TRADE-OFF THEORY VERSUS PECKING ORDER THEORY: CAPITAL STRUCTURE DECISIONS IN A PERIPHERAL REGION OF PORTUGAL

Zélia Serrasqueiro[1], Ana Caetano[2]

[1] *Department of Management and Economics, Faculty of Social and Human Sciences, University of Beira Interior, Covilhã, 6200-209, Portugal*

CEFAGE Research Center – University of Évora, Évora 7000-809, Portugal

[2] *Department of Management and Economics, Faculty of Social and Human Sciences, University of Beira Interior, Covilhã, 6200-209, Portugal*

E-mails: [1]zelia@ubi.pt (corresponding author); anacaetano19@gmail.com

Abstract. Based on a sample of Small and Medium-Sized Enterprises (SMEs) located in the interior region of Portugal for the period 1998–2005, using the LSDVC dynamic estimator as method of estimation, this study tests whether the capital structure decisions of SMEs are closer to the assumptions of Trade-Off Theory or to those of Pecking Order Theory. The empirical evidence obtained allows us to conclude that Trade-Off and Pecking Order Theories are not mutually exclusive in explaining the capital structure decisions of SMEs. The most profitable and oldest SMEs resort less to debt, which corroborates the forecasts of Pecking Order Theory. SMEs, with greater size, resort more to debt, corroborating the forecasts of Trade-Off Theory and Pecking Order Theory. In addition, SMEs adjust noticeably their current level of debt towards the optimal debt ratio, which corroborates what is forecast by Trade-Off Theory. The results suggest that younger and smaller SMEs of Beira Interior Region should be object of public financing support, when the internal financing is clearly insufficient to fund those firms 'activities.

Introduction

Trade-Off and Pecking Order Theories have often been placed in opposition, seeking to identify which of them offers the best explanation regarding capital structure decisions. The difficulty in accessing to debt, as a consequence of asymmetric information problems is considerably relevant in SMEs. According to Scherr and Hulburt (2001), trying to understand the dynamism of capital structure in SMEs, is fundamental, given that these companies must carry out frequent adjustments toward the target debt level, as a consequence of the need to renegotiate the level and terms of debt. Therefore, the objectives of this study are to: i) analyse if Trade-Off and Pecking Order Theories, seeking to which of them offers the best explanation regarding SME capital structure decisions; and ii) analyse if SMEs carry out adjustments toward their target level of debt.

With this study, we seek to contribute to extending the study of SME capital structure, considering SMEs in the interior region of Portugal. Regional disparities in terms of economic growth and economic development are a real problem in economy. In this context, Álvarez-Herranz *et al.* (2011), Bistrova *et al.* (2011) and Valackienė and Virbickaitė (2011), conclude that the firms' activity may be a particular importance to economic growth and economic development o regions.

It is important to analyse the financing decisions of SMEs located in an interior and a less developed region of Portugal, looking for results that may be extended to the context of countries or regions with particular rates of development. To reach the main objectives of this study, we consider a sample of 53

SMEs for the period between 1998 and 2005. As method of estimation, we use panel data models, namely the LSDVC (2005) dynamic estimator. In general, the results suggest that Pecking Order and Trade-Off Theories are not mutually exclusive in explaining the capital structure decisions of SMEs

After this introduction, this study is structured as follows: Section one gives a review of the literature on Trade-Off and Pecking Order Theories; Section two presents the methodology; Section three presents and discusses the results obtained; and finally, the last Section presents the conclusions, limitations and suggestions for future research.

1. SME Capital Structure Decisions and Research Hypotheses

1.1. Trade-off theory – research hypotheses

Trade-Off Theory claims that firms have an incentive to turn to debt as the generation of annual profits allows benefiting from the debt tax shields. According to several studies (DeAngelo, Masulis 1980; Fama, French 2002; López-Gracia, Sogorb-Mira 2008), a positive relationship is expected between the effective tax rate and debt. On the basis of this argument, the first hypothesis is formulated in the context of Trade-Off Theory:
Hypothesis 1: There is a positive relationship between the effective tax rate and debt in SMEs.

According to DeAngelo and Masulis (1980), non-debt tax shields, such as deductions allowed by depreciations and investment tax credit could substitute the role of tax savings permitted by debt. This implies that a firm with a high level of non-debt tax shields will probably have a lower level of debt than a firm with low non-debt tax shields. The Trade-Off Theory forecasts a negative relationship between non-debt tax shields and debt, therefore it is formulated the following research hypothesis:
Hypothesis 2: There is a negative relationship between other non-debt tax shields and debt in SMEs.

The most profitable firms have capacity for a higher level of debt, taking advantage of debt tax shields (Fama, French 2002). Highly profitable firms are likely more able to fulfil their responsibilities regarding the repayment of debt and interests, which contributes to a less likelihood of bankruptcy. The anterior arguments justify the possibility of a positive relationship between profitability and debt, and so the following hypothesis is formulated:
Hypothesis 3: There is a positive relationship between profitability and debt in SMEs.

Myers (1984) states that as bankruptcy and agency costs are greater for firms with high expectations of growth opportunities, firms can be reluctant to use high amounts of debt so as not to increase their likelihood of bankruptcy. As a result, firms with high growth opportunities may not use debt as the first financing option. According to the Trade-Off Theory, firms with greater growth opportunities have a lower level of debt, given that greater investment opportunities increase the possibility of agency problems between managers/owners and creditors, because the former have a great incentive to under-invest (Myers 1977). Based on these arguments, the following research hypothesis is formulated:
Hypothesis 4: There is a negative relationship between growth opportunities and debt in SMEs.

Tangible assets can be used as collaterals in the case of firm bankruptcy, protecting the creditors' interests. Michaelas *et al.* (1999) claim that firms, with valuable tangible assets, which can be used as collaterals, have easier access to external finance, and they have probably higher levels of debt than firms with low levels of tangible assets. Therefore, in the Trade-Off approach, a positive relationship is forecast between asset tangibility and firms' level of debt, and so the following hypothesis is formulated:
Hypothesis 5: There is a positive relationship between tangibility of assets and debt in SMEs.

Larger firms tend to have greater diversification of activities that implies less likelihood of bankruptcy (Titman, Wessels 1988). In addition, large firms with less volatile profits are more likely to take advantage of the debt tax shields, so increasing the potential benefits of debt (Smith, Stulz 1985).

Therefore, according to the Trade-Off approach, large firms tend to increase their level of debt as a consequence of the lesser likelihood of bankruptcy, and also as a way to increase the debt tax shields. Therefore a positive relationship is expected between size and debt, as defined in the following hypothesis:
Hypothesis 6: There is a positive relationship between size and debt in SMEs.

We can argue that age can be an important determinant of capital structure decisions, given that the firms in the later stages of their life-cycle have more advantageous terms in obtaining debt than young

firms. According to Ramalho and Silva (2009), the older is the firm (and the greater is its reputation), the lower is the cost of debt, as long as creditors believe that the firm will not undertake projects that imply the substitution of assets. Therefore, a positive relationship is expected between age and debt, as formulated in the following research hypothesis:

Hypothesis 7: There is a positive relationship between age and debt in SMEs.

SMEs are subject to higher business risk, and greater probability of bankruptcy. Consequently, SMEs tend to reduce their level of debt. Therefore, according to Trade-Off Theory a negative relationship is expected between firms' level of risk and debt, as formulated in the following research hypothesis:

Hypothesis 8: There is a negative relationship between risk and debt in SMEs.

According to Trade-Off Theory, there is an optimal debt ratio, which is the ratio where tax benefits are equal to the bankruptcy and agency costs associated with debt. Whenever firms deviate from their debt ratio, the existence of adjustment costs prevents firms from making a total adjustment to that ratio, and so Trade-Off Theory forecasts that firms make a partial adjustment of debt towards the optimal debt ratio (López-Gracia, Sogorb-Mira 2008). Adopting the perspective of Trade-Off Theory, the following research hypothesis is formulated:

Hypothesis 9: SMEs adjust their level of debt towards the optimal debt ratio.

1.2. Pecking order theory – research hypotheses

According to the Pecking Order Theory, firms may be financially constrained due to the information asymmetry between managers/owners and investors, and so firms adopt a hierarchy in selecting sources of finance. In the first place, firms use retained profits; if it is necessary to turn to external finance, firms use debt with little or no risk, which usually corresponds to short-term debt; and in the last place, firms will select external equity. The more profitable is the firm, the greater is its capacity to accumulate retained profits, and so there is less need to turn to external finance. A negative relationship is therefore expected between profitability and debt, in accordance with the Pecking Order approach, as identified in various studies (Sogorb-Mira 2005; Ramalho, Silva 2009; González, González 2012). On the basis of the anterior exposition, it is formulated the following hypothesis:

Hypothesis 10: There is a negative relationship between profitability and debt in SMEs.

In accordance with the Pecking Order Theory, firms with high growth opportunities must undertake major investment projects, which generate greater needs for finance. When internal finance is exhausted, firms prefer debt rather than external equity for funding growth opportunities, which are associated with a greater risk than do investment in assets in place (Shyam-Sunder, Myers 1999; Ramalho, Silva 2009). These authors state that firms with good growth opportunities increase debt when internal funds are insufficient. Therefore, Pecking Order Theory forecasts a positive relationship between growth opportunities and debt, and so we formulate the following research hypothesis:

Hypothesis 11: There is a positive relationship between growth opportunities and debt in SMEs.

Considering that a higher level of tangible assets increases the possibility of offering collaterals, lessening problems of information asymmetry between SME managers/owners and creditors (Michaelas *et al.* 1999; Sogorb-Mira 2005), a positive relationship is expected between asset tangibility and debt. According to the Pecking Order approach, we formulate the following research hypothesis:

Hypothesis 12: There is a positive relationship between asset tangibility and level of debt in SMEs.

Pecking Order Theory predicts that greater size allows a firm to accumulate retained earnings, and so less debt is necessary. Therefore, Pecking Order Theory predicts a negative relationship between size and debt (López-Gracia, Sogorb-Mira 2008). According to Myers (1984), greater firm size lessens the problems of information asymmetry between managers/owners and creditors, allowing firms to obtain debt on more favourable terms. A positive relationship between size and debt may be expected in the Pecking Order approach (Psillaki, Daskalakis 2009). According to Pecking Order Theory, the relationship between size and debt can be positive or negative, and so the following research hypothesis is formulated.

Hypothesis 13: There is a positive/negative relationship between size and debt in SMEs.

According to La Rocca *et al.* (2011), the Pecking Order Theory is a useful tool for the analysis of the financing behaviour of firms along the life cycle. According to Pecking Order Theory, older firms have a

greater capacity to retain and accumulate earnings, and so the need to resort to external financing to solve their financing requirements will be less than in the case of younger SMEs. The likelihood of old SMEs to retain profits over time is considerable, so the older SMEs diminish the recourse to debt. Considering the above, the following hypothesis is formulated:

Hypothesis 14: There is a negative relationship between age and debt in SMEs.

2. Methodology
2.1. Database

The firms of the sample of this study are non-financial SMEs belonging to the interior region of Portugal, more precisely to the Beira Interior region. Data was gathered from the System Analysis of Iberian Balance Sheets database (SABI), supplied by *Bureau van Dijk*, for the period 1998 to 2005. The SABI contains the balance sheets and income statements of Portuguese firms. We select the firms on the basis of the European Union recommendation L124/36 (2003/361/CE). According to this recommendation, a business unit is considered an SME when it meets two of the following criteria: i) fewer than 250 employees; ii) assets under 43 million Euros; iii) business turnover under 50 million Euros. The final sample is composed by 53 SMEs with data collected for the period 1998 to 2005, obtaining a total of 371 observations.

2.2. Variables

The choice of variables and respective proxies was based on previous studies, such as Titman and Wessels (1988); Michaelas *et al.* (1999); De Miguel and Pindado (2001); Sogorb-Mira (2005); Ramalho and Silva (2009); González and González (2012), and Serrasqueiro and Maçãs Nunes (2012).

The following table presents the variables to be used in this study, together with their corresponding measures.

(Insert Table 1 About Here)

2.3. Estimation method

Blundell and Bond (1998) conclude that use of the GMM system estimator is clearly appropriate, when the dependent variable is persistent, i.e., when there is a strong correlation between debt in the present and previous periods, avoiding bias in the estimated results. Firm´s debt is associated with high persistency, with a high correlation between debt in the present and previous periods. This being so, use of the GMM system estimator is the most appropriate way to estimate the determinants of firm debt, rather than using the GMM and Anderson and Hsiao estimators. However, use of the GMM system estimator by Blundell and Bond (1998) implies a considerable number of instrumental variables, and may lead to result bias when databases are not very large, as is the case here. Therefore, use of the LSDVC estimator by Bruno (2005) is considered to be suitable for the database used in this study, since it is an appropriate estimator, for correcting results obtained with other dynamic estimators, when databases are not very large. In this study, we choose to present the results obtained with the LSDVC (2005) estimator, for correction of the results obtained with the GMM, GMM system and Anderson and Hsiao estimators.

Since our objective is to estimate the adjustment of actual SME debt towards the optimal debt level, as well as the relationships between determinants and debt forecast by Trade-Off and Pecking Order Theories, we turn to the partial adjustment model, just as López-Gracia and Sánchez-Andújar (2007) and López-Gracia and Sogorb-Mira (2008). The partial adjustment model is given by:

$$Lev_{i,t} - Lev_{i,t-1} = \alpha(Lev_{i,t}* - Lev_{i,t-1}), \tag{1}$$

in which: $Lev_{i,t}$ is the debt of firm i in the period t; $Lev_{i,t-1}$ is the debt of firm i in the period t–1; $Lev_{i,t}*$ is the debt ratio of firm i in period t and α is the speed of adjustment of actual level of debt towards the optimal debt ratio.

In the current study, as the majority of studies about capital structure decisions (e. g. López-Gracia, Sánchez-Andújar 2007; López-Gracia, Sogorb-Mira 2008), we consider that the optimal level of debt depends on the firms' specific characteristics, and on the macroeconomic conditions (i.e. measured by annual dummy variables) as well as on the firms´ unobservable specific characteristics (i.e. measured by u_i). Consequently, we avoid the situation of debt not being constant for different firms and/or for different periods, but assuring that debt varies for each firm and for each period, which is more admissible, in a theoretical perspective. Furthermore, it is worthwhile highlighting to refer that Shyam-Sunder and Myers (1999) obtained results that, regarding the adjustment of actual level of debt towards the optimal level of debt, and the relationships between determinants and debt, do not suffer considerable alterations as a

function of the way of determination of the level of debt. On the basis of the anterior exposition, firms' optimal debt ratio is given by:

$$Lev_{i,t}* = \sum_{K=1}^{8} \varphi_K Z_{k,i,t} + d_t + u_i + v_{i,t} , \tag{2}$$

in which $Z_{K,i,t}$ is the determinant k ($ERT_{i,t}$; $NDTS_{i,t}$; $PROF_{i,t}$; $GO_{i,t}$; $TANG_{i,t}$; $SIZE_{i,t}$; $AGE_{i,t}$; $EVOL_{i,t}$) of the book value of the debt of firm i at time t, φ_K are the coefficients of each debt determinant, d_t are the temporal dummy variables, u_i are individual non-observable effects, and $v_{i,t}$ is the error term.

Substituting (2) in (1) and regrouping the terms, we have:

$$Lev_{i,t} = \lambda_0 Lev_{i,t-1} + \sum_{K=1}^{8} \beta_K Z_{k,i,t} + \theta_t + \eta_i + \varepsilon_{i,t} , \tag{3}$$

in which: $\lambda_0 = (1-\alpha)$, $\beta_K = \alpha\varphi_K$, $\theta_t = \alpha d_t$, $\eta_i = \alpha u_i$, and $\varepsilon_{i,t} = \alpha v_{i,t}$.

The lower the value of λ_0, the greater α will be, i.e., the greater the adjustment of actual SME debt towards the optimal debt ratio. The higher the value of λ_0, the lower α will be, i.e., the lower the adjustment of actual SME debt towards the optimal debt ratio.

3. Results and Discussions
3.1. Results

The descriptive statistics of the sample considered in this study are presented in Table 2.

(Insert Table 2 About Here)

Analysis of the descriptive statistics (Table 2) suggests that the average debt of SMEs is 0.62148. It is also of note that the debt of SMEs, considered in the sample, presents a minimum value of 0.02378 and reaches a maximum value of 0.97002. These figures suggest that a considerable number of SMEs have debt as their main source of finance. We can also mention that on average firm size is approximately 525 060 Euros, and that the average age of SMEs is approximately 17 years. The profitability of SMEs is low, with an average value of 0.04055. We also conclude that the volatility of some variables is high, because for most of them the standard deviation is greater than the respective mean. More precisely, the variables effective tax rate, growth opportunities, profitability, and risk are found to present great volatility.

The table A1 in Appendix presents the correlation matrix of the variables used in this study. All correlations coefficients between independent variables are not above 50%, and so the problem of collinearity between independent variables will not be particularly relevant in this study (Gujarati, Porter, 2010)

The following table presents the results obtained from application of the LSDVC dynamic estimator by Bruno (2005), to correct the results estimated with the GMM, GMM system, and Anderson and Hsiao dynamic estimators.

(Insert Table 3 About Here)

3.2. Discussions of the results

The empirical results obtained with the LSDVC estimator by Bruno (2005) allow not reject/reject the previously formulated research hypotheses to determine if Trade-Off and Pecking Order Theories are followed by SME in their capital structure decisions.

We identify statistically insignificant relationships between the factors determinants effective tax rate, non-debt tax shields, and debt in SMEs, and so the Hypothesis 1 and Hypothesis 2, respectively, are rejected. These results indicate that the managers/owners of SMEs do not reduce the firm's level of debt due to the possibility of obtaining non-debt tax shields. Therefore, the financing behaviour of SMEs does not agree with the forecasts of Trade-Off Theory. Michaelas *et al.* (1999) identify a negative relationship between effective tax rate and debt for SMEs in the United Kingdom. However, Sogorb-Mira (2005) for Spanish SMEs and Michaelas *et al.* (1999) for British SMEs find a negative relationship between non-debt tax shields and debt, which is according to the forecasts of Trade-Off Theory.

The negative and statistically significant relationship between profitability and debt in SMEs implies the rejection of Hypothesis 3, formulated with regard to Trade-Off Theory. However, we cannot reject the Hypothesis 10, which predicts a negative relationship between those two variables. This result indicates that SMEs prefer use internal finance rather than debt, which agrees with the assumptions of Pecking

Order Theory. Various studies identify a similar relationship: Michaelas *et al.* (1999) for SMEs in the United Kingdom; Sogorb-Mira (2005) for Spanish SMEs; Psillaki and Daskalakis (2009) for Greek, French, and Italian SMEs; Bhaird and Lucey (2010) for Irish SMEs; and La Rocca *et al.* (2011) for Italian SMEs.

The results obtained indicate a statistically insignificant relationship between growth opportunities and debt in SMEs. Therefore, we reject the Hypothesis 4 formulated in the context of Trade-Off Theory. Additionally, we reject the Hypothesis 11 formulated in the context of Pecking Order Theory. Lopéz-Gracia and Sogorb-Mira (2008) obtain a negative relationship between growth opportunities and debt, which agrees with the forecasts of Trade-Off Theory. However, La Rocca *et al.* (2011) identify a positive relationship between growth opportunities and debt for Italian SMEs, corroborating the forecasts of Pecking Order Theory.

The empirical results obtained indicate a statistically insignificant relationship between tangibility and debt, and so we reject the Hypotheses 5 and 12, formulated in the context of Trade-Off and Pecking Order Theories, respectively. The absence of a positive and statistically significant relationship between asset tangibility and debt suggests that tangible assets lose importance for SMEs to obtain debt. Probably, SMEs turn above all to short-term debt, and so collaterals associated with tangible assets are not required by creditors. Sogorb-Mira (2005) finds a negative relationship between asset tangibility and short-term debt.

We identify a positive and statistically significant relationship between the variable of size and debt, and so we cannot reject the Hypothesis 6, corroborating the forecasts of Trade-Off Theory. Greater size allows greater diversification of activities in SMEs, which, consequently, allows a reduction of the likelihood of bankruptcy, and so these firms increase their level of debt. Increased size, also, implies a greater possibility of obtaining profits, and therefore greater capacity to obtain debt for taking advantage of the debt tax shields. This fact could be relevant in explaining the positive relationship between size and debt in SMEs. These results agree with the assumptions of Trade-Off Theory. In the context of Pecking Order Theory, the previously formulated Hypothesis 13, about a positive and statistically significant relationship between size and debt in SMEs is not rejected. Increased size also means fewer problems of information asymmetry between owners/managers and creditors, allowing access to debt on more favourable terms. A positive relationship between size and debt was also identified by Michaelas *et al.* (1999) for British SMEs, Sogorb-Mira (2005) for Spanish SMEs, Psillaki and Daskalakis (2009) for Greek, French, and Portuguese SMEs, Bhaird and Lucey (2010) for Irish SMEs, and by La Rocca *et al.* (2011) for Italian SMEs.

The negative and statistically significant relationship between age and debt in SMEs implies to reject the Hypothesis 7, in the context of Trade-Off Theory. However, that relationship allows us not to reject the Hypothesis 14 in the context of Pecking Order Theory. Retention of profits tends to increase with greater firm´s age, and so the need to resort to debt is less. Additionally, a negative relationship between age and debt was identified by Michaelas *et al.* (1999) for British SMEs, Bhaird and Lucey (2010) for Irish SMEs, and La Rocca *et al.* (2011) for Italian SMEs. The positive and statistically insignificant relationship between risk and debt in SMEs allows us to reject the Hypothesis 8. This result implies that we cannot claim that SMEs follow the assumptions predicted by Trade-Off Theory. Michaelas *et al.* (1999) also found evidence of a positive and statistically significant relationship between risk and debt in British SMEs. However, a negative and statistically significant relationship between those two variables was found by Sogorb-Mira (2005) for Spanish SMEs, Psillaki and Daskalakis (2009) for Greek SMEs, and Portuguese SMEs.

Regarding the speed of adjustment of actual debt towards the optimal debt ratio, irrespective of using the LSDVC dynamic estimator to correct the results of the GMM, GMM system, and Anderson and Hsiao dynamic estimators, SMEs are found to make a considerable adjustment towards the optimal debt ratio. Table 4 presents the values of the estimated adjustments.

(Insert Table 4 About Here)

The results suggest that firms adjust their actual debt level towards the optimal debt ratio, which agrees with the assumptions of Trade-Off Theory. Therefore, we cannot reject the Hypothesis 9.

The maximum adjustment value obtained is $\alpha = 0.60462$, from application of the LSDCV (2005) (AH) dynamic estimator, and the minimum value obtained is $\alpha = 0.4139$, from application of the LSDVC (2005) (BB) dynamic estimator. Although considering quoted large firms, Kremp *et al.* (1999) obtain values of 0.53 and 0.28 for Germany, Shyam-Sunder and Myers (1999) 0.59 for the United States and De Miguel and Pindado (2001) 0.79 for Spain. The figures obtained in this study are similar to those obtained in the above mentioned studies, suggesting that the adjustment costs are lower than the costs

associated with an unbalanced capital structure for SMEs. Therefore, Portuguese SMEs appear to have a relatively fast speed of adjustment of their actual level of debt towards the optimal debt ratio.

Summarizing, the negative and statistically significant relationships obtained in the current study between the independent variables of profitability and age, and the dependent variable of debt, are consistent with the assumptions of Pecking Order Theory. However, the positive and statistically significant relationship between size and debt allows us to validate the assumptions made by both Trade-Off and Pecking Order Theories. We, also, conclude that SMEs make a rapid adjustment of their actual debt towards the optimal debt ratio. This result reinforces the conclusion, already referred to, that Trade-Off and Pecking Order Theories are not mutually exclusive.

Conclusions, limitations and suggestions for future research

Based on a sample of Small and Medium-Sized Enterprises (SMEs) located in the interior region of Portugal for the period 1998–2005, using the LSDVC dynamic estimator as method of estimation, this study tests whether the capital structure decisions of SMEs are closer to the assumptions of Trade-Off Theory or to those of Pecking Order Theory. On the one hand, SMEs make considerable adjustment of their actual debt towards the optimal level of debt, and size contributes to increased recourse to debt. These results corroborate the assumptions of Trade-Off Theory. More profitable, older SMEs turn less to debt, but they increase the level of debt as a function of their size. These results corroborate the forecasts of Pecking Order Theory. In general, the results suggest that Pecking Order and Trade-Off Theories are not mutually exclusive in explaining the capital structure decisions of SMEs.

Considering that Beira Interior is a relatively disadvantaged interior region of Portugal in the context of the national economy, where SMEs are especially important for increased employment and economic growth, we suggest that policy-makers should give effective support through favourable terms to these SMEs in obtaining debt. In that way, when internal finance is insufficient, young and small SMEs could turn to external finance on advantageous terms, allowing these firms to finance efficiently their activities.

A limitation of this study is the fact of analyzing only relationships between determinants and total debt. SMEs are very dependent on short-term debt, which may imply differences between the level of adjustment of short-term ratio and long term ratio towards the respective optimal debt ratios.

Therefore, we suggest for future research to separate total debt into short and long-term debt, to analyse the differences between the level of adjustment of short-term debt and the level of adjustment of long-term debt towards the respective optimal levels.

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Zélia SERRASQUEIRO, PhD in Management, Associate Professor at the Department of Management and Economics to Beira Interior University and Researcher in CEFAGE-UE (Center for Advanced Studies in Management and Economics). The research interests are Corporate Finance and Entrepreneurial Finance. Zélia Serrasqueiro is the author of articles in various journals: Journal of Business Economics and Management, Entrepreneurship Theory & Practice, Research Policy, Journal of

Evolutionary Economics, Small Business Economics, Industrial and Corporate Change, Journal of Business Research, Journal of Service Management, The Services Industries Journal, Management Research Review, Social Responsibility Journal, Review of Accounting and Finance, and other journals.

Ana CAETANO, Master in Management in Beira Interior University. The research interests are Corporate Finance and Entrepreneurial Finance.

Appendix

Table A1. Correlation matrix

	$LEV_{i,t}$	$ETR_{i,t}$	$NDTS_{i,t}$	$GO_{i,t}$	$TANG_{i,t}$	$PROF_{i,t}$	$SIZE_{i,t}$	$AGE_{i,t}$	$EVOL_{i,t}$
$LEV_{i,t}$	1								
$ETR_{i,t}$	0.1402***	1							
$NDTS_{i,t}$	–0.0283	–0.1045**	1						
$GO_{i,t}$	0.0248	–0.0313	–0.0232	1					
$TANG_{i,t}$	–0.0978*	– 0.0554	0.4700***	0.2913***	1				
$PROF_{i,t}$	–0.0812	0.1563***	0.0757	–0.2810***	–0.3024***	1			
$SIZE_{i,t}$	0.0401	0.0824	–0.2909***	–0.2241***	–0.0627	0.1006*	1		
$AGE_{i,t}$	–0.2966***	–0.1511***	0.1080**	–0.0739	0.1133**	–0.1049**	–0.0055	1	
$EVOL_{i,t}$	–0.0305	–0.0364	0.0474	–0.0331	0.0016	–0.0145	0.0101	-0.0724	1

Notes: 1. *** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

Table 1. Variables and measurement

Variables	Measurement
Dependent Variable	
Debt ($LEV_{i,t}$)	Ratio between Total Liabilities and Total Assets

Independent Variables	
Effective Tax Rate (ETR)	Ratio of Income Tax Paid and Profits Before Taxes and After Interest
Non-Debt Tax Shields (NDTS)	Ratio between Depreciations and Total Assets
Growth Opportunities (GO)	Ratio between Intangible Assets and Total Assets
Assets Tangibility (TANG)	Ratio between Fixed Assets and Total Assets

Profitability (PROF)	Ratio of operational results before interest and tax to total assets
Size (SIZE)	Logarithm to sales
Age (AGE)	Logarithm of the number of years of firm in existence
Risk (EVOL)	Absolute value of percentage change of earnings before interest, taxes and depreciations

Table 2. Descriptive statistics

Variables	Observations	Mean	Stand. Desv.	Min.	Max.
$LEV_{i,t}$	371	0.62148	0.20332	0.02378	0.97002
$ETR_{i,t}$	371	0.21108	0.71845	–5.6569	5.75000
$NDTS_{i,t}$	371	0.04806	0.04107	0.00049	0.23570
$GO_{i,t}$	371	0.01098	0.02700	0	0.22285
$TANG_{i,t}$	371	0.27885	0.19385	0	0.84876
$PROF_{i,t}$	371	0.04055	0.06712	–0.17639	0.37056
$SIZE_{i,t}$	371	6.26352	0.56041	4.07759	7.36607
$AGE_{i,t}$	371	2.82730	0.69467	0	4.15888
$EVOL_{i,t}$	371	1.40795	3.92401	0	43.3200

Table 3. Debt determinants – LSDVC (2005) dynamic estimator

Dependent Variable: $LEV_{i,t}$

Independent Variables	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)	LSDVC (2005) Initial (AH)
$LEV_{i,t-1}$	0.39652***	0.45861***	0.39538***
	(0.05092)	(0.05131)	(0.06157)
$ETR_{i,t}$	–0.00239	–0.00169	–0.00233
	(0.00578)	(0.00643)	(0.00177)
$NDTS_{i,t}$	–0.48454	–0.44431	–0.48746
	(0.30216)	(0.32471)	(0.29965)
$GO_{i,t}$	–0.11367	–0.08204	–0.11379
	(0.36134)	(0.39038)	(0.36180)
$TANG_{i,t}$	–0.00837	–0.00613	–0.00621
	(0.08953)	(0.09818)	(0.09001)
$PROF_{i,t}$	–0.36028***	–0.39145***	–0.36053***
	(0.10643)	(0.11499)	(0.10532)
$SIZE_{i,t}$	0.05833**	0.06084**	0.05838**

	(0.02410)	(0.02572)	(0.02386)
AGE$_{i,t}$	–0.08420***	–0.07964**	–0.08399***
	(0.03218)	(0.03529)	(0.03199)
EVOL$_{i,t}$	0.00137	0.00146	0.00137
	(0.00090)	(0.00099)	(0.00090)
Firms	53	53	53
Observations	318	318	318

Notes: 1. Standardt Desviations in parenthesis. 2. *** Significant at 1% level; ** Significant at 5% level. 3. Initial (AB) – Correction of GMM dynamic estimator results; Initial (BB) – Correction of GMM System dynamic estimator results; Initial (AH) – Correction of Anderson-Hsiao dynamic estimator results. 4. The estimates include time *dummy* variables but not show.

Table 4. Debt adjustment speed

	LSDVC (2005) I (AB)	LSDVC (2005) I (BB)	LSDVC (2005) I (AH)
Adjustment Speed	0.60348	0.54139	0.60462

Notes: Initial (AB) – Correction of GMM dynamic estimator results; Initial (BB) – Correction of GMM System dynamic estimator results; Initial (AH) – Correction of Anderson-Hsiao dynamic estimator results.