between the financial situation of a firm and its exporting behavior. A handful of studies point to a negative, often insignificant effect of financial pressure (as measured by the weight of interests paid on turnover) on exports, and to a small positive, also insignificant effect of ex-ante financial health on exports (Greenaway et al., 2007; Batista et al., 2017; Nunes et al., 2019). Correia and Gouveia (2016) find that in Portugal, negative past results, and negative equity negatively impact the likelihood of exporting in the future but that the correlation between ex-ante financial health and exports is insignificant. Overall, the financial situation of a firm has little explanatory power on the firm's exporting behavior.

Another widely studied determinant of a firm's exporting behavior is its investing behavior. There is a consensus that investment in R&D and in intangibles has a positive effect on a firm's export. In Portugal, Batista et al. (2017) show that after 3 years, intangible investments produce significant positive effects on export intensity. They find the role of investment in tangibles to be positive as well. Correia and Gouveia (2016) point to the key role of innovation in the ability of Portuguese firms to export. They show that the allocation of a greater share of workers to research and development activities lead to a higher probability of export for the firm later on. The positive effect of R&D on exports is driven by technology, as found by Chadha (2005) and Anoruo and Dipietro (2006).

In the literature on the correlation between a firm's productivity and its exporting behavior, productivity is measured either by total factor productivity (TFP) or by labor productivity, both of which are associated with higher exports.

Highly productive firms seem to select themselves into the international market, so that higher TFP ex-ante is associated with a higher likelihood of exporting and higher exporting intensity. Greenaway and Kneller (2004) show that firms that are in their first year of exporting have a significantly higher TFP than firms that do not export, and a TFP slightly lower than firms that have been exporting for over a year. They find moreover that productivity growth of new exporters before they start exporting is on average 2% per annum faster than that of non-exporting firms. This evidence suggests that a rise of productivity ex-ante increases the likelihood of exporting.

Fatchamps et al. (2007) show that the causality flows from higher productivity to exports by showing that firms that had a labor productivity above average before exporting have a significantly higher probability of beginning to export. These findings have been repeatedly published in the literature (Batista et al., 2017; Greenaway & Kneller, 2004).

Clerides et al. (1998) find the higher labor productivity of new exporters is associated with a relatively more skilled labor force. Similarly, Greenaway and Kneller (2004) show that export intensity positively correlates with wages, and Schank et al. (2008) find that a wage premium in exporting firms already exists in the years before firms start to export, and does not increase in the following years. The dynamics are hence as follows: firms that pay higher wages and hire relatively more skilled labor are relatively more productive, which makes them better exporters.

The question of the relationship between a firm's size and its export behavior has been the focus of many studies. Despite this interest, the role that size plays in export behavior remains unclear. Moen (1999) points to the different competitive advantages of large and small firms. Larger firms could be better able to compete in international markets due to economies of scale, and to the availability of more resources. On the other hand, SME's could be advantaged by technology-related factors. Overall, researchers agree that there is a small positive and significant effect of firm size (as measured by sales amount and number of employees) on export intensity (Greenaway and Kneller, 2004; Calof, 1994; Roberts and Tybout, 1997).

The relationship between firm age and exports is not clear in the literature. Some researchers argue that a firm becomes a good exporter through a gradual process, whereby the firm first finds its place in the national market where competition is less fierce, and accumulates knowledge and experience there before entering the international market (Bilkey & Tesar, 1977; Roberts & Tybout, 1997). Inversely, some firms may be made to export, rather than evolving into international markets. Correia and Gouveia (2016) study the Portuguese footwear sector and find that younger firms are more likely to export than older firms. They suggest that this is due to faster learning-by-doing in young firms. These findings are corroborated by Fatchamps et al. (2007), and by Moen and Servais (2002).

Unsurprisingly perhaps, the strongest determinants of a firm's exporting behavior are its past exporting patterns. It is acknowledged that persistence in the participation in international markets strongly correlates with a firm's exports (Greenaway and Kneller, 2004; Batista et al., 2017). Indeed, through experience in external markets, firms obtain know-how, and have access to shared knowledge and global value chains, which in turn increases their competitiveness. Similarly, a wider variety of trade partners implies a more intense participation of a firm in global value chains, which brings along precious contacts, and learning experiences. Export diversity – a measure of the diversity of export destinations of a firm's products – correlates with larger exports as a share of turnover (Batista et al., 2017), and to efficiency gains (Nunes et al., 2019).

After scrutinizing the role of firm-level variables on exporting behavior, let us briefly discuss the role of synergies between firms. Several studies have found a positive impact of the geographical concentration of firms within one area on their exporting behavior. Nunes et al. (2019) show that in Portugal, the footwear industry is geographically concentrated in the North of the country. This regional and sectorial cluster leads to synergies and cost reductions that positively correlate with firms' exports. Greenaway and Kneller (2004, 2008) similarly find that agglomeration plays an important role in export intensity through information sharing and the reduction of entry cost to international markets.

3. Data and sample characteristics

We exploit a dataset from Informação Empresarial Simplificada, which details financial accounting data on all Portuguese companies that operate at least partly in the defense industry between 2010 and 2019. On average, 40.2% of the turnover of the companies is generated by the defense sector. The panel amounts to 336 firms and is unbalanced. Within the 10 years covered by our data, 57 firms were created, and 46 were dissolved.

The variables

Based on the literature, we compute measures of financial situation, research and development, productivity, exports, size, age, and geographical concentration. Table 1 reports the number of observations, mean, median and standard deviation of these variables. Annex 1 provides a definition of each variable.

Table 1: Summary statistics

	N	Mean	Std. Dev.	Median
expint	3011	.314	.345	.154
expintEU	3011	.452	.415	.38
age	3011	27	19	22
employeenb	3011	109	381	19
Tot sales	3007	7935102	34176307	463641
rd perso	3011	4.1%	.145	0
av wage worker	3011	17103	12997	15246
GVA worker	3006	37010	47735	30788
fin pres EBITDA	3011	.091	.141	.034
leverage ratio	3009	.708	.367	.668
invest tangible	2657	8919	3287419	-1534
Invest intangible	2657	39831	883750	0
expdum	3011	.505	.5	1
expper	3011	.712	.453	1

Because our sample only distinguishes between two export markets (within and outside of the European Union), we measure export intensity to the European Union (expintEU) as a proxy for export diversity, whereby a low ratio indicates more diverse export destinations.

The panel does not explicitly contain information on investment. As a proxy, we estimate investment respectively in tangible and intangible assets by taking the year-on-year difference in asset stocks. By computing the difference in assets to approximate investments respectively in tangible and intangible assets, our variables also contain other effects such as amortization, depreciation and appreciation, thereby adding noise. Due to the computation of differences, we lose one observation per firm, such that our sample drops from 3011 to 2657 observations, and from 336 to 331 firms.

We proxy a firm's financial situation using the leverage ratio, measured as the current debt to current assets ratio, and a measure of financial pressure, computed as interest payments/EBITDA. For both variables, we recode the values at the tails of the distribution (top and bottom 5%) to the value of the 5th and 95th percentile in order to reduce the noise in the variables.

For the sake of clarity and readability, in Table 2, Table 3, and Annex 2, the average wage per worker (av_wage_workers), the gross value added (GVA) per worker (GVA_worker) and the number of employees (employeenb) are measured per 10'000 workers. Firm's age is computed per 10 years, and investments in tangibles and intangibles are measured per 100 million euros.

Descriptive statistics

The Portuguese defense industry is characterized by heterogenous companies. In our sample, 45% of them are S.A[3], while the remaining are limited companies[4]. The majority of the sampled firms (61%) do not have holding companies. Out of the 39% that are daughter companies, 71% are held in Portugal, 10% in Spain, and the rest mostly in Europe.

Geographically, the sample is spread all over the Portuguese territory, including the Madeira islands and the Azores. The densest area is the metropolitan area of Lisbon, with 46.7% of the observations. The North and the center of the country each represent around a quarter of the observations.

The defense industry represents the challenge of encompassing very diverse activities. In total, 40 sectors[5] are represented in the dataset. 95 firms operate in the manufacturing sector, where the most represented activity is the manufacturing of fabricated metal products, except machinery and equipment. 241 firms provide services, working principally in wholesale trading, computer programming, and engineering activities. As shown in Figure 1 Panel A, manufacturing and service companies differ both in terms of export behavior and in terms of firm characteristics. The export intensity in the manufacturing sector is 49% above the mean export intensity, while that of service firms is 20% below. Similarly, the share of exports sent to the European Union is 46% above the mean for manufacturing firms, while this ratio is 19% below average in service firms. Moreover, there are more persistent exporters amongst manufacturing firms than in service firms. Companies in both sectors are on average of comparable age (on average, 31 years old in the manufacturing sector versus 26 in the service sector). Productivity seems to be higher in service firms, where the average wage per worker and R&D spending are also higher.

[3] Sociedade anónima
[4] Sociedade por quotas and sociedade unipessoal por quotas
[5] 2 digits CAE

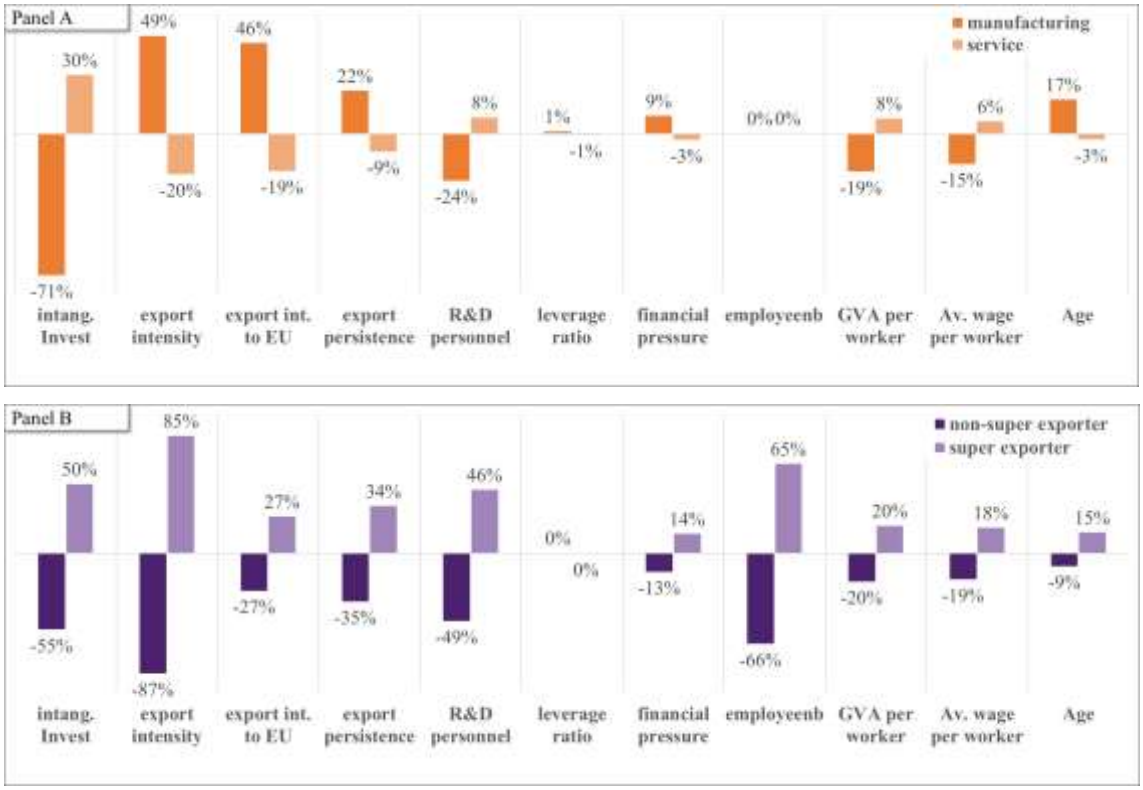

Figure 1: Percentage deviation to mean

Out of the 336 sampled firms, 150 firms are continuous exporters (total exports > 0 for all years), 30 firms have never exported, and 156 are switchers. On average, firms export 31.4% of their turnover, with a median export intensity of 15.4%. When leaving the firms that do not export at all aside, the average export intensity rises to 39.6%.

Each year, around 50% of firms are super exporters, according to our export dummy. That is, around 50% of the firms export either at least 50% of their turnover, or at least 10% of their turnover, for an export value above € 150'000. Figure 1 Panel B compares the main explanatory variables for super exporters and for other firms. In accordance with literature, super exporters are on average much larger than other firms in terms of number of employees (Greenaway & Kneller, 2004; Calof, 1994). The average age of super exporters is superior to that of other firms. We also note that super exporters send a higher percentage of their exports to the European market, and are more persistent exporters. Finally, super exporters invest more in R&D and are more productive than non-super exporters.

4. Estimation strategy

For analytical purposes, the first model we run is a pooled ordinary least squares (POLS). This specification relies on the assumption that the correlation between the regressors and the time-invariant components of the error term equals zero. In our data, the assumption is very unlikely to hold, as there are most likely firm-level time-invariant components that are not caught by our independent variables. Hence, we then run a fixed effect model. This specification relaxes the assumption that $E(x'_{it}c_i)$=0 by subtracting the within-firm means for each variable from the observed values of the variable, so that time-invariant variables are cancelled out. We ran a Hausman test to see whether random effects should be preferred to fixed effects. The null hypothesis was rejected, so that random effects would be inefficient and fixed effects should be preferred. Based on the above-mentioned rationale, our preferred specification is the fixed effects model and the baseline specification is as follows:

$$\begin{aligned} \ddot{expint}_{it} = {} & \alpha_1 \ddot{\text{expintEU}}_{it} + \alpha_2 \ddot{\text{exp per}}_{it} + \alpha_3 \ddot{\text{rd\_perso}}_{it} + \alpha_4 \text{av\_wage\_}\ddot{1}00\ddot{0}\text{0\_workers}_{it} + \alpha_5 \ddot{\text{fin\_pres\_EBITDA}}_{it} \\ & + \alpha_6 \ddot{\text{leverage\_ratio}}_{it} + \alpha_7 \text{GVA\_}\ddot{1}00\ddot{0}\text{0\_workers}_{it} + \alpha_8 \ddot{\text{Employeenb}}\text{\_10000}_{it} \\ & + \alpha_9 \ddot{\text{invest\_tangible}}\text{\_100mio}_{it} + \alpha_{10} \ddot{\text{Invest\_intangible}}\text{\_100mio}_{it} + \alpha_{11} \ddot{\text{geo\_concentration}}_{it} \\ & + \alpha_{12} \ddot{\text{Age\_10}}_{it} + \beta_i + \delta_t + \ddot{\varepsilon}_{it} \end{aligned}$$

Where $\ddot{expint}_{it}$ is the demeaned export intensity of firm i at time t, $\ddot{expint}_{it} = expint_{it} - \overline{expint_i}$. β_i and δ_i represent respectively firm- and year- fixed effects.

In all the regressions, we use robust standard errors, clustered at the company level to account for heteroskedasticity. We include year dummies to account for business and economic cycle effects, with 2019 as base year. To allow for non-linear relationships, we tested the inclusion of different interactions in the model, but the interaction estimators are always insignificant and merely add noise.

It is important to note that fixed effects do not address all the endogeneity of our variables, and that the fixed effects estimators may still suffer from an endogeneity bias. Indeed, as in any study based on corporate finance panel data, our data most likely suffers from reverse causality (Barros et al., 2020). That is, the causality does not unilaterally flow from the independent to the dependent variable, but also from the dependent to the independent variables. In this case, the correlation between the explanatory variables and the error term is non-null even after time-invariant factors are cancelled out. The interpretation of the displayed estimators can hence not be fully causal.

To address this issue, we run a fixed effects model with all independent variables lagged one year. By comparing the contemporaneous model with the lagged model, we can learn about the importance of the contemporaneous year on export intensity. The last model we run is a fixed effects model using both the contemporaneous and the lagged variables as independent variables.

Because all time-invariant variables are cancelled out during the fixed effect transformation, fixed effects models do not enable us to estimate the relationship between age and export intensity. To get an estimation of the role a firm's age plays on its export behavior, we split the sample into four groups, based on the percentile distribution of firm age: the youngest firms (1-15years old), middle-young firms (16-22 years old), middle-old (23-33 years old) and old firms (33 years old or more). We conduct two additional heterogeneity analyzes. First, we split the data into manufacturing and service firms because these two groups exhibit differences in many aspects, as seen in the descriptive analysis section. Second, we split the data based on their export intensity, to analyze potential differences in the estimators of super exporters and other firms.

5. Empirical results

Column 1 of Table 2 reports the POLS results. Column 2 displays the fixed effects estimators with contemporaneous variables. By comparing the results of these two models, we note that they do not fundamentally differ. This shows that the firm-specific time-invariant components are not strongly correlated with the independent variables, so that the bias of the POLS model is small. Yet, as previously discussed, we cannot expect the correlation between these two components to be zero, so that POLS is not an adapted model.

Table 2 column 3 shows a fixed effects model with all independent variables lagged by one year. The estimators of columns 2 and 3 do not differ substantially, but most independent variables lose significance when they are lagged. This difference most likely means that the contemporaneous year is an important determinant of export intensity, or that the year 2010, which is dropped in the lagged model, plays an important role in the data. Column 4 includes both the contemporaneous and the lags of all explanatory variables. The estimates in columns 2 and 4 are comparable, which shows that the contemporaneous variables have a low correlation with their lags, so that the bias from omitting the lags is very small. These results further motivate our preference for the fixed effects model with no lags.

As expected, and in accordance with literature on competitiveness, Table 2 column 2 shows that export persistence is the strongest determinant of export intensity. Experience in international markets gives know-how to firms, which increases their competitiveness. Our model thus confirms the existence of learning economies in the Portuguese defense industry. Table 3 exhibits the estimators for companies for which the export dummy respectively equals 1 (column 3) and 0 (column 4). Export persistence is only significant for non-super exporters, as shown in column 4, emphasizing the idea that experience in international markets is especially valuable for companies that export a smaller share of their turnover.

In our contemporaneous fixed effects model, the estimator of export intensity to the European Union (EU) is positive and insignificant. This result is surprising as literature on competitiveness usually associates lower export diversity with lower export intensity. Indeed, exporting outside of the European Union can usually be interpreted as a genuine indicator of a company's ability to export (Batista et al., 2017). The defense industry however is different to other industries because it is highly politicized and regulated. In this context, sending a high proportion of exports to the European Union may well not be an indicator that the firm is unable to reach other markets, but rather the result of legal limitations, or of political alliances. Columns 1 and 2 of Table 3 show the regression results respectively for the service and manufacturing industries. Export intensity to the EU is only significant for the manufacturing industry. Geographical components are probably at play, whereby Portugal naturally exports manufactured defense goods to this market, while services are more easily exported to other regions.

On average, the Portuguese defense industry spends more resources on R&D than the rest of the Portuguese economy, with 7.1% of the workers employed working in R&D,

compared to an average of 1.5% in the rest of Portuguese firms (idD Portugal Defence, 2021). However, within the defense industry, the correlation between investment and export intensity turns out to be insignificant in most of ours models. Indeed, the estimators of the share of personnel working in R&D, the investments in intangible assets, and the investments in tangible assets all lack robustness, varying both in magnitude and in signs. Because the impact of investments on exports may take a few years to be observable, it is interesting to lag these variables, as in Table 2 columns 3 and 4. Only in the fixed effects model with lags do investments in intangibles become significant. We also test the inclusion of lags of more than one year, which lead to no conclusive results.

As pointed out by Bellais and Droff (2007), innovation is a fundamental part of the defense industry, and the efficiency of armies depends on it. Our results are hence both counter-intuitive and go against the literature on the topic. Remember that our data on investments is only an approximation, based on a difference operation. Without further data, we cannot fully trust the estimators of investments obtained in our model and should not conclude that investments and R&D do not play a role in the export intensity of the Portuguese firms operating in the defense industry.

In accordance with literature, a firm's productivity, proxied by GVA per worker, is positively and significantly correlated with export intensity, as shown by the results we obtain across all fixed effects models with contemporaneous variables. Table 3 columns 3 and 4 highlight that GVA per worker is only significant for the super exporter sub-sample. Because international markets challenge firms through intense competition, when a firm's turnover heavily relies on exports, greater productivity is a decisive factor of that firm's export intensity. Annex 2 shows that productivity is a more relevant determinant of export intensity for the oldest firm group.

Our data also confirms the well-studied positive correlation between average wage per worker and export intensity. As explained by Batista et al. (2017), two mechanisms may be at play: either higher wages proxy the higher skill level of workers, or higher wages lead to higher productivity through the mechanisms of the efficiency wage theory. While on average, 20.1% of workers in Portuguese firms have a tertiary education degree, 39.5% do in the Portuguese defense industry (idD Portugal Defence, 2021). The much higher education level of workers in the defense industry speaks for the first interpretation, whereby the higher skill level of workers is the cause of higher export intensity.

Both the leverage ratio and financial pressure enter our model negatively in Table 2 column 2. In line with previous literature, financial pressure has a negative but insignificant effect on export intensity, and the coefficient of the leverage ratio is negative and significant (Greenaway et al., 2007; Batista et al., 2017). The negative impact of a high leverage ratio on the export intensity of a firm is robust to sample heterogeneity and model specification. Looking at age heterogeneity in Annex 2 highlights that the youngest firm group is the most sensitive to financial pressure, while there is no significant correlation between financial pressure and export intensity for the other three age groups.

The correlation between the number of employees of a firm and its export intensity is positive and very significant. As suggested in the literature, larger firms benefit from economies of scale, and more efficient plants tend to grow faster (Robert & Tybout, 1997; Greenaway & Kneller, 2004; Calof, 1994). Our model shows that size is a much larger determinant of export intensity in the manufacturing sector, where economies of scale are greater.

Our estimator of geographical concentration is insignificant. This result is robust to sample heterogeneity and to variations in specification. As a robustness check, we also use geographical concentration indices on the provincial level and on the municipal level. The estimators of all of the geographical concentration indices are consistently insignificant, so that we cannot conclude that firm agglomeration is a determinant of export intensity in the Portuguese defense industry. Most of the literature claims that geographical proximity generates synergies (Greenaway & Kneller, 2004; Nunes et al., 2019). But the Portuguese defense industry is not comparable to other industries, since it encompasses 40 different sectors. In this context, it is unsurprising that companies working in different sectors of the defense industry do not mutually boost their exports through geographical agglomeration.

6. Conclusions

The recently launched European Defense Fund aims to foster competitiveness and innovativeness in the European Union's defense industry. This is an opportunity for Portugal to position itself as a strategic exporter of defense goods and services to the European Union. In this context, a thorough understanding of the drivers of competitiveness of the Portuguese defense industry is key.

We study panel data from 2010 to 2019 of all Portuguese firms operating in the defense industry to scrutinize the firm-level determinants of export intensity. In order to address time invariant firm-specific characteristics, we model the data using fixed effects, and observe sector, age, and export status heterogeneity.

In accordance with literature, we find that learning economies, proxied by export persistence, is the largest and most robust determinant of export intensity at firm level. Worker productivity and firm size also play a significant positive role. The financial situation of a firm is also a determinant of export intensity, whereby both financial pressure and the leverage ratio exhibit a negative correlation to exports.

Due to the variety of sectors represented in the Portuguese defense industry, we find that geographical agglomeration, measured as a region- province- and municipality-level index is not a determinant of export intensity.

Table 2: Determinants of export intensity

VARIABLES	(1) POLS	(2) Fixed Effects	(3) FE lags	(4) FE lags&contemp
expintEU	0.049***	0.038		0.013
	(0.01)	(0.02)		(0.02)
expper	0.148***	0.124***		0.151***
	(0.01)	(0.02)		(0.03)
rd_perso	-0.008	-0.033		-0.057
	(0.03)	(0.06)		(0.06)
av_wage_10000_workers	0.024***	0.019*		0.019
	(0.01)	(0.01)		(0.01)
fin_pres_EBITDA	-0.048*	-0.054		-0.056
	(0.03)	(0.04)		(0.05)
leverage_ratio	-0.046***	-0.053**		-0.038*
	(0.01)	(0.02)		(0.02)
GVA_10000_workers	0.003***	0.004*		0.004**
	(0.00)	(0.00)		(0.00)
Employeenb_10000	1.369***	1.314***		0.893*
	(0.26)	(0.40)		(0.50)
invest_tangible_100mio	-0.006	-0.028		0.123
	(0.11)	(0.09)		(0.21)
Invest_intangible_100mio	0.205	0.201		0.136
	(0.35)	(0.12)		(0.14)
geo_concentration	-0.168	-0.022		-0.461
	(0.11)	(0.59)		(0.62)
Age_10	-0.004			
	(0.01)			
expintEU (lagged)			0.046***	0.022
			(0.02)	(0.01)
Expper (lagged)			0.020	-0.058***
			(0.02)	(0.02)
rd_perso (lagged)			0.008	0.014
			(0.07)	(0.07)
av_wage10000_workers (lagged)			0.025	0.018
			(0.02)	(0.01)
fin_pres_EBITDA (lagged)			-0.028	-0.014
			(0.03)	(0.03)
leverage_ratio (lagged)			-0.022	-0.007
			(0.03)	(0.02)
GVA_10000_workers (lagged)			0.002	-0.001
			(0.00)	(0.00)
employeenb_10000 (lagged)			0.765	0.230
			(0.52)	(0.57)
invest_tangible_100mio (lagged)			-0.041	0.096
			(0.08)	(0.07)
Invest_intangible_100mio (lagged)			0.266*	0.265
			(0.15)	(0.17)
geo_concentration (lagged)			1.115	1.352*
			(0.76)	(0.76)
Observations	2,653	2,653	2,312	2,310
Year dummies	Yes	Yes	Yes	Yes
R-squared		0.094	0.029	0.102
Number of NIF	331	331	328	328

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Determinants of export intensity by sector, and by export status

VARIABLES	(1) Service	(2) Manufacturing	(3) Super Exporter	(4) Non-super Exporter
expintEU	0.004	0.147***	-0.072*	0.019**
	(0.03)	(0.05)	(0.04)	(0.01)
expper	0.119***	0.137***	0.018	0.034***
	(0.03)	(0.04)	(0.03)	(0.01)
rd_perso	-0.007	-0.190	0.018	-0.004
	(0.06)	(0.13)	(0.03)	(0.02)
av_wage_10000_workers	0.027**	-0.018	0.013*	-0.003
	(0.01)	(0.02)	(0.01)	(0.00)
fin_pres_EBITDA	-0.079	0.021	-0.023	0.014
	(0.05)	(0.05)	(0.05)	(0.02)
leverage_ratio	-0.054**	-0.052	-0.014	-0.003
	(0.02)	(0.04)	(0.02)	(0.01)
GVA_10000_workers	0.003*	0.005	0.003**	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)
Employeenb_10000	1.162***	5.647**	0.639	-0.114
	(0.40)	(2.59)	(0.43)	(0.51)
invest_tangible_100mio	-0.024	0.030	-0.037	-0.042***
	(0.10)	(0.17)	(0.16)	(0.01)
Invest_intangible_100mio	0.209*	-0.980	0.093	-0.020
	(0.12)	(1.24)	(0.09)	(0.13)
geo_concentration	0.408	-0.945	-0.221	0.172
	(0.77)	(1.17)	(0.74)	(0.33)
Observations	1,874	779	1,392	1,261
Year dummies	Yes	Yes	Yes	Yes
R-squared	0.088	0.190	0.039	0.068
Number of NIF	236	95	225	235

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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