DOES THE CAPITAL CONCENTRATION LEVEL INFLUENCE THE BRAZILIAN COMPANIES CAPITAL STRUCTURE?

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ABSTRACT

The purpose of the present research is to identify whether the capital structure of the Brazilian listed companies is influenced by the capital concentration level. The sample comprises 104 Brazilian publicly traded companies listed on the BM&FBOVESPA, totaling 1,258 observations for annual data in the period from January 1st, 2008 to December 31st, 2014. By using panel data analysis and taking into account the control variables identified as relevant in the literature, the main results show that (i) capital concentration has a positive relation with market indebtedness and with long-term net debt to market equity; (ii) the variables size, volatility, profitability and tangibility, highlighted in the theoretical archetype, evidence a significant influence on long-term debt to market equity and book equity, and (iii) there are no findings and/or inferences that net debt to EBITDA may bring implications for shareholders´ capital concentration. For future studies, suggestions are: i) to increase observations of Brazilian privately held companies; ii) to compare the results obtained with the capital structure of other countries, and iii) to highlight and relate other variables in the literature which are not addressed by the present research.
Keywords: Ownership structure, Capital structure, Shareholding control, Capital dispersion.

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RESUMO

O objetivo da presente pesquisa é identificar se a estrutura de capital das empresas abertas brasileiras é influenciada pelo nível de concentração de capital. Adotou-se como amostra as 104 empresas brasileiras de capital aberto listadas na BM&FBOVESPA, totalizando 1.258 observações para dados anuais do período de 1º de janeiro de 2008 a 31 de dezembro de 2014. Ao utilizar a análise com dados em painel e levar em consideração as variáveis de controle apontadas como relevantes pela literatura, os principais resultados mostraram que (i) a concentração de capital possui uma relação positiva com o endividamento de mercado e com a dívida líquida de longo prazo sobre Patrimônio Líquido de mercado; (ii) as variáveis tamanho, volatilidade, rentabilidade e tangibilidade, destacadas no arquétipo teórico, evidenciaram uma significativa influência na dívida de longo prazo sobre PL a mercado e contábil, e (iii) não houve qualquer tipo de constatação e/ou inferência que a dívida líquida sobre o EBITDA pode trazer implicações para a concentração de capital dos acionistas. Para estudos futuros, sugere-se i) incrementar observações de empresas de capital fechado brasileiras; ii) comparar os resultados obtidos com a estrutura de capital de outros países, e iii) evidenciar e relacionar outras variáveis da literatura não abordadas pela presente pesquisa.

Palavras-chave: Estrutura de propriedade. Estrutura de capital. Controle acionário. Pulverização de capital.

1 INTRODUCTION

Research has been developed, in recent decades, discussing the influence and the ownership structure determinants on capital structure and corporate performance (DEMSETZ; VILLALONG, 2001; NAKAMURA, 1992; NAKAMURA; MOTA, 2002, KAPOPOULOS; LAZARETOU, 2007). According to agency theory, the ownership structure makes managerial control easy, improving the financial performance, although it may also lead to majority - minority shareholders´ conflicts within business organizations (JENSEN, 1986).

Noteworthy is that the relation between capital and ownership structures has yet to be explored (DRIFFIELD; MAHAMBARE; PAL, 2005), justifying the efforts to expand research on the theme, especially in Brazil. There is a statistically significant influence of the shareholding control structure on capital structure decisions and the influence of variables related to profitability, size, year and sector (PROCIANOY; SCHNORRENBERGER, 2004). Demsetz and Villalonga (2001) argue that business performance cannot be duly interpreted if disregarding the influence of ownership structure. Capital concentration reduces the number of decision makers (controlling owners) and, as a result, tends to provide better management for companies, affecting on the reduction of gross and net indebtednesses (CÉSPEDE; GONZÁLEZ, 2010, PÖYRY; MAURY, 2010; BRENDEA, 2014; HALILI; ZEITU, 2015).

When companies face financial distress, a divergence of interests between shareholders and administration may lead to suboptimal management decisions, because the objectives of managers and shareholders are not necessarily aligned (ALVES, 2012). The pressure caused by bad results or extreme financial situations motivate managers to manipulate accounts by changing companies' financial performances (CAMPA AND CAMACHO-MIÑANO, 2014). Managers of companies in financial distress are forced either to timely structure the actual transactions, avoiding possible management losses during the financial downturn period (ALI et al., 2010) or to temporarily inflate the market price, increasing their remuneration or the gain of stock-based compensation features.

However, there are a variety of factors that may restrict the actual management of activities among companies in financial distress and/or debts. Some studies have indicated that certain corporate governance features, such as the structure and concentration of capital, have an important effect on corporate accounting behavior, including on the earnings management (AJONA et al., 2008; ALVES, 2012).

Regarding capital structure, Bennedsen and Wolfenzon (2000), Bloch and Hege (2001) and Maury and Pajuste (2005) have demonstrated the theoretical importance of taking into account great shareholders, the control complexity and power balance between great shareholders in influencing the company´s value. In addition, the aforementioned authors emphasize that, since their models focus on the study of capital concentration and on the control coalitions formation and power struggles, they may not apply to companies owned by a single major shareholder or with scattered ownership.

An often used method to calculate ownership concentration is the sum of net equity. However, empirical studies using that method reach widely divergent conciliations, for the influence of ownership concentration is considered as positive (PERRINI et al., 2008), insignificant (DEMSETZAND VILLALONGA, 2001; WELCH, 2003), negative (GEDAJLOVIC; SHAPIRO, 1998), or even nonlinear (MIGUEL et al., 2005; HU ANDIZUMIDA, 2008). The use of a unilateral method of calculating ownership concentration implies that shareholders act irreconcilably.

In this context, there is the guiding question of the present research: **what is the influence of capital concentration level on the indebtedness of Brazilian public companies?**

Therefore, the purpose of this research is to identify whether the capital structure of Brazilian public companies is influenced by the capital concentration level. To this end, the publicly traded Brazilian companies listed on the BM&FBOVESPA are sampled. The research deals with the annual data of 104 companies, in the period from 2008 to 2014. This is a quantitative research adopting the panel data regression model (pooled data and random effects).

Financial theory indicates several reasons for capital structure decisions, but little has been discussed about the influence of ownership concentration on these decisions (PROCIANOY; SCHNOR-RENBERGER, 2004). This is the main motivation for the accomplishment of the present research.

2 THEORETICAL REFERENTIAL
2.1 Ownership concentration and capital structure

Broadly, Modigliani and Miller (1958) described that a company cannot change the total value of its assets by changing the proportions of its capital structure, since company´s value will be the same, regardless of any choice of capital structure. Relevant are the composition and nature of company's assets.

Subsequently, Modigliani and Miller (1963), considering the existence of corporate taxes, concluded that the company should work close to one hundred percent, which would only make sense if the companies did not go bankruptcy. But, since bankruptcy situation can affect companies, they should set an optimal level of debt at an intermediate position between zero and one hundred percent. This reasoning came to be called as trade-off theory.

From the ownership standpoint, the capital structure is partly determined by the purposes of those in control of the company. Evidence was found on the impact of ownership concentration on its ownership management and ownership concentration (PINDADO; DE LA TORRE, 2011).

Some researches provide evidence indicating that foreign ownership is associated with a better monitoring of managers' actions. For example, Gillan and Starks (2003) argue that foreign ownership is associated with better corporate governance around the world. The reason for this is that foreign owners are more independent than local institutional investors, who have business relationships with company´s managers and are, therefore, less able to efficiently monitor them (FERREIRA; MATOS, 2008). Consistent with this view, Aggarwal et al. (2011) show that foreign investors play an important role in improving the governance of non-US corporations,

which may lead to a greater firm´s value. In fact, Ferreira and Matos (2008) find that foreign institutional ownership is positively associated with company´s value and with the operating performance outside the United States.

Accordingly, the literature also shows that the participation of foreign investors in the process of capital concentration is associated with more corporate restructurings. For example, Djankov and Murrell (2002) and Estrin et al. (2009) provide evidence showing that the involvement of foreign investors in the privatization process is associated with further restructuring, which may, in turn, be associated with an increase of capital concentration and with the performance of organizations (MEGGINSON AND NETTER, 2001; ESTRIN et al., 2009).

Thomsen and Perdersen (2000) proposed the hypothesis that the identity of great owners (family, bank, institutional investor, government and other companies) has important implications for corporate performance. Ownership structure may also influence the quality of financial information and thus, play an effective role in investors´ decision-making (SHIRI; SALEHI; RADBON, 2016).

Latin American companies have higher leverage than expected, under the capital structure trade-off theory, because their capital concentration is significantly higher than the one in developed economies (CÉSPEDES; MAXIMILIANO; MOLINA, 2010).

As for the private capital, Brito and Lima (2005) point out that the national privately owned companies are more indebted than the foreign ones, thus using the short-term mechanism for raising capital and debt financing. In Brazil, other works, such as by Rapozo et al. (2007), Ribeiro et al. (2006), Okimura et al. (2004), Fontes Filho (2003) and Silveira (2004), identified that the majority of Brazilian corporations has concentration of its ownership and control structures (TORRES et al., 2009, p. 2).

2.2 Ownership concentration and agency conflicts

Agency theory (JENSEN; MECKLING, 1976) and property rights theories (ALCHIAN; DEMSETZ, 1972), which deal with the separation of cash flow rights and control rights, laid the foundations for an analysis of the relation between corporate performance and company´s ownership structure. In an information asymmetry situation, ownership concentration can be expected as providing a better control over managers and the alignment of their decisions, in the interest of maximizing firm´s value (VILLALONGA; AMIT, 2006).

In general, agency theory is a major contribution to the capital structure study. The emphasis of this theory is on the relationship between principal and agent, with the principal contracting the agent´s services and, therefore, the agency cost-based model assumes the existence of an optimal level of indebtedness that can maximize the company´s value by reducing the conflict of interest between the principal and the agent (JENSEN; MECKLING, 1976).

If capital is concentrated, there is the figure of the majority shareholder. If the majority shareholder exists, there is less agency conflict, as decision-making power is concentrated. This reduces debt to pay for agency costs. According to Shleifer and Vishny (1997), the essence of the agency problem is the separation of ownership and control.

Therefore, two types of conflicts related to agency models may be highlighted: (1) the existing conflict between shareholder and manager, which happens when the former has no control over the company's capital. The tendency for rational shareholder´s action is to anticipate manager´s behavior and discount the firm's value. As a way of minimizing this agency cost, the manager has to accept external controls; (2) the existing conflict between shareholder and creditor, which occurs because the contracts are incomplete. In this case, there are two agency costs of debt: the

cost of exaggerated investment and the cost of insufficient investment (JENSEN; MECKLING, 1976; JENSEN, 1986). Agency costs also arise as a result of outsiders' privileged access to information and self-interest behavior in companies with scattered ownership structures (HALILI; ZEITU, 2015).

For Jensen and Meckling (1976), in the dominant and concentrated structures, the agency problem can be diminished. Yet, dispersed ownership structure is detrimental to companies, as it increases agency costs. Other researches by (ROSS et al., 2002; KIM, 2006; SONZA; KLOECKNER, 2014; CRISÓSTOMO; PINHEIRO, 2015; HALILI; ZEITU, 2015) mention that ownership structure in companies may offer advantage, as it provides a more effective management, capable to overcome the problem posed by the misalignment regarding conflicts of interest between shareholders and managers.

Another relevant aspect is the divergence between voting and cash flow rights that leads to conflicts of interest and creates incentives for controlling shareholders to expropriate other investors, diverting and transferring resources for their own benefit (JOHNSON et al., 2000; MORCK et al., 2005; LIN et al., 2011). This issue can also potentially reduce incentives and restrict investment by reducing free cash flows and increasing lenders´ monitoring (JENSEN, 1986; ZWIEBEL, 1996; HARVEY et al., 2004).

For Chung and Wang (2014), the study of the relationship between change in institutional ownership and change in total debt suggests evidence that the institutional investor shall assume debt to be committed to monitoring the company´s management. This finding does not indicate whether institutional monitoring enhances the company's capital structure, though.

In Brazil, predominant conflict occurs between majority and minority shareholders, considering that, due to the large ownership concentration and its overlapping with management, agency conflicts become inexpressive (ANDRADE; ROSSETTI, 2006).

Thus, in cases where company´s ownership and control structure are diffuse, agency conflicts arise from the relationship between managers and shareholders. However, as concentration increases, there is a change in the nature of agency conflicts, which come to occur between majority and minority shareholders (SHLEIFER; VISHNY, 1997).

2.3 Capital concentration and trade-off theory

Trade-off theory, for Bastos and Nakamura (2009), assumes that the optimal capital structure is achieved when companies combine equity with third party capital, aiming at maximizing company´s value based on tax benefit. The theory is also called as the counterbalance theory.

Under trade-off theory, on the one hand, the most profitable companies with the greatest amount of tangible assets are prone to be financed by debt. On the other hand, the least profitable companies or having intangible assets considered as being at highest risk, are likely to prefer the use of equity (BREALEY; MYERS, 2006). Trade-off theory postulates that every organization has its own optimal capital structure.

Companies with concentrated capital are expected to present a positive relation to trade-off theory, because these companies are more effectively managed and tend to be more likely to use balanced internal and external resources to finance their investments.

Controlling owners face a challenge, based on trade-off theory, between diluting their control by using equity to finance investments and passing on valuable investments to preserve control. Higher debt, which does not dilute controlling share, is, therefore, preferred by controlling shareholders who value control. Harris and Raviv (1988) and Stulz (1988) provide evidence that managers strategically choose high debt levels to gain voting power and to avoid dilution of stocks.

2.4 Related Studies

The research by Shiri, Salehi, Radbon (2016) aimed at analyzing the impact of ownership structure and disclosure quality on the phenomenon of information asymmetry among the companies listed on the Tehran Stock Exchange (TSE). Ownership structure (including ownership concentration and institutional ownership) and disclosure quality (including reliability and timeliness) are considered as independent variables, and their impact is examined on the dependent variable (information asymmetry). Statistical results, based on data collected from 102 TSE - listed companies during 2007-2014, revealed positive impact of ownership structure and negative impact of disclosure quality to information asymmetry. These results show that information asymmetry is lower in companies publishing more reliable and timely information. The asymmetry is greater in companies with more concentrated ownership structure, greater institutional participation and lower disclosure quality. In other words, the reliability and timeliness of information plays a positive role in identifying stock prices.

The research by Crisóstomo and Pinheiro (2015) aimed at analyzing, under the focus of agency conflicts, whether the ownership concentration had any effect on the capital structure of 266 non-financial companies listed on BM&FBOVESPA, in the period 1996-2012. By means of unbalanced data panels, models having indebtedness as the dependent variable and, as independent variable the ownership concentration and other factors capable of interfering with the company's debt capacity, were estimated. The results showed an inverse quadratic effect of ownership concentration, that is, the concentration had a positive effect to some extent; they have since identified that over-concentration undermines the financing capacity through debt. A positive effect of firm´s size and tangibility degree on corporate indebtedness and a negative effect of profitability on indebtedness were detected, which may indicate that companies would be being financed with the use of retained earnings, indicating a pecking order behavior.

Brendea's research (2014) investigated how ownership concentration affects the performance and capital structure of listed Romanian companies, during the period 2007-2011. As a result, it was found that ownership concentration has no effect on corporate performance, but it has a positive effect on companies´ capital structure when those companies behave adjustably to the target capital structure. Debt ratio and company size are the determinants of corporate performance, and tangible assets and ownership concentration are the determinants of companies´ capital structure.

The study by Céspede and González (2010), which assessed the determinants of the capital structure of Latin American companies, spanning seven countries, shows that companies with concentrated ownership avoid issuing shares because they do not want shareholding rights. Latin American companies have a high ownership concentration, which creates an ideal environment for studying how ownership concentration explains corporate capital structure. The study revealed a positive relation between leverage and ownership concentration; when control is lost, it becomes a problem.

The study by Pöyry and Maury (2010) explored the relation between ownership structures and capital structures, in Russia. It found that companies, with the State as a controlling shareholder, have significantly higher leverage than companies controlled by national private controlling shareholders or oligarchic companies. Both State-controlled or oligarchic companies finance their growth with more debt than other companies. Profitability is negatively related to leverage in all types of controlling owners, indicating a preference for domestic financing over debt. The results indicate that companies with owners who have political influence or connections with large financial groups have better debt access (PÖYRY; MAURY, 2010).

Zhang's study (1998) analyzed the effect of capital structure on investment decisions, when the company is controlled by a great, risk-averse shareholder. The result reveals a single

balanced capital structure involving both risk and equity debt, which is directly linked to the ownership structure. The analysis leads to empirical predictions about how ownership and capital structure are interrelated, and how capital structure is affected by factors such as the controlling shareholder identity and project risk. Table 1 below summarizes the results of some previous researches on the capital structure theme.

Table 1- Previous researches on the capital structure theme

Authors	Results
Researches addressing ownership concentration	
Shiri, Salehi, Radbon (2016)	Positive impact of ownership structure and negative impact of disclosure quality on information asymmetry.
Halili; Zeitu (2015)	Companies with ownership concentration have a better operating performance due to alignment of owner management interests.
Crisóstomo; Pinheiro (2015)	Concentration favors indebtedness. Inverse quadratic effect of ownership concentration, that is, concentration had a positive effect to some extent; Positive effect of firm´s size and tangibility degree on corporate indebtedness, and negative effect of profitability on indebtedness.
Brendea (2014)	Ownership concentration has no effect on corporate performance, but has a positive effect on corporate capital structure.
Segura et al. (2013)	Indebtedness in agribusiness family companies is lower than in non-family agribusiness companies.
Pöyry; Maury (2010)	Profitability is negatively related to leverage in all types of controlling owners, indicating a preference for domestic financing over debt.
Céspede; González (2010)	Positive relationship between leverage and ownership concentration.
Researches not addressing ownership concentration	
Rajan; Zingales (1995); Thies; Klock (1992)	The greater is the volume of tangible assets, the greater is the condition of companies to get into debt, that is, these assets can be used as collateral to reduce the cost of debt.
Crisóstomo; Pinheiro (2015); Ferri; Jones (1979); Rajan; Zingales (1995)	Positive relation between company´s size and indebtedness degree.
Harris; Raviv (1990)	The variables increasing debt are: tangible fixed assets, tax advantages, growth opportunities and company´s size. The variables reducing debt are: volatility of profits, advertising expenses, probability of bankruptcy and corporate profitability.

Source: elaborated by the authors.

The next section - Methodology - will detail the methodology used in the research and the appropriate statistical treatments for operating the econometric model.

3 METHODOLOGICAL ASPECTS

This section describes the sample selection process and presents the variables used in the analysis, the descriptive statistics reports and the panel data regressions for the econometric equations.

3.1 Database

The present study can be classified as an explanatory empirical-analytical research, aiming at identifying whether the capital structure of Brazilian public companies is influenced by the capital concentration level. The analysis period involves the years from 2008 to 2014, within which 350 listed public companies are identified. All secondary data from the companies in the sample are taken directly from Economática®.

The initial research sample consisted of publicly traded companies listed on the BM&F-BOVESPA. From this initial sample, financial institutions and other companies not presenting sufficient data for the composition of the variables of this study were excluded. The reasons for these exclusions are based on the fact that the capital structure of the financial sector is different from other companies, considering that banks have minimum reference equity in line with the Basel Accords, so they are significantly more leveraged than non-financial companies.

In these terms, there are 104 publicly-held companies, arranged in 18 business sectors, namely: Agro and Fishing, Food and Beverage, Trade, Construction, Consumer Electronics, Electric Energy, Non-Metallic Minerals, Mining, Machinery, Industry, Paper and Pulp, Oil and Gas, Chemistry, Steel and Metallurgy, Software and Data, Telecommunications, Textiles, Transportation, Services and Vehicles and Parts.

3.2 Exploratory Variables and Equations of econometric models

In this subsection, the exploratory variables being used in the research are highlighted, as a way to demonstrate the possible relation of the dependent variable with the independent ones, as shown in Table 2.

Table 2 – Variables of the study and operating definitions

Variable	Operating Definitions
Capital concentration	Capital concentration per shareholder
Size	Neperian Logarithm of Net Operating Revenue
Volatility	(Standard Deviation EBIT - Average) / Net Operating Revenue
Profitability	EBITDA / Total Assets
Growth opportunity	Asset Market Value / Asset Book Value
Tangibility	Fixed Assets + Stocks / Total Assets
Net debt	Loans - Cash
Long -term debt	Debts over 1 year
Book Indebtedness	Total Debt / Total Assets (accounting)
Market Indebtedness	Total Debt / Total Assets (to market)
Long -term debt / Book Equity	Debts over 1 year / book equity
Long -term debt / Market Equity	Debts over 1 year / market equity
Net debt /EBITDA	Net debt /EBITDA
Net debt / Book Equity	Net debt / Book Equity
Net Debt / Market Equity	Net Debt / Market Equity

Source: elaborated by the authors.

Based on the study variables highlighted in Table 2 and as a way to measure the relations between the dependent and independent variables, Table 3 is structured to present the econometric equation models adopted in the present research.

Table 3 – Dependent variables and equations with independent variables

Dependent variable	Equation with independent variables
Market Indebtedness	Market Indebtedness = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_{Pt}
Book Indebtedness	Book Indebtedness = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_{Pt}
Net Debt to Market Equity	Long-term Debt to Market Equity = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_{Pt}
Net Debt to Book Equity	Long-term debt to Book Equity = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_P t
Long-term Market Debt	Long-term Market Debt= β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_{Pt}
Long-term Book Debt	Long-term Book Debt = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_P t
Market Indebtedness - Long-term Debt to Equity	Market Indebtedness = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + β_7 Long-term Debt to Equity + ε_{Pt}
Book Indebtedness - Long-term Debt to Equity	Book Indebtedness = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + β_7 Long-term Debt to Equity + ε_{Pt}
Net Debt / EBITDA	Net Debt / EBITDA = β_0 + β_1 Equity Share + β_2 Size + β_3 Volatility + β_4 Profitability + β_5 Growth Opportunity + β_6 Tangibility + ε_{Pt}

Source: elaborated by the authors.

After presenting the research sample, the dependent variables, the exploratory (independent) variables and the econometric equations, section 3.3 will deal with the statistical procedures and the robustness tests performed in the present research, such as panel data (pooled or stacked aggregate model, fixed effects model and random effects model).

3.3 Statistical Procedures

The main quantitative analysis procedures applied are: (i) Shapiro-Wilk test, to evaluate whether the public companies´ observations had returns distribution close to the normal distribution, and (ii) the T Test, used to know whether the difference between the sample averages is significant, to conclude whether or not there are differences for the compared data.

For providing the statistical procedures and robustness of the present research, the panel data models are estimated in the analysis of results. According to Fávero (2013), panel data models allow the observer to evaluate the relationship of a performance variable and multiple prediction variables, thus providing a model predicting possible element differences over time and the growth of the analysis object in relation to the element and time.

Assumptions about the general model need to be specified, to make it more suitable for the best fit of the model to the observed data. Among the models combining time series data and cross-sectional data, the most used are: (i) Pooled or stacked aggregate model; (ii) Fixed effects model and (iii) Random effects model.

First, the estimators are presented using the pooled format. The data obtained independently over different periods of time can be analyzed through pooled data, as some variables may change over time. Models with fixed effects consider that the differences of individuals are captured in the constant part, while models with random effects consider that these differences are captured in the error term, as stated by Fávero (2013).

This being so, the pooled and panel data models are developed for fixed effects and random effects. To choose the most appropriate model, the following tests are used: the Chow test which signals, among the pooled or fixed effect data models, which one is the most adjusted; the Breusch Pagan test, to identify which model is the most appropriate, considering the pooled and random effect data models, and the Hausman test, to verify which of the fixed or random effects are the most suitable for the study model with the variables of the equation.

For the confirmatory tests, multicollinearity tests are applied, so that neither independent nor exploratory variables explain the same function as the other. For this, the following statistical method is applied: absence of multicollinearity analysis (VIF Test - Variance Inflation Factor), considering the segregation value equal to 10.

In other words, multicollinearity analysis is applied when, in the econometric model there is the possibility of two or more explanatory variables of the model having correlation with each other (GUJARATI; PORTER, 2011). For the purpose of corrections and adjustments of heteroscedasticity, a command is applied in STATA robust software, transforming the residues into homoscedastics, that is, allowing the distribution of residues as a constant variance, as highlighted by Hill, Judge and Griffiths (2010).

4 RESULTS

By using 1,258 observations for the 104 publicly-held companies in the sample, Table 1 shows the results of average, standard deviation, minimum and maximum observations of each variable.

Table 1- Descriptive Statistics of study variables of the econometric model

Variable	Nº of observ.	Average	St.Deviation	Min.	Max.
Capital concentration	1.258	48,19908	26,46817	5,386955	100,00
Size	1.237	14,16466	1,819767	4,787492	19,53546
Volatility	1.053	6,42375	4,540401	0,0274574	22,27711
Profitability	1.055	0,0935382	0,0624232	-0,0748728	0,484011
Growth opportunity	1.045	0,2619268	1,649032	-1,000000	48,02996
Tangibility	1.055	0,3525889	0,2342564	0,0003336	0,9255826
Book Indebtedness	1.055	1,912774	3,488684	0,0170985	81,80167
Market Indebtedness	1.023	1,415666	2,210134	0,0159968	32,83185
Net Debt to Book Equity	1.054	11,98628	19,04205	0,1650199	397,4249
Net Debt to Market Equity	1.024	9,254867	15,44567	0,1311430	207,4425
Long-term Book Debt	1.054	1,03197	1,495227	0,0045829	25,17995
Long-term Market Debt	1.023	0,8216968	1,494446	0,0027829	18,46634
Net Debt /EBITDA	1.036	-158,222	6281,718	-202027,6	3845,093

Source: elaborated by the authors.

As described in Table 1, the capital concentration variable presents an average of 48% of shareholders with concentrated capital. In other words, shareholders have almost 50%, on average, of capital concentration, specifically under their management. After the descriptive table of information, noteworthy is that, through the Shapiro-Wilk test, it is analyzed whether the observations of the public companies´ variables had returns distribution close to the normal distribution. The test allows to calculating whether or not this sample has normal distribution. The result of the normality test concludes that the distribution of returns is different from the normal distribution, which evidences a non-normal distribution of observations.

After evidencing the descriptive statistics of the study variables, the analysis and discussion of the econometric models are performed in relation to the theoretical framework. For this, Table 2 is elaborated presenting the result of the econometric model for panel data with random effects (chosen after applying the identification tests of the most appropriate model) of the variables: Market Indebtedness and Book Indebtedness.

Table 2 - Result of the econometric model for random effects of the variables: Market Indebtedness and Book Indebtedness

Variable	Market Indebtedness			Book Indebtedness		
	Coef.	Stat. Z	Signif.	Coef.	Stat. T	Signif.
Capital concentration	0,0066816	2,58	0,010	-0,0031156	-1,20	0,229
Size	-0,06527	-1,19	0,234	0,22257	3,92	0,000
Volatility	-0,1398286	-4,37	0,000	-0,2306087	-4,95	0,000
Profitability	-2,720416	-1,15	0,252	10,31918	2,64	0,008
Growth opportunity	0,073175	1,69	0,092	0,0749636	3,80	0,000
Tangibility	-1,050862	-4,10	0,000	-1,434706	-4,27	0,000
Const.	3,530737	4,11	0,000	-0,1940533	-0,32	0,173

Source: elaborated by the authors. Note: significance level at 10% (0.10).

As highlighted in Table 2, the market indebtedness variable presents a significant nominal level for the following exploratory variables: capital concentration, volatility, growth opportunity and tangibility. Regarding the capital concentration that is the central variable proposed in this research, the studies by Céspede and González (2010), Brendea (2014) and Crisóstomo and Pinheiro (2015) corroborate the results found, in which the capital concentration directly and positively impacts indebtedness. In particular, the research by Crisóstomo and Pinheiro (2015) indicated that ownership concentration has a positive linear effect on Brazilian company´s indebtedness, with the explanation associated with the aversion of threat to the controlling power by the main controlling shareholders who would be resistant to the share issuance in the financial market.

As for the book indebtedness, the significant variables in the model are: size, volatility, profitability and tangibility. In this variable, the capital concentration presents no relationship, hence allowing no kind of inference.

Continuing with the econometric models results, Table 3 provides the result of the panel data model for random effects of the variables: Net Debt to Market Equity and Net Debt to Book Equity.

Table 3 - Result of the econometric model for random effects of the variables: Net Debt to Market Equity and Net Debt to Book Equity.

Variable	Net Debt to Market Equity			Net Debt to Book Equity		
	Coef.	Stat. Z	Signif.	Coef.	Stat. T	Signif.
Capital concentration	0,0457774	2,55	0,011	-0,0292676	-0,82	0,414
Size	-1,10962	-2,95	0,003	-1,529595	-3,37	0,001
Volatility	-0,65199	-3,11	0,002	-0,4007289	-2.14	0,033
Profitability	-25,59049	-1,81	0,071	34,93098	2,48	0,013
Growth opportunity	0,4112912	1,47	0,143	-0,0506133	-0,24	0,807
Tangibility	-4,82627	-2,76	0,006	6,182344	2,94	0,003
Const.	31,08603	5,04	0,000	32,75807	4,73	0,000

Source: elaborated by the authors. Note: significance level at 10% (0.10).

Table 3 shows that, while net debt to market equity presents the variables of market concentration, size, volatility, profitability and tangibility with nominal level of significance, net debt to book equity presents only the capital concentration and corporate growth opportunity without any significant nominal level.

Pointed out is that the capital concentration variable, highlighted as the main variable of this research, presents a positive sign only for net debt to market equity, that is, the level of capital concentration is directly proportional to the capital concentration for net debt at market value, and it is in line with the researches by Céspede and González (2010), Brendea (2014) and Crisóstomo and Pinheiro (2015).

Controllers in concentrated ownership companies recourse to different means to retain control rights rather than cash flow rights, which provide them strong incentives to extract control private benefits (BEBCHUK et al., 2000; CLAESSENS et al., 2002; BENNEDSEN AND NIELSEN, 2010). Thus, conflicts of interest may arise in such companies due to the inherent tendency, by their controlling owners, to avoid potential monitoring.

Following the format of the econometric models results, Table 4 shows the results for random effects of the variables: Long-term Debt to Market Equity and Long-term Debt to Book Equity.

Tabela 4 - Result of the econometric model for random effects of the variables: Long-term Debt to Market Equity and Long-term Debt to Book Equity

Variable	Net Debt to Market Equity			Net Debt to Book Equity		
	Coef.	Stat. Z	Signif.	Coef.	Stat. T	Signif.
Capital concentration	0,0064784	3,14	0,002	-0,0008789	-0,66	0,507
Size	-0,0707394	-1,63	0,103	0,1176181	4,47	0,000
Volatility	-0,0889081	-4,56	0,000	-0,1404338	-6,08	0,000
Profitability	-1,256909	-0,93	0,352	6,598868	3,98	0,000
Growth opportunity	0,0432515	1,36	0,174	0,048355	3,67	0,000
Tangibility	-0,7080795	-3,88	0,000	-0,7528693	-4,78	0,000
Const.	2,449079	3,63	0,000	-0,093412	-0,29	0,771

Source: elaborated by the authors. Note: significance level at 10% (0.10).

Long-term debt to market equity is observed as presenting the following significant nominal levels: capital concentration, volatility and tangibility. Long-term debt to book equity provides significance for size, volatility, profitability, growth opportunity and tangibility.

The capital concentration variable, in particular, signals the possible reduction in the number of decision makers (controlling owners) - reduction of conflict between shareholders and

managers and, thus, it indicates better governance of organizations, influencing the reduction of gross and net indebtednesses. However, this role of better management of organizations may be offset by the costs that may result from ownership concentration due to the appropriation of private benefits (HOLDERNESS; SHEEHAN, 1988; SHLEIFER; VISHNY, 1997), or even by disagreement with senior management (BURKART; PANUNZI, 2006).

After the presentation of Table 4, there is the need to present the results of the econometric model for random effects of the variables: Long-term Debt to Market Indebtedness and Long-term Debt to Book Indebtedness. These new results can be viewed and pointed out through Table 5.

Table 5 - Result of the econometric model for random effects of the variables: Long-term Debt to Market Indebtedness and Long-term Debt to Book Indebtedness

Variable	Market Indebtedness to Long- term Debt			Book Indebtedness to Long- term Debt		
	Coef.	Stat. Z	Signif.	Coef.	Stat. T	Signif.
Capital concentration	0,0211124	2,21	0,027	-0,0027617	-1,83	0,068
Size	-0,190131	-1,53	0,127	0,03062	0,96	0,337
Volatility	-0,3266233	-6,76	0,000	-0,0707588	-2,34	0,020
Profitability	10,45172	2,46	0,014	3,506838	1,55	0,122
Growth opportunity	0,0646781	0,78	0,435	-0,0099119	-0,53	0,594
Tangibility	-1,594579	-2,05	0,041	-0,5340106	-2,58	0,010
Long- term debt to equity	0,048484	2,06	0,040	1,360531	12,14	0,000
Const	5,061425	2,74	0,006	0,5211354	1,45	0,148

Source: elaborated by the authors. Note: significance level at 10% (0.10).

For the Market Indebtedness and Book Indebtedness results, Table 5 provides the results evidencing capital concentration, volatility, tangibility and long-term debt/equity as variables with significant forms in both indebtednesses, all for long-term debt. The only significant variable in market indebtedness is profitability, representing a positive coefficient.

For a final analysis, Table 6 shows the econometric model result of pooled data of the Net Debt/EBITDA variable. The results obtained do not present any significant nominal level, that is, it does not allow signaling any type of influence on net debt to EBITDA.

Table 6 - Result of the econometric model for pooled data of variable: Net Debt / EBITDA

Variable	Coef.	Stand. Robust Error	Stat. T	Signif.
Capital concentration	-2,749916	2,744137	-1,00	0,316
Size	90,49689	89,7606	1,01	0,314
Volatility	14,59101	15,24971	0,96	0,339
Growth opportunity	33,0948	44,09089	0,75	0,453
Tangibility	478,6027	455,8204	1,05	0,294
Const.	-1513,06	1534,406	-0,99	0,324

Source: elaborated by the authors. Note: significance level at 10% (0.10).

For having no significance in any of the variables, no inference can be taken, in this case, on whether or not the net debt to EBITDA influences the capital concentration, size, volatility, growth opportunity and tangibility.

Finally, based on the data obtained through this research, the capital concentration is evidenced as having a significant influence on market indebtedness and on long-term net debt based on Shareholders' Equity.

5 FINAL CONSIDERATIONS

The purpose of the present research is to identify whether the capital structure of Brazilian public companies is influenced by the capital concentration level. For the development of the research, the sample comprises Brazilian publicly traded companies listed on BM&FBOVESPA. The research deals with data of 104 companies, in the period from 2008 to 2014.

The present research brings as contribution, in the light of the decision theory on capital structure, the impact of ownership concentration on indebtedness. Another contribution is the use of net debt, a concept widely used in the market, although little was explored in scientific and academic studies in Brazil.

By means of the econometric models applying, such as panel data, pooled data and random effects, the existence of a positive relation between capital concentration and market indebtedness and with long-term net debt based on shareholders´ equity is feasible to be verified. Therefore, evidence is that the variables size, volatility, profitability and tangibility also present a relation with the net debts to equity, both at market value and book value.

For the net debt to EBTIDA, it is not possible to make any kind of inference, as no significant nominal level is identified through the econometric models.

As a limitation found in the development of this research, there is the absence of a significant volume of data from some companies in some periods, due to available economic and financial data, addressed by the research, which resulted in an exclusion of these companies from the sample.

As recommendations for future research are: i) to adopt a database with Brazilian privately-held companies, through other databases having this information - Compustat and IQ Capital; ii) to use a database of companies from other countries for comparison purposes, as this study aimed at analyzing, specifically, the impact on the Brazilian scenario; and iii) to test other capital structure variables, not covered by this research, such as: (i) degree of ownership concentration (ii) capital formed by common and preferred shares; iii) nature of corporate control, and iv) level of investment in working capital needs (WCN).

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Contribution	[Author 1]	[Author 2]	[Author 3]	[Author 4]	[Author 5]
1. Definition of research problem			√		
2. Development of hypotheses or research questions (empirical studies)	√	√	√		
3. Development of theoretical propositions (theoretical work)					
4. Theoretical foundation / Literature review	√	√		√	√
5. Definition of methodological procedures	√	√	√		
6. Data collection					
7. Statistical analysis	√	√			
8. Analysis and interpretation of data	√	√	√		
9. Critical revision of the manuscript			√	√	√
10. Manuscript writing	√	√		√	√
11. Other (please specify)					