

# CAPITAL STRUCTURE AND INFORMATION ASYMMETRY: A STUDY OF BRAZILIAN PUBLICLY TRADED COMPANIES OF TEXTILE AND ELECTRICITY INDUSTRIES

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## ABSTRACT

Given the various theories of capital structure and the Pecking Order theory, the present study related the information asymmetry and the capital structure of companies aiming to verify if information asymmetry affects the definition of the capital structure of Brazilian companies held in the electric power industry and textile. The research involved a sample of 53 companies, 31 of the electricity and 22 textiles sector during the years 2008 to 2012. The methodology used was regression with panel data, it allows the same unit cross-sectional monitored over time. The results showed that information asymmetry is an important determinant of capital structure, but that the sectors diverge with respect to the Pecking Order Theory. In the case of the energy sector to reduce information asymmetry led to a propensity for debt, while the textile sector, the opposite occurred, as companies less susceptible to information asymmetry are averse to debt.

**Keywords:** Pecking Order Theory. Regression with panel data. Fixed and random effects.

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# 1 INTRODUCTION

The manner which companies define their capital structure has been a subject discussed for a long time, but so far, it is not possible to identify a single factor that can be considered determinant for the capital structure. This fact can be confirmed due to the amount of theories that try to explain what companies use as reference when choosing sources to fund their activities.

Modigliani and Miller (1958) in a first study related to the capital structure created three propositions. The first one arguing that the total cost of capital remained unchanged regardless of the level of financial leverage, since the value of a company depends on the quality of its assets and not on the way that it is financed.

However this proposition was created under three hypotheses that reflect an efficient market: there is no income tax; there are no bankruptcy costs, which justifies the fact that the cost of capital does not change when facing high levels of indebtedness; and it is possible for investors to conduct arbitrage in the market.

In a second study, Modigliani and Miller (1963) considered the existence of the income tax and the consequent benefit of the debt, reconsidering that through the use of financial leverage, it is possible to raise the value of the company, reducing the total cost of capital.

Several studies have succeed since this, indicating that factors such as market imperfections, bankruptcy costs, agency costs, and so on, all interfere with the way that companies finance their activities.

Theories have emerged, such as the Free Cash Flow, which focuses on agency relations, and the Trade-off that governs the debt financing decision, seeking an optimal capital structure (MYERS, 2001). Myers and Majluf (1984) and Myers (1984) emphasize in their work that the determining factor for the capital structure is the information asymmetry, which gave rise to the Pecking Order theory.

The use of resources from sources that do not influence, or which has less impact on, the information asymmetry would prevent the company from incurring costs, such as the agency cost, as discussed by Jensen and Meckling (1976).

Faced with the impasse in relation to the determinants of the capital structure, it is necessary to apply theories within the Brazilian market. The purpose of this study was to verify if the information asymmetry interferes with the definition of capital structure in Brazilian publicly traded companies in the electricity and textile sector from 2008 to 2012.

The work is justified by the recurrent need for research in the area, when it comes to Brazilian companies. The theory, initially developed by Myers and Majluf (1984) and Myers (1984), deals with a different market from Brazil, where structural and even macroeconomic characteristics can influence it when it comes to a peculiar subject such as capital structure. Thus, it was intended by a study conducted in the Brazilian publicly traded companies of the electric and textile sectors to contribute to the debate regarding studies related to the capital structure of specifically Brazilian companies, emphasizing and clarifying how the asymmetry of information interferes with this process.

The electrical energy sector was chosen by Modigliani and Miller (1958) to compose the sample that tested their theories, as in the present study. The textile sector was also analyzed as a counterpoint to the energy sector, given the different sectorial characteristics. In addition, the choice of these sectors is justified by the fact that they are two sectors of great importance in the national context. The electricity sector, considering generation, transmission and distribution, totaled R\$ 15.3 billion in 2012, 17% more than in 2011. (ABINEE, 2013). In addition, in 2011 the Brazilian electricity sector had a total of 123,013 formal jobs, 15.6% higher than in 2004 (DIEESE,

2013). The textile sector, for its part, reached a figure of US\$ 58.2 billion in production figures and 1.7 million of direct jobs in 2012. (IEMI, 2013)

However, it is worth mentioning that these two sectors live different times in their economic trajectories. While the energy sector is experiencing a moment of expansion, receiving large capital contributions through financing offered by banks like BNDES (BAHNEMANN, 2013), the textile sector is experiencing a crisis caused by the large volume of foreign products from Asian countries. (Da COSTA and Da ROCHA, 2009). This discrepancy in the economic scenario of the two sectors will make it possible to verify if there are still common situations in the two sectors involved in the analysis, when dealing with capital structure and information asymmetry.

The period of analysis was in relation to the years 2008, 2009, 2010, 2011 and 2012. The choice of this period is due to the fact that the electricity sector is dependent on a water matrix that came into crisis from the year 2013. According to the National Water Agency of Brazil (2014) since 2013 the reservoirs in the southeast of the country have been showing successive monthly drops in storage levels, affecting directly the sector. Given this, the period chosen is justified by the fact that the study is not affected by this situation.

## 2 THEORETICAL FUNDAMENTALS

### 2.1 Agency Theory

Jensen and Meckling (1976), following the ideals of Coase (1937), define the company as a nexus of formal and informal contracts that serve to interconnect and mediate the relations between the individuals that make up the organizations.

In this sense, Jensen and Meckling (1976) point out that one of these contracts is characterized by the relationship between the capital providers, represented by the owners and / or shareholders and the administrators and / or managers of the entity. This relationship is due to the fact that it is not possible for capital providers to anticipate all situations arising from contracts, causing owners (main) to pass the responsibility of decision making to the manager.

Ross (1973), when studying the remuneration of managers and the relationship between the interests of owners and managers, argues that the agency relationship is old and common, as it results from the social interaction between two parties, when one of them is hired (agent) to act representing the interests of the other (principal).

In order to mitigate this divergence, the main can act by monitoring the activities and decisions of the agent, as well as offering incentives to act according to their interests. However, as highlighted by Fama and Jensen (1983), it is not possible for monitoring and incentive offerings to occur without incurring costs. These costs are called agency costs. (JENSEN and MECKLING, 1976).

### 2.2 Corporate governance

Although it seems to be a recent issue, corporate governance is already an old one and its linked to the agency relationships addressed by Jensen and Meckling (1976).

Corporate governance can be understood as a set of internal and external control mechanisms and incentives, which aims to minimize the costs arising from the agency problem. (SHLEIFER E VISHNY, 1997; SILVEIRA, 2006; SILVEIRA, PEROBELLI *et al.*, 2008)

According to Gugler (2001) there are two main conflicts that corporate governance seeks to address: the conflict between the controlling shareholder and minority shareholders; and between the agent and the shareholders.

Andrade and Rosseti (2004) also affirm that governance practices must be able to act also in those conflicts originated by a dispersion of property and a control system that is not adequate.

### **2.3 Information asymmetry**

As Milgrom and Roberts (1992) point out, information is usually imperfectly distributed among agents, a fact that precludes the market equilibrium proposed by traditional theories, which has brought new ways of understanding how certain kinds of market failures arise.

In situations where ex post information asymmetries occur, ie when an agent holds more information than other agents involved in the transaction after the contract is closed, the possibility arises that this better informed agent does not behave in an efficient manner as expected. This situation is called moral hazard. (WILLIAMSON, 1985)

With regard to pre-contractual situations, ex ante, where one of the parties involved has more information before the contract is executed, the problem of adverse selection arises, which allows the better informed party to insert questions for their benefit in the contract. These two situations are considered as opportunism, a problem arising from information asymmetry. (WILLIAMSON, 1985)

Faced with the issue of informational asymmetry, a trend emerges that addresses the asymmetry as determinant of the capital structure. According to Myers and Majluf (1984) and Myers (1984), precursors of this theory, the capital structure is used as a way to mitigate the problems caused by information asymmetry in the financing decisions of the company. From this, the authors develop a hierarchy in relation to the preferential sources of financing by the companies.

### **2.4 Capital structure**

One of the central and most debated financial themes is the capital structure. The capital structure is understood as the form and proportion that companies use their own capital and the capital of a third party to finance their activities. (BRITO et al., 2007)

In general, equity is that provided by shareholders and/or shareholders and the capital of a third party is that obtained through debt. (ASSAF NETO, 2003)

In this way, it would be advantageous for the company to use only debts, given the tax benefit generated by leverage. This assertion, however, is not verified in practice, as emphasized by Famá and Grava (2000), a high level of indebtedness can cause problems for the company, given the risk of insolvency in the face of high financial expenses. This question, still in process, gave rise to a discussion on the subject and to the emergence of various studies about the capital structure.

Myers (2001) presents an overview of the theories that focus on the attempts to explain the factors that drive corporate financing decisions, especially the Free Cash Flow, Trade-off, and Pecking Order theories. This last theory is treated with more attention, since the objective of the research is to verify if the asymmetry of information, central factor of the Pecking Order theory, interferes in the capital structure of Brazilian publicly electric and textile traded companies.

### **2.5 Pecking Order Theory**

The Pecking Order Theory (POT) of Myers and Majluf (1984) and Myers (1984), does not assume the existence of an optimal capital structure. It predicts the existence of a hierarchical

order for the choice of company financing, first using resources generated internally (retention of profits), second from debt securities and finally the issuance of shares.

This hierarchy is based on the idea that every action of the company generates a signal to the market, in which the use of resources less prone to information asymmetry is preferable.

Internally generated resources, in sum, obtained through retention of profits, do not carry transaction costs and do not correspond to information asymmetry, and it is assumed that more profitable companies tend to have more resources available, not having to resort and incur the risk of a high level of indebtedness.(MYERS, 1984; MYERS and MAJLUF, 1984)

For Myers (1984), when the company does not have internal cash flow to finance its capital expenditures, it will resort to the issuance of debt securities rather than the issuance of shares. This is due the fact that whenever the company releases the information that it is issuing debt securities, the market rates it as a positive sign, demonstrating that the company is growing and it's able to raise financing. The use of such mechanism can also be beneficial with regard to information asymmetry. When collecting debts, the creditors demand information regarding to the company, so that it can be correctly evaluated, avoiding errors in the contract. This fact diminishes the informational asymmetry between managers and creditors.(DANTAS and SOUZA, 2008).

At the end of the hierarchical order is the issue of shares. When issuing shares the company signals negative information to the market. Because of the existing information asymmetry, investors may have less information about the value of the company than managers, indicating that stock prices may be undervalued by the market. (MYERS and MAJLUF, 1984)

## 2.6 Empirical Evidence

There is no consensus on the determinants of capital structure, as in the informational asymmetry, addressed by POT, or in other factors. Some findings in the literature are presented below.

Albanez and Valle (2009) sought to identify if informational asymmetry influences the way of Brazilian companies financing. The study was conducted with Brazilian publicly traded companies between 1997 and 2007, using the panel data methodology. As a way of measuring information asymmetry, the authors used as proxies the variables companies listed in the levels of corporate governance, companies that issued shares or bonds (American Depositary Receipts - ADRs) on the New York Stock Exchange (NYSE), companies listed for the transparency trophy, liquidity in the stock market, volatility and intensity of the business. The authors have used the variables: size, tangibility, intangibility, profitability and risk as control variables. As a dependent variable, the authors assumed the variables related to the capital structure. The main result pointed out that companies with lower levels of information asymmetry are more indebted, contrary to the Pecking Order Theory.

Frank and Goyal (2003) in a study with a large sample of US companies from 1971 to 1998 found evidence that contradicts the POT when applying the multiple regression method.

Fama and French (2002) conducted a study to verify which theory best applied to reality. They conclude that both the Trade-off and the Pecking Order theories are applied, depending on the current situation of the company. The results were found through multiple regressions that sought to understand the behavior of dividends and the leverage.

Nakamura Martin et al. (2007) in a study carried out in Brazil, from 1999 to 2003, concluded that both the Pecking Order theory and Trade-off theory are applicable in the Brazilian reality. The sample used in the study was composed of 91 publicly traded companies. The method used was the panel data model, in which the dependent variables used are proxies of financial

leverage, identified by market indebtedness and accounting indebtedness. In relation to the independent variables, the authors used those that they considered as proxies of the different determinants of the capital structure, being: Current liquidity, Company size, Profitability, Expected growth by market value differential, Business risk measured by profit volatility, fiscal economy, and sales growth.

Famá et al. (2001) carried out a study with 68 companies from the North American market, as well as 33 Latin American companies, all from the electric power sector. The multiple regression model was applied and the results also pointed out that Pecking Order was the dominant current for the capital structure of the sample companies.

## **3 METHODS**

### **3.1 Sample and Data Source**

The sample used includes Brazilian publicly traded companies in the electricity and textile sectors listed on the Bovespa, with data from the years 2008, 2009, 2010, 2011 and 2012. The data were collected through the Economática database.

At the end of the filtration, the sample had a total of 53 companies, being 31 of the electric power sector and 22 of the textile sector. Companies that did not present data for the 5 consecutive years of analysis and those that did not include all the variables necessary for analysis were excluded.

In the electricity sector, the 31 companies included in the sample represent 75.6% of the total companies in the sector listed on the Bovespa. Of the total of 31 companies in the sample, according to Exame magazine's ranking, 4 of the 5 companies that had major improvement and the 5 companies with the highest billings in 2012 were included.

Regarding the textile sector, the representativeness of the 22 companies in the sample reaches approximately 81.5% of the total number of companies listed on the Bovespa in the sector. According to the Exame magazine's ranking, 4 of the 5 companies that had the most improvement in the sector are included in the sample, as well as the 5 companies in the sector that most profit in 2012.

Data related to information asymmetry proxies were collected through the External Disclosure System of the Securities and Exchange Commission of mobile values.

### **3.2 Variables**

#### **3.2.1. Measuring Information Asymmetry**

Considering the difficulty of obtaining direct data regarding information asymmetry, the measurement was done through proxies. Such proxies are identified in similar and recent works like Iquiapaza et al (2007), Albanez and Valle (2009). These authors assume in their works categorical variables (dummies), in which the value 1 corresponds to companies that present the condition of value in question and 0 in other cases, besides the numerical variables. In this way, the following independent variables were used, as categorical variables, in order to measure information asymmetry:

- CG: Companies that are listed on some level of Corporate Governance, being Level 1, Level 2 or New Market. This variable was used in studies such as Iquiapaza et al (2007) and Albanez and Valle (2009). According to these authors, adhering to some level of corporate governance requires that the companies disclose a greater amount of information, a fact that reduces informational asymmetry.
- CEO: Chief Executive Officer and Chairman of the Board of Directors are different people. Almeida et al. (2013) argue that when the company's CEO and chairman are different people, control concentration is avoided and also the asymmetry of information between managers and other stakeholders.
- ANEFAC: Companies winners of the Transparency Trophy, carried out by National Association of Executives of Finance Administration and Accounting (ANEFAC, in Portuguese) that rewards companies with the best accounting practices and the most objective set of market information. Thus, as discussed by Albanez and Valle (2009), there is an important variable, since with more transparency the informational asymmetry is reduced.
- ADR: Companies that created shares or bonds in the US market (American Depositary Receipt) on the New York Stock Exchange (NYSE). According to Iquiapaza et al (2007), access to the American market means that the company has a huge need for information disclosure, which reduces the asymmetry of information.
- TAC: Total of administrative counselors - The use of this variable is justified by the fact that the higher the number of members in the board is, the company has fewer chances to suffer asymmetry of information, because according to IBGC (2010) The role of the board is to value and protect the organization, aiming the balance between the wishes of the stakeholders;
- Indep.: Percentage of independent counselors on the board of directors - The use of this variable is justified by the fact that it is understood that the greater the number of independent directors less likely to asymmetry of information the company is. This is because, according to the IBGC (2010), the greater the number of independent advisors, the more closely in line with good corporate governance practices, the company will be;
- Total1: Total percentage of shares in the hands of the largest shareholder - The use of this variable is due to the fact that companies with very concentrated stocks tend to be more susceptible to information asymmetry, since the majority shareholder has greater possibility of having privileged information regarding other minority shareholders. Similar variable was used in the works of Procianny and Schnorrenberger (2004).

### 3.2.2 Control Variables

Albanez and Valle (2009) and Iquiapaza et al (2007) point out that control variables are also important determinants of the capital structure of companies, since they represent important attributes particular to the entities. In this way, the following variables were used:

**Size:** Calculated by the natural logarithm of total assets - Brito et al (2007) argue that the size of the company may have an impact on its capital structure, indicating that in the case of the Brazilian market, large companies have greater access to long-term credit than small companies. The variable was logarithmized to reduce possible problems in the models caused by the discrepancy of these values between one company in relation to another.

**Risk:** Beta Coefficient in year  $t$  - Halov and Heider (2003) stress that risk reduces debt capacity and increases its cost, showing then an inverse relationship between risk and indebtedness.

**Interest:** Interest rate in the year (represented by the basic interest rate, SELIC) - Although it

was not characterized as a specific attribute of the company, the interest rate was included as a control variable since the Brazilian market interest rate differs from a developed market, such as the American, in which the Pecking Order Theory was developed. Thus, it can be assumed that the high interest rate hinders the access to leverage, indicating a negative relation with the indebtedness.

**Profitability:** Asset profitability, calculated by the ratio of total operating profit to total assets - Halov and Heider (2003) point out that larger companies tend to have a better image in the creditors' opinion, which facilitates access to the debt market with better conditions.

**Liquidity:** Liquidity on Bovespa - Bharath et al (2009) further assert that liquidity may be related to information asymmetry. For these authors, the greater the liquidity, the lower the asymmetry, leading to non-indebtedness.

### 3.2.3 Capital Structure

In order to verify the influence of the information asymmetry in the definition of the capital structure, it was represented in this paper by the Debt variable, calculated by gross debt/total assets. The choice of this variable, which was treated as the dependent variable, stems from the fact that companies with high indebtedness present high proportions between gross debt and total assets.

### 3.2.4 Panel Data Analysis

According to Gujarati (2006), the panels are configured in two forms, the balanced and unbalanced. The balanced panel is the one with the same  $T$  periods for the same cross-sectional units  $N$ , in the case of the unbalanced panel, some cross-sectional units do not present some periods of analysis.

When treating these two panel configurations, Wooldridge (2006) highlights fixed effects and random effects. The fixed effects model is applied directly to unbalanced panels. This model allows the intercept to vary for each unit of cross section, respecting the specific characteristics of each one, but it is assumed that the angular coefficients are constant between them. The fixed effects estimator considers as arbitrary correlation the unobserved characteristics of



each cross-sectional unit, and independent variables in any time period. When dealing with random effects, unlike fixed effects, it assumes that the unobserved characteristics are correlated with the explanatory variables. The generic equation is shown below.

$$Y_{it} = \beta_{0i} + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it}$$

Gujarati (2006) also points out that the difference between the two models is that in the case of fixed effects, each cross-sectional unit has its own intercept value, in all N values for N cross-sectional units. In the random effects, the intercept  $\beta_0$  represents the average value of all cross-sectional intercepts and the element error represents the random deviation of the individual intercept of its average value. The decision rule is performed by the Hausman test. This test assumes as null hypothesis that the differences between the fixed and random effects is not systematic. In the case of differences between the two models, this is interpreted as evidence in favor of fixed effects, thus rejecting the null hypothesis.

According to Gujarati (2006, p. 514) the use of the panel data method has several advantages, including “more informative data, more variability and less collinearity between variables.” The same situation is highlighted by Hsiao (1986), which says that the collinearity between the independent variables is reduced.

Stata software version 12 was used to process the data.

## 4 RESULTS AND DISCUSSION

### 4.1 Panel data analysis

#### 4.1.1 Electric Power Section

In the case of the electric power sector the Hausman test, with p-value 0.0002, presented that the best model to be used would be the fixed effects model. The Wald test was used to detect heteroskedasticity, Wooldridge test for autocorrelation detection and variance inflation factor to detect multicollinearity problems, as highlighted by Gujarati (2006). The results for multicollinearity detection are shown in Table 1.

Table 1 – Variance Inflation Factor for energy sector

Variable	VIF
Interest	1,05
Risk	1,04
Profitability	1,36
Size	2,36
Liquidity	1,66
TAC	1,83
Indep	1,14
ADR	2,75
CEO	1,25
ANEFAC	1,17
CG	2,14
Total1	2,39

Source: Prepared by the authors (2013)

According to Table 1, it can be seen that no variable presented problems of multicollinearity, since all values obtained were less to 10.

The Wald test used to detect problems of heteroscedasticity in fixed effects panels assumes as null hypothesis that the data are homoscedastic. The test result, analyzed through the p-value (0.00) offered subsidies to reject the null hypothesis. The Wooldridge test was used to detect autocorrelation problems. The test assumes, as null hypothesis, the absence of autocorrelation. The test result with p-value 0.00 rejected the null hypothesis. Considering the results obtained from the tests, the models were corrected using the Newey-West methodology (1987), since it is a robust estimator in the presence of both heteroscedasticity and autocorrelation.

Nine models were estimated. The first to seventh counted on the control variables and a proxy variable of information asymmetry. The model 8 was composed of all the control variables: Interest, Risk, Profitability, Size and Liquidity, as well as proxies of asymmetry, which are TAC, Indep, ADR, CEO, ANEFAC, CG and Total1. The last model counted only on the proxies variables of information asymmetry, as follows.

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 TAC_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 Indep_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 ADR_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 CEO_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 ANEFAC_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 CG_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 Total1_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 Interest_{it} + \beta_2 Risk_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 TAC_{it} + \beta_7 Indep_{it} + \beta_8 ADR_{it} + \beta_9 CEO_{it} + \beta_{10} ANEFAC_{it} + \beta_{11} CG_{it} + \beta_{12} Total1_{it} + u_{it}$$

$$Debt_{it} = \beta_{0i} + \beta_1 TAC_{it} + \beta_2 Indep_{it} + \beta_3 ADR_{it} + \beta_4 CEO_{it} + \beta_5 ANEFAC_{it} + \beta_6 CG_{it} + \beta_7 Total1_{it} + u_{it}$$

The estimation purpose of the first seven models was to verify the isolated effect and each proxy, together with the control variables. These models sought to evidence the joint behavior of the proxy variables in a gradual way. The eighth model had all the variables, control and proxies, in order to verify how the variables behave together. The ninth model was constructed only with the proxies variables to verify if the asymmetry of information, represented by them, interfere in the capital structure of the companies.

Table 01 considers the output of the panel data regression models with fixed effects for companies that made up the sample of the electric power sector.

Table 1 - Fixed effect Panel Data Model with Newey West correction. Dependent variable: Debt

Independent variables	Equation (1)		Equation (2)		Equation (3)		Equation (4)		Equation (5)		Equation (6)		Equation (7)		Equation (8)		Equation (9)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Interest	-0.25	0,603	-0.37	0.430	-0.36	0.463	-0.32	0.509	-0.36	0.474	-0.46	0.351	-0.31	0.525	-0.26	0.558		
Risk	-0.03	0,000	-0.03	0.000	-0.02	0.000	-0.03	0.000	-0.02	0.000	-0.03	0.000	-0.04	0.000	-0.05	0.000		
Profitability	-0.08	0,615	-0.21	0.226	-0.12	0.508	-0.17	0.350	-0.10	0.555	-0.04	0.784	-0.13	0.449	-0.31	0.091		
Size	5.217	0,000	3.572	0.000	3.795	0.001	3.31	0.006	4.02	0.000	5.08	0.000	5.33	0.000	3.57	0.015		
Liquidity	-7.45	0,407	-1.38	0.857	-5.74	0.447	-3.18	0.695	-4.30	0.595	0.13	0.990	-4.13	0.642	-0.60	0.949		
TAC	-0.89	0,109													-1.17	0.804	0.27	0.706
Indep			0.467	0.000											0.34	0.000	0.33	0.000
ADR					9.992	0.001									14.92	0.000	16.99	0.000
CEO							12.89	0.001							12.29	0.000	16.26	0.000
ANEFAC									5.78	0.050					-1.94	0.621	-2.69	0.587
CG											-5.47	0.110			-2.83	0.441	-0.43	0.878
Total1													0.14	0.012	0.12	0.099	0.06	0.350
Constant	-40.98	0.025	-64.78	0.000	-25.76	0.161	-29.86	0.096	-29.28	0.110	-43.02	0.021	-57.42	0.004	-71.05	0.001	-23.74	0.036
Observations	155		155		155		155		155		155		155		155		155	
F (p-value)	Equation (1)		Equation (2)		Equation (3)		Equation (4)		Equation (5)		Equation (6)		Equation (7)		Equation (8)		Equation (9)	
	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	

Source: Prepared by the authors (2013).

Observing Table 01, it is important to note that the F statistic, represented in this case by p-value, rejected the null hypothesis that the combined effect of the explanatory variables on the dependent variable is null at a significance level of 1% for all models.

It is worth highlighting the use of the model 9. This model is restricted to variable proxies of information asymmetry, and it was intended to verify if, in fact, these variables interfere in the capital structure of companies. The p-value result of the F statistic was significant at 1%, indicating that the combined effect of the explanatory variables, which in this case reflect the asymmetry of information, in the dependent variable is not null, confirming that they influence the variable that reflects the capital structure of companies.

In the analysis of variables step, it is noted that the following coefficients of the variables: Interest, Profitability and Liquidity were not significant in any of the models, and in this situation they cannot be interpreted. In this study, the coefficients were considered significant considering p-values less than 0.10. This choice refers to the fact that in econometrics the significance is usually set at 1%, 5% or until 10%, as highlighted by Gujarati (2006)

In relation to the other control variables, the Risk variable coefficient, represented by the Beta of the companies of the sample, was significant at 1% in all the models in which it was inserted, with coefficient around -0.03. This negative relation confirms what was expected and corroborates with the studies of Halov and Heider (2003). The rationale is that risk hinders access to leverage, making debt more expensive and less viable.

The other control variable that presented a significant coefficient in all models was the Size, represented by the natural logarithm of the total assets, with significance of 1% in the first seven models and 5% in the last one. The coefficient that was positive in all situations varied between 5.33 and 3.31. The result shown was expected. This is because, as highlighted by Halov and Heider (2003), it is understood that larger companies have a "better reputation" and, consequently, more access and facility to indebtedness than smaller companies.

The results found corroborate with the findings of Harris and Raviv (1991), Brito et al (2007) and Albanez and Valle (2009) and it is in agreement with what was obtained by the correlation analysis, which established a positive relation between the independent variable size and the debt dependent variable. The result found is even more evident when taking into account the sector in question. In this case, larger companies have a better reputation, less risk of bankruptcy, and are better suited to lenders to borrow, especially if it is a market in which leverage has been greatly facilitated as highlighted by Bahnemann (2013) and Ventura Filho (2013) as is the case with the energy sector.

Regarding the proxies variables of information asymmetry, it is worth mentioning initially that the variable TAC, that indicates the total number of directors of the board of directors, and the variable CG, that indicates the companies that adhere to some level of corporate governance, were not significant in either of the two models that they have been included.

The Indep variable that indicates the percentage of independent directors of the board of directors had a significant coefficient of 1% in all three models in which the variable was included. The coefficient was positive in all cases, indicating that companies with greater number of independent directors tend to get more debt. This situation is contrary to what is expected, as presented in the Good Corporate Governance Practices Manual (IBGC, 2010), as the greater the number of independent directors, the less the possibility that the board is "contaminated" by the interests of the administration, that is, less likely to asymmetry of information is the company. The result, however, was consistent with the one found in the correlation analysis between this

proxy and the dependent variable. The explanation for this situation may lie in the fact that a reduction in the asymmetry of information leads to the market more information about the company, facilitating the evaluation by creditors. The increase in indebtedness can then be explained by the momentum experienced by the energy sector, which goes through a phase of a large supply of financing, facilitating access to leverage, as reported previously.

The ADR binary variable also presented a statistically significant coefficient in the three models in which it was included, with a significance level of 1% in all three models. The coefficient is not in accordance with the expected one, because as it was emphasized by Iquiapaza et al (2007), it is understood that companies that issue ADRs, that is, stocks or bonds in the American market, are more transparent due to the greater demand of accuracy of information by the American market, which reduces informational asymmetry. However, Albanez and Valle (2009) also argue that the increase in the strict disclosure of information facilitates access to the credit market, given the reduction of risk by creditors, as well as causing more attractive rates to be capped, situation that fits the current moment experienced by the energy sector, which has been benefited by a large amount of financing.

As for the proxy of the asymmetry which seeks to identify the companies in which the executive director of the company and the president of the board are different people, the coefficient of the variable DE, was also significant in the three models in which it was inserted, at a level of significance of 1%. The result found was a positive coefficient, indicating that companies in which the chairman and CEO of the company are different people tend to have more debts. The result is contrary to the expected one. The reason, as IBGC (2010) points out, is that the board of directors represents the link between ownership and management of the company, with the objective of guiding and supervising the relationship between the company management and the other stakeholders. Therefore, companies that the chairman and the CEO of the company are different people tend to be less passive on asymmetry of information, because in this case, it becomes safer the effective fulfillment of the board's objective.

Almeida et al (2013) also argue that companies whose the CEO and the chairman are different people avoid concentration of control and consequently the asymmetry of information between managers and other stakeholders. This situation contrary to what was expected can be explained once again by the sector in question. The reduction of information asymmetry facilitates the assessment of companies by creditors, increasing access to credit, which in the case of the energy sector was abundant in the studied period.

The ANEFAC binary variable, assumed as a proxy for information asymmetry, indicates the winners of the Transparency Trophy Award from the National Association of Executives in Finance, Administration and Accounting. These companies are those that have shown more transparency among competing companies. According to Albanez and Valle (2009), there is an important proxy for information asymmetry, since the greater the transparency, the less is the possibility of information asymmetry. The coefficient of this variable was significant at 5% and positive in the first model in which it was included. In this condition, there are companies that were winners of this trophy, that is, less likely to asymmetric information, tend to get more debt.

The result found contradicts the expected again. One more time, this situation can be explained by the moment that the industry experienced during the period of analysis. Companies that earn the transparency trophy have clear and objective information disclosed to the market, which facilitates the evaluation of the company by creditors, facilitating access to credit. This sit-

uation is evident when taking into account the large amount of credit offered to the sector during the analyzed period.

Finalizing the detailed analysis of the proxies, we follow to the analysis of the variable Total1 that indicates the amount of total shares in the hands of the largest shareholder. This variable was assumed as a proxy for asymmetry, since it is understood that a large number of shares in the hand of a single shareholder leads to information asymmetry, as it is easier to have access to information than other minority shareholders. The coefficient of this variable was positive in the first two models in which it was inserted, being significant at 5% and 10% respectively. This fact corroborates with the expected, since the companies with very concentrated stocks tend to get more debt, since they are more likely to asymmetry of information. This result also confirms the positive and significant correlation obtained previously. However, it is worth noting that Pro-cianoy and Schnorrenberger (2004) found that open capital Brazilian companies with concentrated ownership tend to be less indebted.

#### 4.1.2 Textile sector

Regarding the textile sector, the best adjusted models were those of random effects, as pointed out by the Hausman test, which presented p-value of 0.996. The models were corrected by means of the estimation of the robust standard errors, in order to correct heteroscedasticity problems, detected by the Wald test that presented p-value (0.00), rejecting the null hypothesis of absence of heteroscedasticity. The Wooldridge test was also performed to verify the existence of autocorrelation. The test reported the result of p-value 0.788, indicating absence of autocorrelation. It was also verified the existence of multicollinearity, by the Variance of Inflation Factor, as shown in Table 2.

Table 2 - Variance of Inflation Factor for textile sector

Variable	VIF
Interest	1.04
Risk	1.24
Profitability	1.50
Size	1.86
Liquidity	1.21
TAC	1.62
Indep	1.94
ADR	2.04
CEO	1.05
ANEFAC	1.93
CG	1.41

Source: Prepared by the authors (2013)

As shown in Table 2, VIF values indicate that there are no multicollinearity problems, since no value was greater than 10.

Eight models were estimated. The first six were composed by the control variables and a proxy variable of information asymmetry. The seventh model was composed by all control variables: Interest, Risk, Profitability, Size and Liquidity, as well as the proxies of the asymmetry, which are TAC, Indep, CEO, ANEFAC, CG and Total1. The last model was restricted to the proxies of variables asymmetry of information, as it follows.

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 TAC_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 Indep_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 CEO_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 ANEFAC_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 CG_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 Total1_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 Interest_{it} + \beta_2 Risco_{it} + \beta_3 Profitability_{it} + \beta_4 Size_{it} + \beta_5 Liquidity_{it} + \beta_6 TAC_{it} + \beta_7 Indep_{it} + \beta_8 CEO_{it} + \beta_9 ANEFAC_{it} + \beta_{10} CG_{it} + \beta_{11} Total1_{it} + w_{it}$$

$$Debt_{it} = \beta_0 + \beta_1 TAC_{it} + \beta_2 Indep_{it} + \beta_3 CEO_{it} + \beta_4 ANEFAC_{it} + \beta_5 CG_{it} + \beta_6 Total1_{it} + w_{it}$$

It is important to inform that the textile sector presented a less model in relation to the electric power sector, since the ADR variable was not contemplated in any model. This was because no sample company in the textile industry issues stocks or bonds on the NYSE. Table 2 presents the regression results with panel data by random effects, with gross standard error correction.



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Table 2 - Panel Data Model with random effects, corrected by gross standard error. Dependent variable: Debt.

Independent variables	Equation (1)		Equation (2)		Equation (3)		Equation (4)		Equation (5)		Equation (6)		Equation (7)		Equation (8)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
Interest	-0.99	0.073	-0.94	0.077	-0.90	0.091	-0.95	0.080	-0.93	0.089	-1.02	0.058	-0.89	0.096		
Risk	8.53	0.172	8.58	0.170	8.67	0.172	8.56	0.173	8.91	0.162	7.42	0.175	7.78	0.167		
Profitability	-0.06	0.364	-0.05	0.381	-0.05	0.367	-0.06	0.373	-0.05	0.379	-0.06	0.350	-0.05	0.374		
Size	-2.52	0.683	-2.65	0.673	-2.34	0.700	-2.29	0.710	-1.62	0.796	-1.76	0.766	-1.44	0.82		
Liquidity	-14.2	0.076	-14.1	0.067	-13.9	0.080	-14.6	0.063	-13.7	0.081	-19.0	0.080	-16.4	0.023		
TAC	0.48	0.702											0.39	0.834	0.03	0.999
Indep			0.10	0.376									0.19	0.190	0.25	0.33
CEO					-4.12	0.273							-6.23	0.171	-8.26	0.019
ANEFAC							-3.74	0.018					-3.47	0.022	-5.08	0.000
CG									-11.0	0.100			-13.2	0.188	-14.63	0.106
Total1											-0.19	0.217	-0.23	0.201	-0.25	0.261
Constant	67.60	0.434	62.86	0.455	69.0	0.418	67.15	0.435	0.107	0.484			54.02	0.534	27.09	0.125
Observations	110		110		110		110		110		110		110		110	
	Equation (1)		Equation (2)		Equation (3)		Equation (4)		Equation (5)		Equation (6)		Equation (7)		Equation (8)	
F (p-value)	0.0077		0.0068		0.0075		0.0000		0.0101		0.0028		0.0000		0.0000	

Source: Prepared by the authors. 2013.

Analyzing the output of the textile sector regression, presented in table 02, it is initially estimated that the p-value of the F statistic was significant at 1% for all the estimated models.

Initially the model 8 was analyzed, which was composed by the restricted variables the information asymmetry proxies. The construction of this model has the same purpose as the one previously constructed for the energy sector, and its purpose is to verify if, in fact, proxies variables of information asymmetry interfere in the capital structure of companies. The result of the p-value of the F statistic rejects the null hypothesis, indicating that the asymmetry of information interferes in the capital structure.

Analyzing initially the control variables, it is possible that the coefficients of the Interest and Liquidity variables were significant. In the case of the variable Interest, which was represented by the Selic rate, it was significant at 10% in all estimated models. The negative coefficient indicates what is expected, that the increase in the interest rate tends to reduce the propensity to borrow, as it becomes more expensive.

Considering the variable Liquidity, which is measured by the liquidity at Bovespa, it also showed a significant coefficient of 10% in all models, always showing a negative sign. The result confirms the negative correlation with the dependent variable presented previously. The result was already expected since, as argued by Agarwal and O'hara (2007), more liquid securities have lower costs of issuance and repurchase of their shares, leading to a decrease in leverage. In addition, Bharath et al (2009) point out that more liquid companies are less susceptible to information asymmetry, a fact that contradicts indebtedness. This result was also found in Albanez and Valle (2009).

Regarding the proxies of informational asymmetry, the CEO variable considers if the company's executive director and the board of directors are different people, it presented a negative and significant coefficient of 5%. This result is in line with the expected result, since companies in which the positions of executive director and chairman of the board of directors do not accumulate tend to be less likely to undergo asymmetry of information, indicating then that these companies incur less debt.

The ANEFAC binary variable, which lists the winning companies of the Transparency Trophy promoted by the National Association of Executives of Finance, Administration and Accounting (ANEFAC) presented a coefficient with significance of 5% in the first two models in which it was included, from 1% in the eighth model. The result found was a negative coefficient in the three regressions, a situation that shows itself as expected, since companies that win the premium tend to be less susceptible to informational asymmetry, given the transparency of the information and, consequently, a lower tendency towards indebtedness, as discussed by Albanez and Valle (2009).

Analyzing the panel data for textile companies, the proxy binary variable for the asymmetry of the information CG, which presents the companies that adhered to some level of corporate governance, presented a coefficient with a significance of 10% in the first model. The result was a negative coefficient which companies that adhere to some level of governance have a lower average debt. The result shows itself as expected, since companies that adhere to some level of governance tend to be less susceptible to informational asymmetry, which contributes to a lower level of indebtedness. This situation was also found by Albanez and Valle (2009)

The result shows that for the textile sector, reductions in asymmetry lead to an increase in the use of internal resources, a situation contrary to that verified in the energy sector. This can be explained by the crisis situation experienced by the sector, which increases the risk of contracting credit, hindering access to leverage.

## 5 FINAL THOUGHTS

Several theories present factors that can serve as determinants of the capital structure. Among these theories is the Pecking Order, which assumes that asymmetric information is a determining factor for companies to choose sources of funding for their activities.

It is worth mentioning that this work did not have the objective of verifying the application of the Pecking Order, but rather verifying whether information asymmetry, the central factor of the POT, interferes in the definition of the capital structure of Brazilian publicly traded companies in the electric power sector and the textile sector.

Considering the obtained results, the research may say yes for both sectors, rejecting the established null hypothesis. This is because in both sectors, the estimated models restricted the information asymmetry proxies presented global significance. In addition, in the case of the electric power sector, only the coefficients of the TAC and CG proxies were not significant. The assertion can also be made for the textile sector which showed significant coefficients of the ANEFAC variables, (also significant in the electric power sector) and the variable CG, besides the Liquidity variable, which despite being assumed as a control variable may be related to asymmetry of information.

It is important to emphasize that in the case of the electric power sector the asymmetry of information plays a different role from that predicted in the Pecking Order. As already pointed out, the theory predicts that sources of financing that carry less informational asymmetry are preferable, indicating that preferential use should be made of domestically generated sources rather than of debt.

In this case about the electric power sector, the results showed the opposite, indicating that companies less prone to information asymmetry become more indebted. The explanation may be that reductions in information asymmetry cause an increase in the transparency of the company in the creditors mind, a factor that acts as a facilitator of credit supply.

In the case of the textile sector Pecking Order is already valid, since all significant binary proxies showed that firms with fewer tendencies to asymmetric information are less indebted. This fact also showed significant numerical variables.

The difference in the behavior observed in the two sectors in relation to Pecking Order may be related to the moment lived by them. Considering the energy sector, this is a moment of strength and the supply of credit is abundant during the analyzed period. Therefore, the reduction of the asymmetry leads to a better evaluation by the creditors, facilitating the access to credit, causing less asymmetry to signal higher indebtedness. On the other hand, the textile sector, as already mentioned, is experiencing a difficult time, which increases the credit risk and consequently hinders its contracting, making the results corroborate with the theory, in which a reduction in information asymmetry leads to preference by internal remedies. In addition, it is worth noting that the energy sector is a subject to highly regulate by ANEEL, a fact that may cause information asymmetry to have a different impact on the capital structure than that observed in the electric power sector.

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