Does export intensity affect corporate leverage? Evidence from Portuguese SMEs

Cátia S. Silva
Treasurer at Faurecia Portugal
and
Visiting Scholar, Católica Porto Business School
Catholic University of Portugal
catiamsousasilva@gmail.com

João M. Pinto*
Professor of Finance
Católica Porto Business School
Catholic University of Portugal
jpinto@porto.ucp.pt

December 22, 2019

* Corresponding author: Católica Porto Business School, Rua Diogo Botelho, 1327 - 4169-005 Porto, Tel: (00351) 226 196 260, e-mail: jpinto@porto.ucp.pt.
The authors would like to thank Gary Emery, John Goodell, Luís Pacheco, and Ricardo Ribeiro for their helpful suggestions. We would also like to extend our thanks to participants in the 10th Accounting and Finance Conference of the Catholic University of Portugal-Porto for helpful comments on earlier drafts. The authors are responsible for all remaining errors and omissions.

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Abstract

This paper examines the effect of export intensity on a firm's capital structure using a sample of 7,676 Portuguese SMEs. Results obtained from a system GMM estimation method show that the leverage ratio is negatively affected by export intensity. We document that firms with more growth opportunities have a higher leverage, while firms that have more profits, higher asset tangibility and face higher business risk have lower debt ratios. Our results also show that the implementation of governmental mechanisms that support export firms' borrowing activities are critical in economies facing a financial crisis.

JEL classification: F23; G32; G38

1. Introduction

Firm capital structure problems have always been a source of intense debate, based on the central question of the relevance of strategic financing decisions on a firm's valuation. Although empirical works are substantial in volume, the general view is that the topic lacks sufficient empirical research.[1] This paper aims to contribute to the knowledge of capital structure by examining the determinants of corporate leverage across a large panel of Portuguese unlisted firms and by focusing on the impact of export intensity on firms' capital structure. Firstly, we examine the effect of export intensity on leverage. Then, we explore which firm-level determinants affect Portuguese small and medium-sized enterprises' (SMEs) capital structure and analyze if our results differ from previous research.

Extant empirical literature on the determinants of firms' leverage has focused largely on U.S. firms (e.g., Lemmon *et al.*, 2008; Frank and Goyal, 2009; Graham *et al.*, 2015). Recent and growing research, to mitigate this geographical bias, evaluates the contribution of firm-specific factors to leverage variations in non-U.S. environments, also incorporating country-level characteristics (e.g., Booth *et al.*, 2001; Antoniou *et al.*, 2008; Gungoraydinoglu and Öztekin, 2011; Öztekin, 2015). However, the focus remains mostly on large listed firms. Research into the determinants of capital structure for non-listed companies, namely SMEs, is scanter and more recent.[2] Among the empirical papers, Hall *et al.* (2004) and Psillaki and Daskalakis (2009) support that firm-specific characteristics outweigh country factors in determining a firm's capital structure. van der Wijst and Thurik (1993) and Sogorb-Mira (2005) show that theoretical determinants of firm leverage also work in the case of SMEs, but they vary across short- and long-term debt ratios. More recently, Jõeveer (2013) states that the

[1] In order to refer to useful surveys on both theoretical and empirical corporate literature in relation to capital structure, see, among others, Myers (1977, 2003), Masulis (1988), Titman and Wessels (1988), Harris and Raviv (1991), Rajan and Zingales (1995), Jõeveer (2013), Graham *et al.* (2015), and Öztekin (2015).

[2] According to Jõeveer (2013), capital structure choices in small firms are likely to differ from large firms because (*i*) small firms face large information opacity, and (*ii*) are less diversified and deal with higher bankruptcy costs.

influence of common determinants of leverage differ across firm types, with country factors significantly influencing capital structure choices. This paper aims to contribute to this branch of literature by examining whether these results hold for a large panel of Portuguese SMEs. According to OECD, in 2010, SMEs accounted for 99.9% of firms, 70% of employment, and 60.9% of the turnover in Portugal. This raises the first question: (1) *Do common factors that explain public firms' leverage also determine Portuguese SMEs' capital structure?*

Although international trade literature shows that a firm's export activity depends on financial factors such as size, leverage and credit rationing (Wagner, 2001; Bernini *et al.*, 2015; Minetti and Zhu, 2011), yet only two papers examine the impact of export activity on firms' debt level. Chen and Yu (2011), focusing on Taiwanese firms, show that export intensity leads to a lower debt ratio. Bernini *et al.* (2015), using a sample of French manufacturing exporters, find a negative causal relation between firms' leverage and export quality. We intend to contribute to this literature by examining if export intensity affects a firm's capital structure. We use a database of Portuguese firms because since 2011 the dynamism of the export sector has contributed decisively to the economic recovery of Portugal in the period of the financial crisis (2011-2013).[3] The weight of exports in Portuguese GDP increased from 27% in 2009 to 42% in 2016 (45% in 2018),[4] which was a determinant of Portugal leaving the Financial Assistance Programme in May 2014, the same year that positive economic growth re-appeared following three years of recession. In addition, when Portuguese firms enter international markets through export activities, local creditors find themselves unable to monitor the selling activities carried out by firms because of the complexity of operations. As a result, exporters face significant difficulties when trying to borrow funds in those countries. This raises an additional question: (2) *Does export intensity affect Portuguese SMEs' leverage level?*

[3] In 2011, to prevent an insolvency situation, Portugal applied for a bailout program of €78.0 billion from the International Monetary Fund, the European Financial Stabilisation Mechanism, and the European Financial Stability Facility.

[4] Data extracted from World Bank Open Data; GDP and exports of goods and services at 2010 reference levels.

We find that export intensity negatively affects a firm's leverage level, which corroborates our hypothesis that due to higher adverse selection and monitoring costs, firms with a higher degree of export intensity rely more on internal funds. Regression analysis reveals that more profitable SMEs and those with more asset tangibility and business risk have lower debt ratios. We also find that firms with a larger growth opportunity set are more levered. In addition, non-debt tax shields negatively influence the debt level, while effective tax rate, as well as firm size and industry conditions, do not influence Portuguese SMEs' capital structure.

2. Literature review

2.1. Capital structure determinants

The literature on capital structure presents some factors that influence firms' financing decisions. According to Miller (1977), Graham (1996) and Gungoraydinoglu and Öztekin (2011), to take advantage of higher interest tax shields, firms will issue more debt when tax rates are higher. Jõeveer (2013) argues that tangibility leads to a decrease in asymmetric information costs and agency cost of debt. Therefore, tangibility is expected to be positively related to leverage. However, as pointed out by Psillaki and Daskalakis (2009), relatively higher tangibility may imply that a firm has a stable source of cash flow, which provides more internally generated funds. In such a case, a negative relationship may arise. In a trade-off theory framework, tax shield benefits of debt will induce profitable firms to use more debt (Myers, 1977; Harris and Raviv, 1991). However, Fama and French (2002) and Frank and Goyal (2009) argue that a negative relation between leverage and profitability is expected and that this relationship is in line with the pecking-order theory. According to Psillaki and Daskalakis (2009) and Jõeveer (2013), a similar relationship is expected for SMEs. As SMEs face higher information opacity *vis-à-vis* large firms, they tend to rely more on internal funds.

The trade-off theory predicts that growth reduces leverage (Fama and French, 2002). On the contrary, according to the pecking-order theory, holding profitability constant, firms

with more investments should accumulate more debt over time (Harris and Raviv, 1991; Rajan and Zingales, 1995). Harris and Raviv (1991) and Rajan and Zingales (1995) find evidence of a positive relationship - supporting the trade-off theory - while Frank and Goyal (2009) find evidence supporting either a positive or negative relationship between firm size and leverage. Regarding SMEs, Psillaki and Daskalakis (2009) and Jõeveer (2013) find results that corroborate the pecking-order theory: larger firms rely less on debt than smaller firms.[5]

Hull (1999), Hovakimian *et al.* (2001), Flannery and Rangan (2006), and Jõeveer (2013) finds a positive relationship between median sector leverage and firm leverage. According to the trade-off theory, a firm with higher earnings volatility faces higher expected costs of financial distress. Thus, firms with higher business risk have lower leverage. However, firms with volatile earnings may suffer more from adverse selection. If so, then the pecking-order theory would predict that riskier firms have higher leverage. Psillaki and Daskalakis (2009) and Jõeveer (2013) find results supporting the trade-off theory prediction for SMEs. In fact, business risk is particularly important for SMEs, as it is closely related with their death rate, which is significantly higher than that of large public firms.[6]

2.2. Export intensity and firm's capital structure

According to the pecking-order theory, exporters tend to be less leveraged than non-exporters because the former rely more on internal than on external financing due to deadweight costs of asymmetric information (Myers, 1984; Myers and Majluf, 1984). Following the trade-off theory, agency costs of debt (Jensen and Meckling, 1976; Burgman, 1996) are more severe in multinational firms as they function in complex environments based on institutional and economic differences between the home country of a parent firm and the

[5] However, Jõeveer (2013) finds a positive relationship between leverage and firm size in their regressions based on small firms where leverage ratio corresponds to 'narrow leverage' (defined as debt to debt plus shareholders' funds).

[6] Extant empirical evidence suggests that firms' leverage is not only affected by their own characteristics but also by macroeconomic and institutional environments. See, among others, Rajan and Zingales (1995), Booth *et al.* (2001), Antoniou *et al.* (2008), Gungoraydinoglu and Öztekin (2011), Fan *et al.* (2012), and Öztekin (2015).

host countries of its subsidiaries (Wright *et al.*, 2002; Chen and Yu, 2011). When firms enter international markets through export activities, local creditors find themselves unable to monitor the selling activities carried out by firms because of the complexity of operations, anticipating that the risk of asset substitution (Myers, 1977) will be higher. As a result, those creditors are less motivated to lend funds to exporters and exporters face difficulties when trying to borrow funds in foreign countries because of the high costs of monitoring. We thus expect a higher degree of export intensity to be associated with a lower debt ratio.[7]

3. Data and methodology

3.1. Sample selection

To avoid sample selection problems, we search on the SABI database - provided by Bureau van Dijk - for sectors in which at least one firm has an export record during our sample period. By doing this, we consider in our sample export and non-export firms that belong to export sectors only. From this sample, we exclude firms without information about total assets or debt, and firms with negative values for depreciation and amortization. In addition, we only consider firms that fall within the definition of SME by the European Commission.[8]

As we are testing which factors are correlated with SMEs' leverage, we use book leverage as the dependent variable, computed as the ratio of total liabilities divided by the total assets of the firm. Total liabilities include both long-term and short-term liabilities, as well as leasing, accounts payable and accounts receivable, namely the trade credit which is an important means of finance for SMEs (Rajan and Zingales, 1995). Therefore, we consider, as in Psillaki and Daskalakis (2009) and Jõeveer (2013), this broader definition of leverage. To

[7] Related empirical studies on internationalization strategies (Burgman, 1996; Chen *et al.*, 1997; Lee and Kwok, 1988; Chen, 2004) examine the relationship between the capital structure of multinational corporations and their international diversification strategy, showing evidence that multinational corporations have a lower debt ratio than domestic ones.

[8] SMEs are defined as companies that employ less than 250 employees, have either an annual turnover of up to €50 million euros, and/or an annual balance-sheet total of no more than €43 million euros, and are independent and privately held.

examine the exportation effect on firms' capital structure, we use export intensity (Chen and Yu, 2011) as our main explanatory variable. From the existing literature (see section 2.1), we extract a list of other factors that are claimed to have some influence on firms' capital structure. Table 1 gives an overview of the variables, the proxies used, their expected impact on firms' leverage, taking into consideration the literature review, and our findings.

****** Insert Table 1 about here ******

After applying these screens, we are able to analyze a sample of 7,676 firms (44,268 firm-year observations). Table 2 presents the top 10 export sectors, sectors in which at least one firm has an export record during the 2011-2016 period.

****** Insert Table 2 about here ******

3.2. Methodology

The analysis of the financing decisions taken by an SME is performed based on a dynamic panel model. We use a system Generalized Method of Moments (GMM) that enables us to take into consideration the dynamic nature of the firm's capital structure while accounting for the potential endogeneity of the explanatory variables. Faulkender *et al.* (2012) and Flannery and Hankins (2013) show that the system GMM is the most adequate method to estimate capital structure models in the presence of endogeneity. Flannery and Hankins (2013) conclude that Blundell and Bond's (1998) system GMM estimator is the best option, when compared with alternative methods of estimating dynamic panel models, for higher levels of endogeneity.[9] Wintoki *et al.* (2012) point out that an important advantage of this method is that it relies on a set of internal instruments contained in the panel itself, eliminating the need for external instruments, which in most cases is extremely complicated, if not impossible (Pindado *et al.*, 2015). Therefore, we use Blundell and Bond's (1998) GMM methodology, estimating a

[9] As pointed out by Flannery and Hankins (2013), Blundell and Bond's (1998) system GMM estimation method provides adequate estimates when the regression model requires instruments for the endogenous transformed lagged-dependent variable and for the short panel bias to be corrected, and is useful for databases with many panels and only a few periods, as occurs in our case.

two-equation system of the regression in levels and in first differences. The general form of our model in levels is:

$$Leverage_{i,t} = \alpha + \gamma Leverage_{i,t-1} + \beta X_{i,t} + Y_t + \varepsilon_{i,t} \quad (1)$$

where the subscripts refer to firm i at year t, X_i is a vector of firm-specific determinants of leverage (see Table 1) and Y_t is a year-fixed effect. When estimating equation (1), we use the Stata procedure 'xtabond2' (Roodman, 2009) and, like Pindado *et al.* (2015), we use all the right-hand side variables in the models lagged from *t*-1 to *t*-4 as instruments for the equations in differences, except for the lagged leverage, whose instruments are lags from *t*-2 to *t*-5. In addition, we estimate heteroskedasticity-consistent standard errors clustered by sector and year. Finally, we use the Hansen *J* statistic of overidentifying restrictions to test for the absence of correlation between the instruments and the error term and find that the instruments used are valid in all models. Because GMM runs on first differences, we expect first-order serial correlation (AR(1)) but the absence of second-order serial correlation (AR(2)). Results show that there is no problems with second-order serial correlation in the models.

3.3. Univariate analysis

Table 3 outlines the descriptive statistics of the variables used in the study. All of the pair-wise comparisons indicate statistically significant differences between leverage and the capital structure determinants for export *vis-à-vis* non-export SMEs' subsamples. Our results show that export firms have, on average, higher leverage than non-export firms. The mean (median) export firms' leverage of 57% (60%) is significantly higher than the non-export firms' mean (median) leverage of 53% (54%). These results are contrary to what we expected and to the results obtained in the multivariate analyses, which could be driven by other differences between export and non-export firms in the sample (e.g., differences in business risk levels). At the same time, export firms sell, on average, 36% of their total sales as exportations. It is also important to note that the mean exporter firm presents a higher marginal tax rate than the

non-exporter firm (25% *versus* 23%) and the mean (median) asset tangibility for exporter firms of 24% (19%) is higher than the 21% of the non-exporter firms (14%). Our results also show that export firms are larger and have, on average, higher profitability and growth opportunities than non-export firms. Finally, the business risk level of non-export SMEs belonging to export sectors is higher than that for export SMEs, while the median non-debt tax shields of non-export firms is lower than that of export firms.

****** Insert Table 3 about here ******

4. Regression analysis

4.1. Which factors explain Portuguese SMEs' leverage?

Table 4 reports the results of estimating equation (1) using Blundell and Bond's (1998) system GMM method.[10] We find (models [1] and [2]), as expected, that export intensity has a significant negative impact on leverage, which means that export firms with higher export sales to total sales ratios have a lower debt ratio. The finding that export intensity drives the firm to a lower leverage level is consistent with the pecking-order theory: due to asymmetric information problems, exporters rely more on internal than on external financing and are, thus, less leveraged. Results also corroborate the trade-off theory argument that higher monitoring costs lead firms entering international markets through export activities to face significant problems when trying to raise debt. As a result, firms will have lower leverage. These results show the importance of governmental policies supporting the export sector, in particular for countries where the dynamism of export SMEs is crucial for economic growth, mainly during periods of financial crisis. The significant growth in the weight of exports in Portuguese GDP between 2009 and 2016 may be explained by the fact that during this period, the Portuguese Government gave financial support to export firms through guarantees provided to term loans

[10] We do not experience any collinearity problems when estimating our models since the higher pair-wise correlation coefficient is 0.3914 between non-debt tax shields and profitability.

and credit lines dedicated to export projects. As a result, export firms benefited from greater access to debt funding. This is of particularly relevance for private firms that face difficulties in borrowing funds from local banks in foreign countries.

***** Insert Table 4 about here ******

Asset tangibility is significant and negatively related with leverage, which means that firms that maintain a higher ratio of tangible assets to total assets tend to use less debt than those that do not. Our results are thus in line with those of Psillaki and Daskalakis (2009), but contrary to results obtained by Jõeveer (2013). Contrary to the findings of Rajan and Zingales (1995) and Frank and Goyal (2009), other works also find a negative coefficient for asset tangibility in samples of firms from developing countries (Booth *et al.*, 2001) and based on small firms (van der Wijst and Thurik, 1993; Hall *et al.*, 2004; Sogorb-Mira, 2005).

In line with the results of Fama and French (2002) and Frank and Goyal (2009), we find a negative relationship between profitability and leverage. As pointed out by Psillaki and Daskalakis (2009) and Jõeveer (2013), as SMEs face higher information opacity rather than large public firms, they tend to rely more on internal funds. We also find, in line with Psillaki and Daskalakis (2009) and Jõeveer (2013), that leverage and growth opportunities have a significantly positive relationship. Results are thus consistent with the pecking order theory, but not with the trade-off theory. Additionally, business risk is negatively related to leverage in model [2], supporting the trade-off theory. SMEs with higher expected costs of financial distress, those with higher business risk, have lower leverage.

Model [2] show an insignificant relationship between the effective tax rate and leverage. Similarly, firm size, the median sector leverage, and non-debt tax shields do not seem to influence Portuguese SMEs' capital structure.[11]

[11] We re-estimate model [2] considering whether SMEs are exporters or non-exporters (i.e., firms with export intensity equal to zero). Untabulated results show that signs and significance of the coefficients are the same across the subsamples.

4.2. Robustness checks

In this section, we perform a number of robustness checks that overall confirm the results in Table 4. First, we verify the robustness of our results to alternative proxies for growth opportunities and business risk - models [3] and [4] of Table 5. We use the ratio between CAPEX and total assets (Frank and Goyal, 2009) and the standard deviation of the ratio of EBIT to total book value of assets (Graham *et al.*, 2015) as alternative proxies for growth opportunities and business risk, respectively. Second, as suggested by Hovakimian and Li (2011), we drop extreme leverage observations greater than 90% and less than 10% to avoid spurious results - model [5]. Results show, again, that SMEs with higher export intensity have lower debt. For the remaining variables, we find that the sign and significance of the coefficients are in line with those presented in model [2], with the following exceptions: (*i*) in model [4], consistent with the trade-off theory, results show a significantly positive relationship between firm size and leverage - as supported by Sogorb-Mira (2005) and Psillaki and Daskalakis (2009) for SMEs; and (*ii*) in line with DeAngelo and Masulis (1980), Bradley *et al.* (1984), and Titman and Wessels (1988), we find a significant negative impact of non-debt tax shields on leverage in models [3] and [4].

***** Insert Table 5 about here ******

5. Summary and conclusions

This study examines if export intensity affects a firm's leverage and explores which firm-level determinants affect Portuguese SMEs' capital structure, using a sample of 44,268 firm-year observations. Our results are relevant from a policy perspective. As corporate financial structure is sensitive to policy decisions, the debt-equity mix should be taken into consideration when Governments implement corporate tax reforms or plans to support corporate financing via public funds. This is of special relevance since the promotion of the export sector, particularly based on innovative and value-added products, is fundamental in

economies facing a severe financial crisis. Thus, the implementation of governmental mechanisms (e.g., guarantees provided to bank loans) that support export activities reveal themselves as critical, mainly for countries where exporters face difficulties when trying to borrow funds in foreign countries.

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Table 1 - Variables, proxies, expected impact on firms' leverage, and findings

Variable	Proxy	Expected Impact	Findings
Dependent variable:			
Leverage	The ratio of total liabilities to total assets (Psillaki and Daskalakis, 2009; Jõeveer, 2013)		
Determinants: explanatory variables			
Export intensity	The ratio of export sales to total sales and takes the value zero for non-exporting firms (Chen and Yu, 2011; Bernini *et al.*, 2015)	-	-
Taxes	The ratio of effective tax paid to pre-tax earnings (DeAngelo and Masulis, 1980; Graham, 1996; Öztekin, 2015)	+	I
Tangibility	The ratio of fixed tangible assets to total assets (Psillaki and Daskalakis, 2009; Gungoraydinoglu and Öztekin, 2011; Jõeveer, 2013; Öztekin, 2015)	+/-	-
Profitability	The ratio of EBITDA to total assets (Frank and Goyal, 2009; Jõeveer, 2013; Öztekin, 2015)	-	-
Growth opportunities	The growth in firm sales Psillaki and Daskalakis (2009)	+/-	+
Firm size	Logarithm of firm total assets (Frank and Goyal, 2009; Gungoraydinoglu and Öztekin, 2011; Jõeveer, 2013; Öztekin, 2015)	+/-	I
Industry conditions	The median leverage ratio for the firm's industry (Frank and Goyal, 2009; Gungoraydinoglu and Öztekin, 2011; Öztekin, 2015)	+	I
Business risk	The standard error of EBIT to its mean over the sample period (Chen and Yu, 2011; Graham *et al.*, 2015)	-	-
Non-debt tax shields	The ratio of depreciation and amortization to total assets (Frank and Goyal, 2009; Gungoraydinoglu and Öztekin, 2011)	-	-

The following characters mean: – = negative impact on leverage | + = positive impact on leverage | I = insignificant impact on leverage |

Table 2 - Top 10 export sectors in the 2011-2016 period

Sector Code *	SIC Code **	Description	Sector weight in total exportations ***
CAE 29	3711 / 3714 / 3715	Manufacture of motor vehicles, trailers and semi-trailers	7.27%
CAE 19	2911	Manufacture of coke and refined petroleum products	4.54%
CAE 51	4512 / 4522	Air transport	4.46%
CAE 25	3490	Manufacture of fabricated metal products, except machinery and	3.45%
CAE 71	8700 / 8711 / 8734	Architectural and engineering activities; technical testing and analysis	3.20%
CAE 22	3021 / 3050 / 3060	Manufacture of rubber and plastic products	3.13%
CAE 14	2300	Manufacture of wearing apparel	3.03%
CAE 42	4011 / 1623 / 4400 / 4900	Civil engineering	2.94%
CAE 20	2800	Manufacture of chemicals and chemical products	2.59%
CAE 27	3600	Manufacture of electrical equipment	2.48%

This table presents the top 10 export sectors, sectors in which at least one firm has an export record during the 2011-2016 period. * Defined as in CAE-Rev.3, the Portuguese statistical classification of economic activities, which is in line with both United Nations (CITA-Rev.4) and European Union (NACE-Rev.2) classifications. ** SIC Codes corresponding to CAE-Rev.3 Codes. *** Computed as the ratio of the sector's exports to the total volume of SMEs' exports during the sample period.

Table 3 - Descriptive statistics

Variable	All firms						Export firms						Non-export firms						Wilcoxon z-test | t-test
	Number	Mean	Median	Std. Dev.	Min.	Max.	Number	Mean	Median	Std. Dev.	Min.	Max.	Number	Mean	Median	Std. Dev.	Min.	Max.	
Leverage	44,268	0.55	0.58	0.23	0.00	1.00	22,215	0.57	0.60	0.22	0.00	1.00	22,053	0.53	0.54	0.25	0.00	1.00	*** | ***
Export intensity	44,268	0.18	0.00	0.31	0.00	1.00	22,215	0.36	0.24	0.35	0.00	1.00	-	-	-	-	-	-	-
Taxes	44,268	0.24	0.23	0.41	-1.83	3.54	22,215	0.25	0.24	0.41	-1.25	3.49	22,053	0.23	0.22	0.42	-1.83	3.54	*** | ***
Tangibility	44,268	0.22	0.17	0.20	0.00	1.00	22,215	0.24	0.19	0.19	0.00	1.00	22,053	0.21	0.14	0.21	0.00	1.00	*** | ***
Profitability	44,268	0.10	0.08	0.11	-0.79	0.54	22,215	0.10	0.08	0.10	-0.79	0.54	22,053	0.09	0.08	0.11	-0.78	0.54	*** | ***
Growth opportunities	44,268	0.01	0.03	0.28	-1.00	1.00	22,215	0.02	0.04	0.25	-1.00	1.00	22,053	0.00	0.02	0.30	-1.00	1.00	*** | ***
Firm size	44,268	2.74	2.65	0.70	0.83	3.76	22,215	3.04	3.00	0.70	0.90	3.76	22,053	2.45	2.38	0.57	0.83	3.75	*** | ***
Industry conditions	44,268	0.78	0.80	0.23	0.14	1.15	22,215	0.77	0.79	0.23	0.14	1.15	22,053	0.80	0.80	0.22	0.14	1.15	*** | ***
Business risk	44,268	2.11	0.76	5.24	0.06	70.17	22,215	1.80	0.69	4.68	0.06	69.13	22,053	2.43	0.87	5.73	0.06	70.17	*** | ***
Non-debt tax shields	44,268	0.04	0.03	0.04	0.00	0.74	22,215	0.05	0.04	0.03	0.00	0.74	22,053	0.03	0.03	0.04	0.00	0.52	*** | ***

This table presents the descriptive statistics for a sample of 7,676 export and non-export Portuguese SMEs. Data was extracted from the SABI database, provided by Bureau van Dijk, and the sample was developed according to the sector code, therefore there is no possibility of a firm being allocated to more than one sector. We have trimmed these variables as follows: (*i*) as in Kayhan and Titman (2007), we only consider values between 0 and 1 for leverage; (*ii*) a similar constraint was implemented for export intensity, tangibility and non-debt tax shields; (*iii*) we only considered values between -1 and 1 for growth opportunities; and (*iv*) in line with Frank and Goyal (2003, 2009), we have trimmed taxes, profitability, industry conditions, and business risk at the top and bottom 0.5% percentiles. We use both a parametric (t-test) and a non-parametric test (Wilcoxon rank-sum test) to compare whether the distribution of the reported values for export and non-export firms are significantly different. *** indicates that the population mean ranks differ significantly between export and non-export SMEs at the 1% significance level. For a definition of the variables, see Table 1.

Table 4 - Determinants of Portuguese SMEs' leverage

Dependent variable: Leverage	[1]	[2]
Explanatory variables:		
Leverage (L1)	0.863 *** (0,000)	0.297 *** (0,000)
Export intensity	-0.043 * (0,072)	-0.048 *** (0,004)
Taxes		0.002 (0,507)
Tangibility		-0.683 *** (0,000)
Profitability		-0.234 *** (0,000)
Growth opportunities		0.054 *** (0,000)
Firm size		0.098 (0,492)
Industry conditions		0.005 (0,454)
Business risk		-0,074 *** (0,000)
Non-debt tax shields		-0.057 (0,794)
Intercept	0.071 *** (0,001)	0.119 (0,764)
Year fixed effects	No	Yes
Number of observations	35,561	35,561
Firm observations	7,661	7,661
AR(1)/AR(2)	0.000/0.022	0.000/0.854
Hansen	0.578	0.911

Estimates are obtained using Blundell and Bond's (1998) two-step system GMM. ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively. Coefficients were estimated based on heteroskedasticity-consistent standard errors, clustered by sector and year. p-values are listed in parentheses. AR(1) and AR(2) denote the p-values for the first- and second-order autocorrelation in the residuals. Hansen reports the p-value under the null hypothesis of joint validity of the instrument set. For a definition of the variables, see Table 1.

Table 5 – Robustness checks

Dependent variable: Leverage	[3]	[4]	[5]
Explanatory variables:			
Leverage (L1)	0.355 *** (0,000)	0.537 *** (0,000)	0.235 *** (0,000)
Export intensity	-0.025 ** (0,049)	-0.040 ** (0,042)	-0.062 *** (0,002)
Taxes	0.003 (0,227)	-0.001 (0,901)	0.004 (0,201)
Tangibility	-1.133 *** (0,000)	-0.761 *** (0,000)	-0.713 *** (0,000)
Profitability	-0.173 *** (0,000)	-0.301 *** (0,002)	-0.149 * (0,065)
Growth opportunities		0.064 *** (0,000)	0.049 *** (0,000)
Growth opportunities_alternative	0,214 *** (0,000)		
Firm size	0.218 (0,147)	0,705 ** (0,029)	0,005 (0,980)
Industry conditions	0.002 (0,677)	0.003 (0,725)	0.014 (0,156)
Business risk	-0,069 *** (0,000)		-0,093 *** (0,001)
Business risk_alternative		2.559 (0,443)	
Non-debt tax shields	-0.668 *** (0,000)	-0.616 ** (0,050)	-0.294 (0,159)
Intercept	-0.165 (0,677)	-1.655 (0,121)	0.355 (0,528)
Year fixed effects	Yes	Yes	Yes
Number of observations	35,561	35,561	30,579
Firm observations	7,661	7,661	7,187
AR(1)/AR(2)	0.000/0.230	0.000/0.421	0.000/0.798
Hansen	0.966	0.959	0.983

Estimates are obtained using Blundell and Bond's (1998) two-step system GMM. ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively. Coefficients were estimated based on heteroskedasticity-consistent standard errors, clustered by sector and year. p-values are listed in parentheses. AR(1) and AR(2) denote the p-values for the first- and second-order autocorrelation in the residuals. Hansen reports the p-value under the null hypothesis of joint validity of the instrument set. For a definition of the variables, see Table 1.