



Responsible Editor: Rafael Barreiros Porto
Associate Editor: Ilirio José Rech
Evaluation Process: Double Blind Review pelo SEER/OJS

Determinants of Capital Structure of Companies that Make up the Small Caps Index of B3

ABSTRACT

Objective: The purpose of this study was to analyze the determinants of short-term debt (STD) and long-term debt (LTD) of the companies that make up the B3 SMLL Index in order to identify which theory, trade-off or pecking order better describes the behavior of these companies.

Method: Panel data models were used, having as explanatory variables the profitability, risk, size, current liquidity, growth and tangibility of the assets.

Relevance: The study stands out by analyzing the adequacy of capital structure theories to the context of smaller capitalization companies listed on the stock exchange of an emerging country.

Results: The results showed that the profitability and the current liquidity presented a negative relation with the STD, while the variables size, growth and tangibility presented a positive relation with this variable. In the long run, the variables profitability and tangibility presented a negative relation with the LTD, and the variables risk and size presented a positive relation with this indebtedness measure.

Theoretical contributions: The theoretical contribution of the study lies in the fact that, in the short term, pecking order theory was more adequate to describe the choice of indebtedness level, while for long-term indebtedness, there was no predominance of a theory.

Contributions to management: In the practical field, the study contributes to point out the relationship between different variables and the decision of indebtedness, which is useful for a more assertive decision-making by investors and managers.

Keywords: Capital Structure, Trade-off, Pecking Order.

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Received: September 26, 2018

Revised: February 25, 2019

Accepted: March 06, 2019

Published: August 31, 2019



How to Cite (APA)

Carvalho, G. A., Ribeiro, J. E., & Amaral, H. F. (2019). Determinants of Capital Structure of Companies that Make up the Small Caps Index of B3. *Journal of Accounting, Management and Governance*, 22 (2), 227-242. http://dx.doi.org/10.21714/1984-3925_2019v22n2a5

1 INTRODUCTION

The discussion on the capital structure of companies emerges with Durand's (1952) work, which argues that there is a relation between capital structure and value of the company, and with Modigliani & Miller (1958), who claim that capital structure is irrelevant in a context of perfect competition. Proof of the existence of market flaws, which cause capital structure to impact on the value of the company, prompted the development of new theories regarding the topic, such as Miller's (1997) trade-off theory, Myers's (1984) and Myers & Majluf's (1984) pecking order theory, Jensen & Meckling's (1976) agency theory, and Jensen's (1986) free cash flow theory.

These theories point to different factors that impact the companies' financing decision. Tarantin Junior & Valle (2015) highlight the wide array of factors that are analyzed in researches on this topic. They mention characteristics such as size, profitability, tangibility, risks and growth opportunity. The authors also emphasize the presence of studies that included external factors to the companies in their analyses, usually related to resource providers and macroeconomic conditions.

It must be emphasized that none of these theories are predominant over the others in empirical research on capital structure. Authors such as Bastos & Nakamura (2009) point to the suitability of more than one theory to a given sample. Other authors such as Gaud, Jani, Hoesli & Bender (2005) and Matias & Serrasqueiro (2017) stress that the factors shown by the theory fail to explain the totality of the companies' financing decisions. Such fact shows the need for the development of new researches on the theme that seeks to describe managers' decision-making in different contexts.

Furthermore, the Brazilian economic context demands an even greater effort from the manager and the researcher, because the long-term credit restriction and the high interest rates affect the decisions and create outcomes that are different from those proposed by the theories. Still concerning the Brazilian context, Góes (2018) stresses the difficulties of small and medium companies in accessing financing via capital market, highlighting that this access happens in late stages, when the company is already consolidated and has increased in size. Mateev, Poutziouris & Ivanov (2013) emphasize that small companies, in spite of their importance for economic growth, face restrictions in credit access within the context of emerging markets, increasing the relevance of decision-making over financing for these companies.

Based on these assumptions, the present study seeks to analyze, through panel data models, the indebtedness determinants of Brazilian companies listed on the Small Caps Index (SMLL) of the *Brasil Bolsa Balcão* (B3), to observe which theory – trade-off or pecking order – can better explain the capital structure of these companies for the annual data from 2007 to 2016. It must be stressed that the SMLL was developed by B3 in order to reflect the average performance of a theoretical portfolio constituted by the companies with the smallest capitalizations in the market.

In this sense, this study is justified by its analysis on the suitability of the main theories on capital structure in the context of companies with small capitalization, listed in the stock market of an emergent country, marked by these companies' difficulties to access credit, either via private credit market, or via capital market. Furthermore, by analyzing the relationship between a set of factors that are internal to the companies and their debts, the work clarifies the decision-making process regarding capital structure for managers and investors.

Beyond this introduction, this research has other five sections: the theoretical framework, which presents the main theories on the topic and some empirical studies with similar approaches; the methodology used in the research; the results, followed by a brief discussion; and, lastly, the final considerations.

2 THEORETICAL FRAMEWORK

2.1 Capital Structure and Its Dominant Theories

Durand (1952) assumes that the way a company is financed has a direct impact on its value. Therefore, a company should contract debt until its total capital debt reaches a minimum threshold, thus obtaining an optimal capital structure. Modigliani & Miller (1958), on the other hand, defend that the form of financing does not affect the value of the company. These authors claim, under the assumption of the existence of a perfect market, that the value of the company does not depend on its financing decisions, which implies in the nonexistence of an optimal capital structure.

Modigliani & Miller (1963) assess the effects of introducing fees and taxes on capital structure. Taxation on profit incur in fiscal benefits for the debt, therefore, the increased debt make the paid interest reduce the taxable income. As a consequence, higher debt levels would be able to increase the value of the company. As highlighted by Nakamura *et al.* (2007), the relationship between the fiscal benefit of debt and the bankruptcy costs caused by the high level of debts is the input for the creation of the trade-off theory. The bankruptcy costs are caused by the higher risk of insolvency that an indebted company holds, and its direct consequence is the increased cost of third-party capital, given that the market's risk perception of towards the company rises.

Among the works that explore this relationship are DeAngelo & Masulis (1980), Miller (1977) and Scott (1976). Under the scope of the trade-off theory, managers seek an optimal debt level, which could be attained by balancing bankruptcy costs and fiscal debt economy. Thus, companies seek to optimize their values through the optimization of the trade-off between the two variables.

The use of third-party capital, apart from increasing risk, makes creditors become interested in the company's decisions and influence their capacity of dealing with debts. This way, in addition to the already existing conflicts of interest between managers and shareholders, conflicts between shareholders and creditors also arise. The theory of agency appears in this context, developed by Jensen & Mackling (1976), which analyze the relationship between shareholders, administrators, agency costs and capital structure. The conflicts of interest that involve the companies' administration must be balanced in order to allow the company to focus on maximizing its value.

Jensen (1986) argues that the expansion of the company is in the manager's best interest, for it also increases their power. However, this can drive the company to grow beyond the optimal level. Jensen (1986) defends debt as a way for shareholders to reduce agency costs of free cash flow and, consequently, force managers to be more efficient in their decisions, in the so-called theory of free cash flow. Bastos & Nakamura (2009) argue that such measure also creates a negative effect, which is the loss of the flexibility in low debt situations. Debt is, therefore, proposed as an instrument of the shareholders' control over managers.

Myers & Majluf (1984) developed the pecking order theory, which suggests the presence of an order of preference, among managers, for the financing sources due to the signs that this choice displays to the capital market. It's assumed that managers have more information and, because of that, are reluctant to seek external funding, specially through

issuance of shares. According to this theory, the company tends to prefer internal financing to compose its capital structure, and only if they need it do they seek external funds, prioritizing obtaining resources through debts and, in a last case, through the issuance of new shares (Myers, 1984).

Eid Jr. (1996) reiterates that information asymmetry makes companies become under-evaluated by the market, considering that the issuance of new shares is seen as bad news by the market, for it creates a conflict of interest between new and old shareholders, since profit would be divided among a larger number of partners, and the actions would be under-evaluated by new investors. This way, the author argues that managers will avoid issuing under-evaluated shares, initially opting for other types of resource.

2.2 Empirical Evidence of Capital Structure Theories

In parallel to the development of theories about capital structure, several empirical studies were developed in order to verify the validity of said theories under different circumstances, and also to identify the relationship between different factors and the capital structure adopted by the companies. Some of the empirical works developed in this context are presented below.

Perobeli & Famá (2003), based on the study by Titman & Wessels (1988), researched what factors induce indebtedness in open capital companies in markets in Argentina, Chile and Mexico. The results found were favorable to the pecking order theory. Furthermore, they evidenced that the factors showed divergences from country to country. In Argentina, only profitability showed relation to debt. In Chile, the attributes of size, asset structure and profitability came out as debt inducers. And finally, in Mexico, among the factors tested, only asset structure did not foster debt.

Brito, Corrar & Batistella (2007) studied the determinant factors in the choice of indebtedness level for the 500 largest Brazilian companies. The explanatory factors tested were profitability, risk, size, asset allocation, growth and the company's type of capital. Through multiple linear regression, the authors show that risk and asset allocation were statistically significant for all the measures of debt; size and growth were also revealed to be significant in most cases; profitability and type of capital were not significant in any case.

Nakamura *et al.* (2007) tested the determinants of capital structure in a sample of 91 open capital Brazilian companies. For that end, the authors departed from the variables defined by Gaud *et al.* (2005) and used data panel models. The results they found were favorable to the descriptions made by the pecking order and trade-off theories. Thus, the decisions by Brazilian managers follow the rationality of the choice of resource used while not giving up on seeking an optimal level of indebtedness in the short term.

Bastos & Nakamura (2009) used panel data to evaluate the factors that motivated the decision regarding capital structure adopted in Brazilian, Chilean and Mexican companies. Their explanatory variables were: indebtedness level, liquidity index, tangibility, profitability, market to book, growth, income tax pay, size and risk. The authors pointed out that Brazilian and Mexican companies tend to fit into the theories of information asymmetry and pecking order. Furthermore, in the case of Chilean companies, trade-off theory was also revealed to be relevant.

Tristão & Dutra (2012) evaluated the determinants of capital structure of the companies listed in B3. The authors used as independent variables for multiple linear regressions proxies for the company size, growth, profitability and tangibility, while indebtedness was the dependent variable of the models. In the regression of all variables, was

found an adjusted R2 of 0,73, however, when analyzed separately, only the tangibility variable influenced the companies' indebtedness.

Sant'Ana & Silva (2015) studied the determinants of capital structure in Brazilian technology companies. They tested proxies for size, growth, profitability, type of capital and control, in a panel data analysis in the time frame from 2009 to 2013. In the results, a negative relation was found between debt and size, profitability and type of capital, and a positive relation was found between debt and growth and the company's control type. It must also be stressed that size and growth were not statistically significant in the study.

Prazeres, Sampaio, Lagioia, Santos & Miranda (2015) tested the determinant factors for indebtedness among Brazilian telecommunications companies. The study uses panel data regression for the period between 2002 and 2013. The dependent variables tested were short and long term debt, while the explanatory variables were profitability, tangibility, growth opportunity, size and risk. The authors' findings did not allow them to defend any particular theory, although pecking order has a greater explanatory power for short term debt.

These studies were developed in the context of Brazilian and Latin-American markets; studies done in other markets also pointed to a plurality of results. Among the authors who study the determinants of capital structure in other markets, Gaud *et al.* (2005), Rajan & Zingales (1995) and Titman & Wessels (1988) can be mentioned.

Still in the realm of empirical studies on the determinants of capital structure in different markets, Mateey *et al.* (2013) studied the determinants of capital structure in a sample of small and medium enterprises in Europe. As explanatory variables for indebtedness, cash flow, growth opportunity, liquidity, profitability, size and tangibility were employed. Among the results, a negative and statistically significant relation was found between profitability and debt, as proposed by the pecking order. Furthermore, when controlled by other characteristics, the cash flow coefficient remained significant only for medium companies, which points to the fact the determinants of capital structure vary according to the size of the company.

Matias & Serrasqueiro (2017) investigated the determinants for the decision regarding indebtedness level by small and medium Portuguese enterprises. The following factors were used as explanatory variables: profitability, size, age, asset allocation and growth. The authors determined that profitability, age of the company and asset allocation were the most important variables to explain indebtedness. They stressed that the relationships established are favorable to the hypothesis of pecking order. The results, however, show that neither the pecking order nor the trade-off theory were sufficient to explain the decisions regarding capital structure.

Canh, Liem & Son (2017) and Vo (2017) studied the relationship between the characteristics of Vietnamese companies listed in stock markets and their indebtedness level. In the first study, Canh, Liem & Son (2017) pointed out that profitability and size lose their importance as explanatory variables for more indebted companies, and tangibility is seen as a factor that increases the companies' indebtedness level. Vo (2017) found different relations between the variables tested, and short and long-term-debt. Vo (2017) points that characteristics such as tangibility, size and liquidity having a negative relation to short-term debt and a positive one to long-term debts.

This theoretical framework has illustrated the relevance of financing structure for companies. Furthermore, it has been verified through empirical researches the non-predominance of one theory over the others, which justifies the development of new research on the topic, so as to observe how the choice of capital structure is made, and what theory better describes the decisions by managers in different contexts. In the next section, the methodological procedures adopted for the development of this research will be presented.

3 METHODOLOGY

3.1 Sample and Data Collection

This study had as an initial sample companies whose shares were listed in B3’s SMLL index, considering the portfolio for the period between April and January 2018. The data used for the estimation of the models proposed in this research were obtained through Bloomberg’s financial information platform. The time frame adopted for this research was the ten-year period between 2007-2017, while the 2006 data was considered for sales growth, in order to enable the sales variation calculation for 2007.

After the data collection, financial companies were excluded due to their financial statements and indicators having a different interpretation than that of the other companies. This way, the companies Grupo SulAmérica (SULA11), Banrisul (BRSR6) and ABC Brasil (ABCB4) were excluded from the initial sample, leading to a final study sample of 71 companies.

3.2 Variables

The variables considered in this research were defined based on previous literature and refer to internal characteristics of the companies, aiming at assessing their debt and the possible determining factors of its decision. The determinant variables were the companies’ measures of debt. As in Prazeres *et al.* (2015), it was chosen to use Short-Term Debt (STD) and Long-Term Debt (LTD), whose calculation formulas are presented in Equation 1 and Equation 2, respectively:

$$STD = \frac{\text{Short – termDebt}}{\text{TotalAssets}} \tag{1}$$

$$LTD = \frac{\text{Long – TermDebt}}{\text{TotalAssets}} \tag{2}$$

Regarding the independent variables, six indicators of the companies’ internal characteristics were employed, which are: profitability, risk, size, liquidity, growth, and tangibility. The measure employed for the calculation of each of those factors and its expected relation to debt are described below.

For profitability, under the scope of pecking order, the company establishes an order of preference in relation to the resources used for its financing; withholding profits is the preferable option. In this way, as also highlighted by Brito *et al.* (2007) and Prazeres *et al.* (2015), it is expected for companies of greater profitability to contract less debt. On the other hand, according to the trade-off theory, as stressed by Prazeres *et al.* (2015), the most profitable company tends to contract debt, so as to use the fiscal benefit as a way of protecting cash flow. The measure of profitability chosen was ROA (Return on Assets), as in Bastos & Nakamura (2009), Nakamura *et al.* (2007), Prazeres *et al.* (2015), Rajan & Zingales (1995) and Titman & Wessels (1988), and is defined by:

$$ROA = \frac{\text{EBITDA}}{\text{Total Assets}} \tag{3}$$

The risk directly impacts on the company’s capital cost, insofar as the higher the company’s risk, the higher the return demanded by agents to allocate their capital into it. This way, as highlighted by Bastos & Nakamura (2009) and Prazeres *et al.* (2015), it is expected

for the relation between risk and debt to be negative, both by pecking order and trade-off theory. The measure chosen to quantify the business risk follows the line of Bastos & Nakamura (2009) and Prazeres *et al.* (2015), and is given by:

$$\text{Risk} = \frac{\text{Standard Deviation(EBIT)}}{\text{Total Assets}} \tag{4}$$

Before dealing with the expected relation between size and debt, it is important to stress that in spite of using SMLL companies, there still is a variability between these companies, which justifies the inclusion of this measure in the model. A bigger and more diversified company has smaller bankruptcy costs, as shown by Brito *et al.* (2007). Furthermore, bigger companies in Brazil are granted access to distinctive lines of credit, which reduces their capital cost, and as a consequence, such factors increase the company’s debt capacity.

With this, according to trade-off theory, it is expected a positive relation between size and debt, while according to pecking order, Prazeres *et al.* (2015) highlight the presence of divergent positions regarding the relation between size and debt; Bastos & Nakamura (2009) acknowledge that the relation established between these variables can have both signs, a position that is also being adopted in the present work. The measure adopted for company size, as in Bastos & Nakamura (2009), Nakamura *et al.* (2007), Prazeres *et al.* (2015) and Titman & Wessels (1988) is estimated as follows:

$$\text{Size} = \ln (\text{Net Operating Revenue}) \tag{5}$$

The Current Liquidity Ratio (CLR) intends to measure the company’s capacity to deal with its short-term obligations. This way, a higher value for this ratio shows that the company has a larger volume of liquid resources available in relation to its debts. According to pecking order theory, the company might use these resources before contracting debt, therefore, there is a negative relation between current liquidity and debt; trade-off theory does not establish a direct relation between these indicators (Bastos & Nakamura, 2009; Ozkan, 2001). CLR is also employed in the studies by Bastos & Nakamura (2009) and Nakamura *et al.* (2007), and is calculated as follows:

$$\text{CLR} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \tag{6}$$

A growing business has part of its value connected to future profit expectations, which, according to Brito *et al.* (2007), makes bankruptcy costs larger. Apart from that, the author highlighted the presence of greater flexibility for these companies, which is reflected in a larger agency cost. Given this, it is expected for the relation between growth and debt to be negative both for pecking order and for trade-off theory, because the larger agency costs will make the company prioritize financing through its own resources, an effect corroborated by the larger bankruptcy costs. As a measure for growth (GROW), the same indicator employed by Bastos & Nakamura (2009) was adopted:

$$\text{GROW} = \frac{(\text{Sales}_t - \text{Sales}_{t-1})}{\text{Sales}_{t-1}} \tag{7}$$

Finally, the tangibility of the company’s assets expresses the potential of using assets as a guarantee for debts, reducing capital cost and information asymmetry. Therefore,

according to trade-off theory, a smaller capital cost makes the debt of a company with a larger amount of tangible assets become bigger. In relation to the assumptions of pecking order theory, there is a reduction in information asymmetry, which makes debt more attractive. Hence, for both theories, the larger the amount of tangible assets, the larger the debt. As a measure to calculate tangibility (TANG) of the company’s assets, like in Bastos & Nakamura (2009) and Tristão & Dutra (2012), the following indicator was employed:

$$TANG = \frac{(Fixed\ Assets + Stock)}{Total\ Assets} \tag{8}$$

3.3 Empirical Model

Panel data methodology was employed in this study. According to Nakamura *et al.* (2007), there is no predominant standard model in the literature regarding capital structure. The use of this method has the advantage of enabling the combination of two dimensions of the collected data, which are: time and cross section.

Wooldridge (2011) presents three possibilities for estimating data panel models: pooled data, where the same constant and coefficients are assumed for all companies; fixed-effects, where it is admitted that each company has distinct characteristics, invariable over time, captured by the constant; and random effects, which considers the constant as a non-observable random parameter. In this last model, the differences between companies are captured by the error term.

Once listed this set of panel data models, it is important to define which of them is better suited for the research sample. This way, the Breusch-Pagan test was employed for the comparison between the random effect model and the pooled data model; the Chow test for the comparison between the pooled data model and the fixed-effects model; and, finally, the Hausman test for the comparison between the fixed-effects model and the random effects model. Besides, it is important for diagnosis tests to be made in order to verify if the model fulfills the demanded preconditions. To that end, tests of multicollinearity, residue normality, homoscedasticity and autocorrelation are run.

The models and tests proposed for this study were estimated with the use of the Stata software, using the annual data from 2007 to 2016 of the companies that constitute the sample. It must be stressed that some companies started offering their stocks during the time frame of the estimation of the model, in which case there are not available data for the entire period. In this case, all available data for the companies were incorporated, in order to avoid possible biases caused by the exclusion of these companies from the model, which culminated in an unbalanced panel and a total of 611 observations for the estimation of the models.

3.4 Validation of the Models

This subsection is dedicated to the presentation of the tests previously described, conducted with the purpose of validating the models used for the ulterior analysis. Table 1 shows the correlation matrix of the independent variables. It can be observed that the highest correlation between these variables occurs between Risk and Size, with a value of -0,450. Furthermore, in table 2, the variance inflation factors (VIF) values for the variables of this study are presented. As pointed out by Wooldridge (2011), in spite of being an arbitrary choice, the literature usually assumes that VIF values higher than 10 point imply collinearity problems. Considering the mentioned above, there are no signs of collinearity problems among the variables investigated.

Table 1
Correlation Matrix of the Independent Variables

Variables	ROA	Risk	Size	CLR	GROW	TANG
ROA	1					
Risk	0,341	1				
Size	-0,138	-0,450	1			
CLR	-0,0864	0,112	-0,269	1		
GROW	0,0330	0,0671	-0,0787	0,0878	1	
TANG	-0,0695	-0,00640	-0,0553	-0,0120	-0,0281	1

Table 2
VIF of the independent variables

Variable	VIF	1/VIF
Risk	1,390	0,717
Size	1,340	0,744
ROA	1,160	0,863
CLR	1,100	0,905
GROW	1,010	0,986
TANG	1,010	0,989

That considered, the pooled data, fixed effects and random effects models were estimated for the STD and LTD, and tests were ran to verify which model better suits the data. The p-values found are presented in Table 3, and similar results were found between the short and long-term models. As for the Chow test, the null hypothesis was strongly rejected, which is a favorable evidence for the use of the fixed effects model, to the detriment of the pooled data model. The Breusch-Pagan test also allows for the rejection of the null hypothesis, which shows that the random effects were significant.

Finally, in the comparison between the fixed effects and the random effects model, when considering a statistical significance level of 5%, the Hausman test does not allow for the rejection of the null hypothesis neither for the STD model nor for the LTD model. As pointed out by Wooldridge (2011), not rejecting the null hypothesis is inconclusive for the comparison between the models, which leaves the choice to be supported by the theoretical foundation.

For the rest of this work, the fixed effects model will be adopted because, as emphasized by Wooldridge (2011), this model allows for the presence of correlation between unobserved fixed effects and the regressors used; furthermore, the author stresses that the random effects model is more appropriate when the main explanatory variable is constant in time, which is not the case for this research.

Table 3
Panel Data Model Tests

Test	STD	LTD
Chow	0,0000	0,0000
Hausman	0,3370	0,0914
Breusch-Pagan	0,0000	0,0000

Below, Table 4 presents the p-values for the diagnosis tests, which were done with the purpose of verifying if the necessary preconditions for the estimated coefficients to be correct were met. For normality, the asymmetry and kurtosis test was employed, which rejects the null hypothesis of the presence of normality of the residue for both models. In relation to non-normality of the residue, Wooldridge (2011) stresses that if the sample size is sufficiently

large, according to the central limit theorem, residues tend to have a normal distribution, which does not invalidate the inference based on the model.

To verify the presence of heteroscedasticity in the models, the Wald test was done, which rejects the null hypothesis of the residue variance being constant, that is, proves the presence of heteroscedasticity in the models. Finally, for autocorrelation, the Wooldridge test was done, which rejects the null hypothesis that there is no first order autocorrelation in the data.

Table 4
Diagnostic Tests

Test	STD	LTD
Normality of the Residues	0,0000	0,0026
Wald	0,0000	0,0000
Wooldridge	0,0003	0,0000

Considering the presence of heteroscedasticity and autocorrelation in the models, this study considered the models with standard errors corrected by Driscoll & Kraay’s (1998) procedure.

4 PRESENTATION OF THE RESULTS

In Table 5, the coefficients and their significance level are presented. The F test for the significance of the model and the determination coefficient for the short and long term models are also present, and the discussion of the results is conducted in the next section.

Table 5
Results of the Regressions

Variable	STD	LTD
Constant	0,0507 (0,317)	-0,208 (0,000)
ROA	-0,176 (0,000)	-0,115 (0,025)
Risk	0,0800 (0,153)	0,156 (0,015)
Size	0,0122 (0,0500)	0,055 (0,000)
CLR	-0,0193 (0,000)	0,000767 (0,778)
GROW	0,0000718 (0,001)	-0,000062 (0,142)
TANG	0,000803 (0,000)	-0,00147 (0,001)
Prob > F	0,000	0,000
R2 <i>within</i>	0,1794	0,1020

Initially, in an analysis of the global significance of the models through the F test, it can be seen that in both analysis the null hypothesis is strongly rejected, given the p-value of 0, which allows us to argue that these factors altogether are significant as explanatory variables for STD and LTD. In regards to the models’ determination coefficient, the value obtained for the short term model shows that the variables considered are capable of explaining around 18% of the total variation of the STD level, while the LTD model shows a value of 10,2%, which is a considerable loss in the explanation power of the model in

comparison to the short term. Such fact is to be expected, due to the possibility of change in factors that are inflexible over time, and also due to a greater effect of characteristics that are external to the company, such as the macroeconomic scenario.

In relation to the significance of the coefficients, in the model for short term debt the size was statistically significant only when a significance level of 10% was considered, while the constant and the risk were not statistically significant even at a level of 10%. On the other hand, in the model that has long term debt as its dependent variable, CLR and growth were not statistically significant. Below, the direction of the models' coefficients will be analyzed, and the results obtained will be compared to previous studies and to the propositions of trade-off and pecking order theories.

5 DISCUSSION OF THE RESULTS

The ROA coefficient has presented a negative relation to both short and long-term debt. This result is coherent with the assumptions of the pecking order theory, and compatible with the reality of the companies with less capitalization in the market, which face credit restrictions and high fees in the Brazilian market, leading them to perceive financing through their own resources as a more attractive alternative. The relation found in this study was similar to the results found by Bastos & Nakamura (2009), Mateev *et al.* (2013) e Prazeres *et al.* (2015).

The Risk coefficient was positive in both models. According to trade-off and to pecking order theories, a negative relation is expected between these variables. Other studies have already pointed to a positive relation between risk and indebtedness in Brazil. Bastos & Nakamura (2009) found a positive relation between risk and short term debt. The findings by Brito *et al.* (2007) show a positive relation for all the debt measures they found, and explain this fact as a peculiarity of the Brazilian market, a consequence, for example, of investors who avoid high risk companies, forcing them to seek third-party capital.

The variable size was positive for both STD and LTD. Such a result is accepted by the trade-off and pecking order theory, which admit the possibility of either a positive or a negative relation. This result is similar to the study developed with a sample of big companies by Brito *et al.* (2007), and to the findings of Mateev *et al.* (2013), who found a positive relation in the short and in the long term, for small and medium enterprises in Central and Eastern Europe. Prazeres *et al.* (2015) emphasize that the relation between size and debt is a source of theoretical disagreements, with studies pointing to both negative and positive relations. Brito *et al.* (2007) stressed that larger companies have a greater capacity for debt, and highlighted the presence of subsidized long term credit in the Brazilian market, through the National Bank for Social and Economic Development (*Banco Nacional de Desenvolvimento Econômico e Social*, BNDES).

The CLR coefficient found was negative in the STD model and positive, but insignificant, in the LTD model. This way, the short term result is favorable to the pecking order theory and the long term is favorable to trade-off theory, and no statistic significance in this relation is expected. Bastos & Nakamura (2009), and Nakamura *et al.* (2007) are also authors who pointed to a negative relation between liquidity and indebtedness. The negative relation is caused by the fact that a greater liquid resource availability for the company increases the indicator and, as proposed by pecking order theory, means that the company has more of its own resources to self-finance.

Growth was positive in the STD model and negative in the LTD model. This result is in disagreement with both trade-off and pecking order theory. An analogous result was found by Brito *et al.* (2007) and Mateev *et al.* (2013), and the latter stressed that the fact that

growing business tend to incur more debt is in line with the information asymmetry theory, because financing through debt would be a way for the company to signal to the market that its stocks are under-evaluated. It must be added that in spite of the positive relation, the coefficient value found is too small, which signals that the impact of growth in debt is meager.

Finally, TANG presented a positive coefficient in the short term and a negative one in the long term. The expected result for this variable in both theories is a positive relation to indebtedness, therefore the relation observed to STD is favorable to trade-off and pecking order theories, and the result found for LTD is in disagreement with both. Brito *et al.* (2007) found a negative relation between tangibility and short term debt and a positive one for long term debt; Bastos & Nakamura (2009) discovered a negative relation between tangibility and total accounting debt; Prazeres *et al.* (2015) found tangibility coefficients that are statistically insignificant, results that evidence a heterogeneity of this relation in Brazilian studies.

Figure 1 presents a summary of the expected relations and the observed relations of this study. It is possible to observe, from the figure, that a large portion of the variables did not present the expected relation to indebtedness. Below, the relations that were expected and those that were observed in the context of short term and long term debt will be analyzed individually.

Variable	Expected Relation		Observed Relation	
	Trade-off	Pecking Order	STD	LTD
ROA	Positive	Negative	Negative	Negative
Risk	Negative	Negative	Insignificant	Positive
Size	Positive	Positive/Negative	Positive	Positive
CLR	Insignificant	Negative	Negative	Insignificant
GROW	Negative	Negative	Positive	Insignificant
TANG	Positive	Positive	Positive	Negative

Figure 1. Expected and Observed Relations

In an analysis of the results, it is possible to argue that, in the short term, the pecking order theory has revealed itself to be more adequate in describing the choice of the indebtedness level of the companies in the sample of the study. Only risk and growth resulted in relations that diverged from what is proposed by the theory. Bastos & Nakamura (2009) claimed that the pecking order theory has a better explanatory power in the Brazilian market, Prazeres *et al.* (2015) pointed to pecking order as the theory that best describes short term debt decisions. In relation to small companies, Matias & Serrasqueiro (2017) also pointed to a better suitability of pecking order theory.

In the context of long-term debt, it was not possible to point to a predominance of one single theory over the other in the explanation of the decisions regarding LTD. It must be stressed that the worse performance of the variables considered in this study to explain LTD can be the result of the greater difficulty these companies have in getting credit, as highlighted by Mateev *et al.* (2013), which renders other factors relevant in the manager’s decision. The importance of the macroeconomic variables for the companies and the presence of subsidized government lines of credit must also be emphasized, which can be important factors in the decision of incurring long-term debt. These aspects can be considered in future studies on this theme.

6 FINAL REMARKS

This research aimed at studying the short-term and long-term debt determinants of the companies in the B3 SMLL Index, in order to identify what theory better describes these companies' behavior: trade-off or pecking order. To that end, this study investigated in the literature the companies' internal factors that are determinants for the decision of their indebtedness level. Thus, it was used as explanatory variables: profitability, risk, size, current liquidity, growth and assets tangibility. It was considered the annual data for the period between 2007 and 2016, collected in Bloomberg's financial information platform.

Pecking order theory, in spite of the divergence with the literature that was found in the risk and growth variables, was revealed to be the most pertinent in describing the companies' choice of indebtedness level in the sample. For long term debt, there was no single theory that was better suited to explain the LTD decisions, which might be a consequence of the increased difficulty these companies have in getting credit, which makes other factors relevant in the manager's decision.

This study was justified by the relevance of the decision of financing structure holds for the companies, and by the lack of predominance of a theory over the others. The contributions of the results consist in pointing out which theory better describes the managers' decisions. The factors considered by the managers when making decisions about the company's debt level must also be stressed. In the short-term size, growth, and tangibility showed a positive relation and profitability, and current liquidity showed a negative relation to debt level. In long-term debt, profitability and tangibility presented negative relation to the variable, while risk and size presented a positive relation.

The results aforementioned are useful not only in analyzing the theories' suitability to the context of companies with smaller capitalization at B3, but also to explore the managers' behavior. By better understanding these companies' debt decision, investors can make more assertive decisions and the government can identify policies that favor these companies' access to credit, either through private credit or capital market.

However, the research has some limitations, such as the sample size and the use of variables that are only internal to the companies. This way, as a suggestion for future studies, it is possible to analyze the behavior of these variables and the explanatory power of these theories in a larger sample, and it is also possible to include macroeconomic variables in the models, given that many Brazilian companies are severely affected by the economic cycles and its impacts in the private credit market.

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Determinantes da Estrutura de Capital das Empresas que Compõem o Índice Small Caps da B3**RESUMO**

Objetivo: O estudo objetivou analisar os determinantes do endividamento de curto (ECP) e de longo prazo (ELP) das empresas que compõem o Índice SMLL da B3, a fim de identificar qual teoria, trade-off ou pecking order, melhor descreve o comportamento destas empresas.

Método: Foram empregados modelos de dados em painel, tendo como variáveis explicativas a rentabilidade, o risco, o tamanho, a liquidez corrente, o crescimento e a tangibilidade dos ativos.


Relevância: O estudo destaca-se por analisar a adequação das teorias sobre estrutura de capital ao contexto de empresas de menor capitalização, listadas em bolsa de valores de um país emergente.

Resultados: Nos resultados apontou-se que, a rentabilidade e a liquidez corrente apresentaram uma relação negativa com o ECP, enquanto as variáveis tamanho, crescimento e tangibilidade apresentaram uma relação positiva com esta variável. No longo prazo, as variáveis rentabilidade e tangibilidade apresentaram uma relação negativa com o ELP e, as variáveis risco e tamanho apresentaram uma relação positiva com essa medida de endividamento.

Contribuições teóricas: A contribuição teórica do estudo reside no apontamento de que, no curto prazo, a teoria da pecking order mostrou-se mais adequada para descrever a escolha do nível de endividamento, enquanto para o endividamento de longo prazo, não houve predomínio de uma teoria.

Contribuições para a gestão: No campo prático, o estudo contribui ao apontar a relação entre diferentes variáveis e a decisão de endividamento, sendo tal conhecimento útil para uma tomada de decisão mais assertiva pelos investidores e gestores.

Palavras-chave: Estrutura de Capital, Trade-off, Pecking Order.

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Recebido: setembro 26, 2018

Revisado: fevereiro 25, 2019

Aceito: março 06, 2019

Publicado: agosto 31, 2019

