ARTICLES

DIVERSITY OF THE BOARD AND CAPITAL STRUCTURE

Diversidade do conselho de administração e a estrutura de capital

Diversidad del consejo de administración y la estructura de capital

ABSTRACT

Board diversity has been a recurring theme for discussions in both the academic and corporate environments. The concept of diversity is broad and encompasses not only gender and ethnic variety but also cultural, social, and professional diversity. This research aims to contribute to the understanding of the influence of company boards on corporate policies, by analyzing the effects of board diversity on firms' financial policy decisions. The results suggest that board diversity improves monitoring effectiveness and is positively related to firm leverage, in line with the effects of reducing managerial entrenchment by means of stronger monitoring.

KEYWORDS | Board diversity, board of directors, capital structure, leverage, managerial entrenchment

RESUMO

A diversidade dos conselhos de administração tem sido tema recorrente de discussões tanto no meio acadêmico quanto no meio empresarial. O conceito de diversidade é entendido de maneira ampla, incluindo não apenas a variedade de gênero e etnia, mas também a diversidade em relação aos aspectos culturais, sociais e profissionais. O objetivo desta pesquisa é contribuir para o entendimento da influência do conselho de administração nas políticas corporativas a partir da análise dos impactos da diversidade do conselho nas decisões de política financeira das empresas. Os resultados desta pesquisa sugerem que essa diversidade propicia melhor monitoramento por parte do conselho em relação aos administradores e está relacionada positivamente com o endividamento da empresa, em linha com os efeitos da redução do entrincheiramento gerencial por meio de maior monitoramento.

PALAVRAS-CHAVE | Diversidade do conselho, conselho de administração, estrutura de capital, endividamento, entrincheiramento gerencial.

RESUMEN

La diversidad de los consejos de administración ha sido un tema frecuente de discusiones tanto en el medio académico como en el empresarial. El concepto de diversidad es entendido con bastante amplitud, incluyendo no solamente la variedad de género y etnia, sino también la diversidad en relación a los aspectos culturales, sociales y profesionales. Esta investigación tiene por objetivo contribuir a la comprensión de la influencia que tiene la diversidad del consejo de administración en las políticas corporativas, a partir del análisis de los impactos producidos por dicha diversidad, en las decisiones de la política financiera de las empresas. Los resultados de esta investigación sugieren que esa diversidad propicia un mejor control de los administradores por parte del consejo y está relacionada positivamente con el endeudamiento de la empresa, en línea con los efectos de la reducción del llamado atrincheramiento gerencial, por medio del mayor monitoreo.

PALABRAS CLAVE | Diversidad del consejo, consejo de administración, estructura de capital, endeudamiento, atrincheramiento gerencial.

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INTRODUCTION

Corporate governance has been a recurring issue within economic and financial discussions for some time now, especially after the spate of scandals that took place at the start of this century. Sometimes, the effects of the global economic crisis are discussed; sometimes, the specific crises that have befallen a certain country; and other times, specific aspects of the corporate world. In Brazil, corruption in corporations, fraud, and poor conduct on the part of companies, together with questionable decisions taken by boards of directors, for example, are issues that have been repeatedly raised by the media.

The board of directors is a core instrument of governance. It is the main source of monitoring of management, with greater flexibility than external controls, for adjusting the behavior of management. The board of a company is also assigned the responsibility of improving corporate governance (Stiles & Taylor, 2001), particularly in markets with poor external monitoring (Ararat, Aksu, & Cetin, 2015; Dahya, Dimitrov, & McConnell, 2008).

Consequently, there are increased expectations regarding the activities of board members and their influence on corporate decisions. Thus, the board members' profiles are specified on the agenda of discussions. Should the board member be a professional counselor or someone with political connections? How much experience is desirable? Would it be better to have a board member who has already presided over a company in the same business segment or a board member with experience in the financial sector? Is the age of the board member important? Does diversity of gender have a bearing on decisions? The characteristics of the board, from both the occupational and the social points of view, are aspects that could have a significant influence on its activities, both with regard to the monitoring of the Executive Board and its strategic guidance on company operations. This means that understanding the impact caused by diversity, in its widest sense, considering not only gender diversity but also the structural diversity of the board, social diversity, and the functional diversity of the board, becomes a relevant factor within studies of corporate decisions.

Among corporate policies, the policies of financing of companies have their importance stressed in times of crisis or appraisal of risks. According to the finance ministers and presidents of the central banks of the largest economies in the world, who constitute the G-20 (Group of Twenty), the excessive external debt of companies is one of the new financial risks (Moreira, 2015) that need to be mitigated. Apart from these macroeconomic aspects, naturally there are also specific aspects of business risks. The board is at the center of this process, as

decisions about the policies governing the financing of companies normally have areas of approval that reach the board of the companies.

According to agency theory, debt is a disciplinary element for company executives. As Jensen (1986) explains, debt reduces agency conflicts through the reduction of cash available for discretionary use by executives. This means that the decisions taken by the board with regard to financing policies could affect the monitoring of the executive board of the company. In contrast, Güner, Malmendier, and Tate (2008) argue that the composition and the expertise of the board could also influence the investment and financing policies of the company. Conversely, Anderson, Reeb, Upadhyay, and Zhao (2011) doubt whether the heterogeneity of the board makes it more efficient. However, many researchers who have studied diversified groups have shown that "the decision-making process improves with diversity" (Hillman, 2015, p. 104).

With the crises and poor performance experienced by large companies, the board is playing a more significant role, increasingly influencing investors' analyses. In this regard, "understanding the board is vital, both for understanding corporate behavior and the definition of policies that govern corporate activities" (Adams, Hermalin, & Weisbach, 2010).

The characteristics of the boards and their influence on corporate decisions have been researched, with unclear and inconclusive results, thereby motivating further study, especially with regard to the influence of board diversity on corporate policies. As Hillman (2015) points out, there are many more unanswered questions than answers regarding the benefits of diversity within the board. From the corporate standpoint, research on the effect of diversity on the board could help organizations in their decisions to improve corporate governance processes, especially within an environment of an emerging country with a concentration of shares, and corporate governance undergoing development.

In the light of the points mentioned, we sense that this would be the time to empirically address the following research problem: Considering the effects of greater monitoring and counseling, would a greater diversity, considering different criteria, have a relevant influence on how companies set up their capital structure?

Thus, the main purpose of this study was to determine the influence of diversity within the board on decisions affecting companies' capital structure, and the basic hypothesis tested was: "There is a positive relationship between general diversity of the board and the company's level of debt."

Regression analysis results suggest that there is a positive and significant relationship between the General Diversity Index

and Debt Indices. These results suggest that the pressure of monitoring has an influence on the relationship between the board diversity and company debt. Berger, Ofek, and Yermack (1997) explain that closer monitoring of company executives by the board reduces entrenchment, thus positively affecting leverage.

Along the theoretical lines of resource dependence, Hillman and Dalziel (2003) suggest that diversity through expertise, experience, relationships, and legitimation leads to improved monitoring by the board. Thus, both from the standpoint of Agency Theory and Resource Dependence, it is possible to interpret the results of this study as being an evidence that diversity positively influences company debt through improvements to the monitoring process.

This article presents a brief overview of the theoretical references in the next section, followed by the methodological procedures, results, and final considerations.

THEORETICAL REFERENCES

The board of directors is crucial in the structure of an organization. It is the link between the shareholders who provide capital and executives who use this capital to create added value (Monks & Minow, 2011). This means that the board members are representatives appointed by the shareholders to supervise the management, manage company assets, and promote sustainable growth. According to Fama and Jensen (1983), it is the board that "ratifies and monitors important decisions, and also chooses, dismisses and rewards important decisions taken by the managers" (p. 323).

The activities of the board are split into monitoring and advising (Adams & Ferreira, 2007; Coles, Daniel, & Naveen, 2008; Hillman, Nicholson, & Shropshire, 2008; Lehn, Patro, & Zhao, 2009; Linck, Netter, & Yang, 2008; Raheja, 2005). According to agency theory, monitoring assumes control activities, on behalf of the shareholders, for the control of shares and of results obtained by the executive board led by the CEO. Advisory role involves, mainly, the strategic decisions regarding company operations, including the policies of investments and financing. From the perspective of resource dependence, this activity is associated with the provision of resources through committees, statements, or relationships (Adam & Ferreira, 2007).

Agency Theory and Resource Dependence Theory

Agency theory is still the main paradigm in financial literature when analyzing the process of decision making by management and the relationships between executives and the company (Baker & Anderson, 2010). The agency theory model focuses on the relationship between the principal (shareholders) and the agent (managers), and their priorities of interests.

From the agency perspective, the purpose of a corporation is to generate wealth for its owners, and the sharing of this wealth with managers would only be justified if managers create substantially more wealth than they receive (Nordberg, 2010). In this context, corporations need strong boards, which act as controllers to control the executive board. The boards should carry out the critical role of monitoring, and paying compensation to, top executives to ensure maximization of the shareholders' wealth. In a nutshell, the board is considered an essential mechanism for corporate control (Zahra & Pearce, 1989).

According to Resource Dependence theory, the board plays an essential role as a provider of resources. Hillman and Dalziel (2003) make it clear that these resources could come in the form of legitimacy, guidance and opinion statements, and relationships with other organizations. They refer to the capital of the board, which consists both of human capital (experience, specific knowledge, reputation) and relational capital (a relationship network, with connections to other companies, and external contingencies). The researchers of the theory of Resource Dependence stress the contribution of external board members as a link between the organization and its environment, thereby providing access to resources that are necessary for the company (Daily, Dalton, & Cannella, 2003; Zahra & Pearce, 1989).

Thus, in short, from the agency perspective, the boards should carry out the critical function of monitoring the executive board; in contrast, from the point of view of Resource Dependence, the boards should provide resources through their human and relational capital. The board diversity, in its widest scope, including not only racial and gender diversity but also structural, demographic and occupational diversity, may contribute to a more complete decision-making process. Bear, Rahman, and Post (2010) stress that this diversity can provide experience and knowledge for efficient monitoring of company management by boards. Hillman and Dalziel (2003) also suggest that diversity through expertise, experience, relationship, and legitimation produce improvements in the monitoring carried out by the board.

Corporate governance, committees, and capital structure

Morellec, Nikolov, and Schürhoff (2012) show that agency costs vary significantly between companies and are related to the proxies

commonly used for Corporate Governance (CG). The variables associated with stronger monitoring, like board independence, have a negative effect on the estimates of agency conflicts.

In Brazil, the results obtained by Silveira, Perobelli, and Barros (2008) do not support these findings. The authors study the relationship between the quality of CG and the companies' capital structures, using simultaneous equations, supporting a possible bidirectional causality. The quality of the CG would be a factor in determining the capital structure and, at the same time, the capital structure would be one of the factors that would establish the quality of CG. The results related to the influence of the capital structure on CG are not conclusive, but results suggest that CG practices significantly influence the leveraging of the companies. The authors explain that this positive relationship between CG quality and the extent of debt, different from what is shown by international studies, could be induced by the market with a low degree of protection for minority shareholders. It is important to stress that the results of econometric analyses show that the Governance Index, with regard to the property and committee structure, seems to have a positive influence on companies' debt level (Silveira et al., 2008).

Starting from the assumption that capital structure is one of the mechanisms for the mitigation of agency costs, as defended by Jensen (1986), the results of the study by Harford, Li, and Zhao (2008) show that strong boards are closely related to leverage, and negatively correlated to the use of long-term debt. Here, we point out that the greatest power of a board lies in the non-duality of the function of the CEO and in the presence of blockholders (shareholders with share participation of more than 5%) on the board.

Using a panel of over 2,400 companies in 33 countries, Alves, Couto, and Francisco (2015) present evidence that companies with more independent boards use more external financing than internal financing (accumulated profits), more long-term debt than short-term debt, and more financing through capital rather than through debt.

According to Berger, Kick, and Schaeck (2014), the reduction of the average age of the committee (board) also increases the risk of banks' portfolios. The increased participation of women also leads to increased risk, but this effect is only marginal, both economically and statistically. Thus, the authors conclude that although the presence of board members with PhD qualifications is associated with a reduction of risk – albeit small, this reduction is statistically significant.

In Brazil, the results of the study conducted by Mendes-da-Silva, Famá, and Martelanc (2007) were not conclusive regarding the composition of the board and its possible influence on debt

levels. However, in cases without any duality of CEO (when the president of the board is from outside the company), the companies show a lower level of debt in the short term. One possible explanation, in this specific case, is that the CEO prefers to avoid the risk of debt as a result of stronger participation by the board. Alternatively, this study shows that possible encouragement of executives through profit participation could increase company debt. This result is in line with the findings of Berger et al. (1997), which showed a lower element of debt when the CEO has a poor incentive plan within the company's compensation plan.

Silva, Santos, and Almeida (2011) show that companies with better governance practices with regard to the board tend to use more short-term and less long-term debt. The authors offer two possible interpretations for this fact: a) short-term debt is a disciplinary mechanism for managers, and b) controlling shareholders are risk averse, as there is a high concentration of property in Brazil.

Diversity of the board and capital structure

Racial and gender diversity have been widely studied in the literature and remain important subjects for discussion also within the corporate world. In particular, the participation of women in top management and boards has been a point for discussion and questioning.

The board diversity or heterogeneity, however, is not limited to the presence of women. As Hillman (2015) explains, the benefits of diversity could come from issues such as ethnicity, nationality, occupation, and other types of diversity. Regarding the composition of the board, the Brazilian Institute for Corporate Governance, in its Code for Best Practices, recommends that "the board of directors shall be formed based on a diversity of knowledge, experience, behavior, age group, and gender" (IBGC, 2015, p.42).

Considered within a wider scope, diversity can be classified into demographic diversity, including social and occupational diversity, and statutory or structural diversity (Adams, Haan, Terjesen & Ees, 2015; Anderson et al., 2011; Ben-Amar, Francoeur, Hafsi, & Labelle, 2013). Structural diversity is closely associated with board independence and non-duality of the CEO; in contrast, social diversity considers differences in gender, age, ethnicity, or nationality; and functional diversity refers to academic qualifications and background and to professional experience.

The general understanding is that independent board members, or those without any family ties, business

associations, or any other relationship with controlling shareholders or executives, represent diversity in the structure of the board. In the same way, when there is non-duality of the CEO, i.e., the President of the board and the CEO are different people, this could also represent diversity in the board composition.

Intuitively, it is believed that diversity in terms of demographic and social characteristics may facilitate a more complete decision-making process, as different experiences may allow a more detailed analysis. Gender diversity is still a relevant issue within discussions on company governance, both in academic research as also in the corporate area. Gupta, Lam, Sami, and Zhou (2014), for example, find evidence that racial and gender board diversity improves the social, environmental, and governance performance of the company. In a study conducted in Denmark, Rose (2005) explains that the younger boards are more innovative and more efficient at monitoring when compared to older boards. The functional board diversity, with board members with different backgrounds and experience, could bring different perspectives and skills, complementary to each other, that add value to the board discussions and the deliberations (Anderson et al., 2011).

Studies involving relations of statutory diversity (considering the board independence and CEO duality, in isolation) with capital structure are scarce and diffuse. With regard to demographic diversity (social and occupational diversity), despite the presence of several work projects dealing with specific characteristics of diversity, the study does not show any evidence of the direct effects on decisions related to capital structure. Aside from indirect effects, such as those mentioned in the studies by Berger et al. (2014), many studies involving demographic diversity emphasize the relevance and the impact of the board monitoring function, as did the studies conducted by Ararat et al. (2010), Rose (2005), and Adams and Ferreira (2009).

The intensity of board monitoring is directly associated with the effects of managerial entrenchment. Indeed, Berger et al. (1997) define entrenchment as a situation in which "executives are not subjected to the control mechanisms of CG, including monitoring from the board, the threat of acquisition or dismissal, and performance incentives based on remuneration or shares" (p. 1436). In agreement with the theories raised by Jensen (1986), these researchers present evidence that the entrenched executives, which are those who do not face active monitoring, seek to avoid getting into debt. This represents a positive association between monitoring and debt. As Jensen (1986) explains, executives tend to issue less debt, without the pressure of a disciplinary force. Berger et al.

(1997) state that executives use leverage as an instrument of defense, seeking to boost the value of the company through a more favorable capital structure. They stress that executives who feel there could be any threat to their security increase the level of debt as an action toward the improvement of value. Monitoring actions are indeed threats that could reduce the level of entrenchment of executives. In this context, executives increase their level of debt in response to actions that reduce their entrenchment.

Based on the theory of Resource Dependence, one can argue that the provision of resources in the form of board capital, considering guidance and consultancy through expertise, experience, relationships, and legitimation, also helps to improve monitoring (Hillman & Dalziel, 2003). This adds weight to the hypothesis that diversity is positively associated with debt.

RESEARCH METHODOLOGY

Based on the publicly-listed companies in B3 (the Brazilian Stock Exchange), the sample covers a period of five years, from 2010 to 2014. It focused on the 100 companies with highest trading volumes in 2013 and 2014, excluding companies in the financial sector. The accounting information was extracted from the Economática database.

The information about the boards was obtained by checking the reference forms (FRE) available in the database of the Brazilian Securities and Exchange Committee (*Comissão de Valores Mobiliários* - CVM). In this study, we have based ourselves on the last FRE for each year, meaning that the data as extracted correspond to the position as at the end of each business year.

The information on the composition, characteristics, and experience of the board and the statutory board of the company is shown in Chapter 12 of the FRE. Despite a certain degree of standardization, the detailing of the information made available by the companies is highly variable. Due to the specificities for this study, the data have been collected manually, meaning that, in some cases, the reported information needed to be identified and interpreted. Missing data were obtained by accessing other sources of information, including the databases of Bloomberg, 4-Traders, Reuters, and companies themselves. In this process, data from multiple sources were compared, to maximize consistency and accuracy.

Our study is explanatory and quantitative in nature, as it seeks to obtain evidence that could be generalized, with the application of econometric methods and use of secondary data.

Regression models with panel data

In general, the three most common approaches for regression models with panel data (Fávero, Belfiore, Silva, & Chan, 2009) are a) Pooled OLS; b) Panel with Fixed Effects, and c) Panel with Random Effects. The Pooled OLS Model uses panel data without considering the nature of the transversal cross-section and time series – all data are essentially piled up. In the Panel with Fixed Effects model, one considers the heterogeneity between individual people, allowing each one to have his or her intercept. Finally, in the Random Effects model, different from the Fixed Effects Model, it is assumed that the variation between individuals is a random variable. According to Wooldridge (2013), "the estimator based on random effects is appropriate when it is believed that the non-observed effect is not related to all the explanatory variables" (p. 465).

Adams et al. (2010) recognize that empirical studies about boards are difficult, as almost all the variables of interest are endogenous. The simultaneity (simultaneous establishment of different variables) and/or the feedback effect (feeding-back of the response variable, to the regressors), very common in research in the area of Corporate Finance, weaken the assumption of strict homogeneity. The use of instrumental variables is the solution recommended for this type of endogeneity.

Barros, Castro, Silveira, and Bergmann (2010) affirm that the methods described above allow the use of instruments only when they are sequentially exogenous, based, for example, on dephasing of the original regressors themselves.

Fama and French (2002) and Silveira at al. (2008) are examples of studies that used lagged and independent variables, to mitigate possible endogeneity problems arising from certain simultaneous determination, with dependent variables. Recently, other studies used lagged independent variables, including those of Jiraporn, Kim, Kim, and Kitsabunnarat (2012), and Minton, Taillard, and Williamson (2014).

Econometric model

The general model starts from the assumption that there is a connection between debt and the board diversity; in other words, Debt = f (Board diversity, Control Variables).

Considering the panel data, the tested econometric model considers equation [1], below:

$Debt_{it} = \alpha + \beta_1 DivG_{i,t-1} + \beta_2 VC_{it} + a_i + w_{it}$	(1)

where:

- i and t represent the company and the year, respectively.

- $Debt_{it}$: the rate of debt.

- CV_{it}: control variables. Despite the presence of subscripts i and t, they do not need to vary between companies and between time moments. The control variables may also include the *dummies* (binary variables).

- a_i: unobserved heterogeneity, a specific component for companies that does not vary over time and could affect company debt

- w_{it}: a non-systematic error component of the i-th company in the t-th year.

Here, we must also stress that the econometric model considers the main value of interest as an lagged regressor ($DivG_{i,t-1}$), with the aim of mitigating problems of endogeneity that can arise from the simultaneity of variables. On the other hand, the control variables were taken as contemporary regressors, according to the main studies on capital structure determinants (Silveira et al, 2008; Fama & French, 2002).

Operationalization of variables

The focus of this study lies in the associations between the board diversity with the decisions taken regarding the company's capital structure. To investigate the extent of this relationship, we used different categories, including structural diversity, social diversity, and functional diversity.

Most studies on diversity issues use proxies with different characteristics and specific dimensions of the board – for example, gender diversity is observed through the percentage participation of women in the board. Some studies, wider in scope, use diversity indices constructed based on different attributes. Anderson et al. (2011), for example, have created an index to measure board heterogeneity based on six categories of board members: age, gender, ethnicity, education, professional experience, and board experience. The sample was ranked to measure the heterogeneity of each attribute. Ararat et al. (2010) operationalized their diversity index by calculating the Blau index for the following measurements: percentage of foreigners; percentage of women; percentage of independent board members; standard deviation of dispersions of age within each board, and the standard deviation

of the number of years of schooling. Kim (2014) also used the Blau index to characterize educational heterogeneity and functional heterogeneity. However, we must stress that the conclusions reached by this study are associated with the choices and definitions of the indices used.

Exhibition 1 presents a summary of these categories of diversity, showing the respective indicators, as also the references used for the definition thereof. The index of general board diversity (DivG), in each year, is an aggregated index of the point scores obtained by the board in each of the categories. For each category, the indicators of all boards of directors were distributed in quartiles, and the boards were then given a point score on a scale from 1 to 4.

Exhibition 1. Index of diversity – Categories and indicators

Diversity	Category	Indicator	References
Structural	Independence of BD	Percentage of independent board members	Ararat et al. (2010)[1], Ben-Amar et al. (2013), Fraga and Silva (2012),[6] Mendes-da-Silva et al. (2007)
Structural	Duality of CEO	*Dummy*, 0 if the CEO of the company is also the Board President	Ben-Amar et al. (2013), Harford et al. (2008), Mendes-da-Silva et al. (2007)
Social	Age	Coefficient of variation of ages of board members	Ali, Ng, & Kulik (2014), Anderson et al. (2011), Ararat et al. (2010)[1], Fraga and Silva (2012)[7]
Social	Gender	Percentage of women on the BD	Ali et al. (2014)[1], Anderson et al. (2011), Ben-Amar et al. (2013), Ararat et al. (2010),[1] Fraga and Silva (2012),
Social	Nationality	Percentage of foreigners on the BD	Anderson et al. (2011)[4], Ararat et al. (2010)[1], Ben-Amar et al. (2013),
Occupational	Education: area of qualification	Blau Index considering area of undergraduate classification	Anderson et al. (2011), Kim (2014), Fraga and Silva (2012)[8]
Occupational	Education: level of schooling	Blau Index considering area of undergraduate classification (up to doctoral level)	Anderson et al. (2011),[2] Ararat et al. (2010)
Occupational	Professional: CEO	Percentage of members who hold, or have held, the role of CEO	Anderson et al. (2011)[3]
Occupational	Professional: experience on the job	Number of different areas of expertise represented among the BD members	Anderson et al. (2011),[4] Kim (2014)[5]
Occupational	Experience on BDs	Coefficient of variation of the number of seats on BDs apart from that of the company considered	Anderson et al. (2011)

(1) uses the Blau index

(2) uses the Herfindahl index

(3) considers only those who simultaneously hold the position of CEO

(4) here, expertise is defined as experience in law, consultancy, accounting and investment banks (or venture capital)

(5) uses the Blau index, considering functional experience based on exit (marketing and sales), functions of production (operations, R&D and engineering) and peripheral functions (law, finance, and accounting)

(6) considered as a dichotomic variable

(7) considers diversity to be the number of categories, based on five age intervals

(8) considers diversity as the number of different areas of formal education (maximum = number of board members)

Debt

Among the different methods for measuring the extent of company debt, the indicators used in this study are summarized in Exhibition 2.

Exhibition 2. **Debt variable**

Variable	Code	Operational definition
Total accounting debt	Debt1	100* (Current liabilities + fixed liabilities) / total assets
Financial debt at accounting values	Debt2	100*Financial Debt / (financial debt + net equity)
Financial debt at market values	Debt3	100*Financial Debt / (financial debt + market value)
Net Debt / EBITDA index	Debt4	(Net financial debts) / EBITDA

For the Net Debt/EBITDA index, the following criteria were used: 1) the index is excluded from the database if the EBITDA is negative; and 2) the index is zero, if net debt is negative (cash available is higher than debts), meaning that there is no debt.

Control variables

Based on the main factors that determine the capital structure of companies, the control variables and the proxies used in this study are as follows:

a. Growth opportunities (MTB = Market-to-Book, the Market value of net equity/accounting value of the net equity).

b. Tangibility (fixed assets / total assets).

c. Profitability (EBITDA/ total assets).

d. Size of the company (ln (total assets)).

e. Tax savings ((depreciation + amortization)/total assets).

f. Current liquidity (current assets / current liabilities).

g. Growth in sales ((sales in period 1 – sales in period 0) / sales in period 0)

Apart from the explanatory variables as above, in some models analyzed, some dummy variables were used for each year of the sample, with the aim of isolating any macroeconomic effects that may have affected the companies in the periods analyzed. The Contr variable is a dummy variable reflecting whether the company has majority control and/or a shareholders' agreement instead of minority or dispersed control.

RESULTS

Based on the information collected with the study sample, we see that the boards have, on average, the following characteristics:

* 8.2 board members in each board, with a mean age of 56.8 years;

* In 84.1% of the boards, the Chairman is not the CEO of the company;

* Among the board members, 31.1% are considered independent;

* Also, 9.7% are internal board members, 5.7% are women, and 9.1% are foreigners.

Table 1 shows a summary of the descriptive statistics for the variables analyzed in this study. We notice that the data contained in this table agrees with the standards as expected for the variables concerned.

Table 1. Descriptive statistics of the variable involved

Variables	Obs.	Mean	Standard Deviation	Median	Min.	Max.
Debt1	495	54.885	17.465	54.610	8.470	103.340
Debt2	495	40.749	21.752	41.250	0.000	109.070
Debt3	493	31.059	21.928	28.220	0.000	93.890
Debt4	463	2.244	4.681	1.540	0.000	74.370
DivG	495	22.689	3.290	23.000	12.000	31.000
DivE	495	3.196	1.266	3.000	1.000	5.000
DivS	495	7.594	1.629	8.000	5.000	12.000
DivO	495	11.899	2.545	12.000	5.000	18.000
MTB	493	1.712	1.172	1.280	0.340	8.740
Tang	495	0.236	0.216	0.201	0.000	0.899
Profitability	495	0.118	0.119	0.114	-1.429	0.554
Tam	495	15.870	1.323	15.790	12.499	20.492
Depr	495	0.029	0.021	0.028	0.000	0.166
Lcor	495	1.919	1.194	1.677	0.251	12.252
Growth	492	0.448	4.960	0.130	-0.729	109.771

Regression Analysis

The basic procedure was that of identifying the best approach, between Pooled OLS, Panel with Fixed Effects, and Panel with Random Effects, through the three tests currently available in Stata, namely, the Chow Test, the Breusch-Pagan LM Test, and the Hausman Specification Test. In the Chow test, the rejection of the null hypothesis means that the model based on fixed effects is the most appropriate. In the Breusch-Pagan LM test, the choice is between Pooled OLS and Random Effects, and the rejection of the null hypothesis (H_o) means that the model based on Random Effects is the most appropriate. Finally, the rejection of H_o in the Hausman Specification Test makes the Fixed Effects model the most appropriate choice. In regressions with robust standard errors, the models chosen were confirmed using the Schaffer-Stillman test with the Sargan-Hansen x^2 statistic.

The tests for heteroskedasticity proposed by Breusch-Pagan/Cook-Weisberg, applied to the models as evaluated here, show problems with heteroskedasticity in some of the Regression models, as does the Wald test for Fixed Effects regression. For this reason, we have adopted the robust standard errors as a base in all our analyses.

Table 2 shows the results of the model of Equation 1. Except in the case of debt represented by the net debt index, (Net debt)/EBITDA, the Panel of Fixed Effects was the appropriate model. Table 2 presents a summary with the model including the Contr variable, and without the dummies of the sector and year, for each of the debt indices. We see that the effect of the general diversity index upon the four debt indices is positive and statistically significant, showing that an increase in board diversity is associated with increased company debt.

Table 2. **Results for the Model of Equation 1**

Variable	Total accounting debt	Financial debt at accounting value	Financial debt at market value	Net Debt / EBITDA index
DivG	0.3821**	0.4216**	0.9070***	0.1372**
MTB	-0.0735	-1.3236	-6.0516***	0.4946
Tang	5.7381	5.1198	1.0918	0.9067
Rentb	-8.5379*	-15.2878**	-25.6667***	-29.8215***
Tam	5.3645*	8.9167**	8.0525**	0.2342
Depr	13.4244	56.8101	163.7272	-20.3321*
Lcor	-1.1587***	-0.5756	-1.1258*	-0.2692***
Cresc	0.2569***	0.0912	0.0901	-0.9391
Contr	0.8244	1.5006	7.1416	0.3192
_cons	-37.8494	-108.9287*	-111.5693*	-0.4176
Dummy – Sector	No	No	No	No
Dummy - Year	No	No	No	No
Effects	Fixed	Fixed	Fixed	Random
N	395	395	395	367
r2	0.1705	0.1640	0.3016	
r2_b	0.1020	0.1368	0.3715	0.2283
r2_w	0.1705	0.1640	0.3016	0.0730
F	149.2808	18.1963	342.7256	
chi²				37.5403

Note: The asterisks refer to the level of significance of the coefficients: *** for 1%, ** for 5% and * for 10%.

Static panel with fixed or random effects, according to the results produced by the Hausman test and the Scheffer-Stillman test (x2 statistics of Sargan-Hansen). Regressions consider robust standard errors with groupings by company.

The inclusion of the control dummy (separating companies with majority control and/or shareholders' agreement, from those with minority or dispersed control) and/or the dummy for time (year) has not changed the relationship between diversity and debt, except in the case of the Debt/EBITDA index. In this case, the relationship is still positive but is no longer statistically significant.

With regard to the control variables, we see that, in most cases, the signs of an association with debt indices are consistent. The MTB (Market-to-Book) variables, namely profitability and current liquidity, have negative coefficients, while tangibility, size, depreciation, and growth have a positive association with the indices of accounting and financial debt. However, it should be mentioned that the MTB, Depr, and Cresc variables have opposite signs to the Debt/EBITDA index. The only index to have a statistically significant influence on all four debt indices is the profitability index.

Seeking to confirm the robustness of the results, we have tested the association between each component of the diversity index and the debt indices. In isolation, few components show statistical significance, but there is a prevalence of the positive relationship between the components of the diversity indices and the debt indices. Moreover, the control variables were replaced by other parameters related to the models of the capital structure used in specialized literature. The general diversity index maintains its positive correlation with the debt indices, even when the control variables are changed.

Analysis of results

The results of the regression analysis show that there is a positive and statistically significant relationship between the general diversity index and the debt indices. Therefore, in general, there is acceptance of the basic hypothesis of this study, with the positive association between diversity and debt.

These results seem to show that the pressure of monitoring has an impact on the relationship between board diversity and debt. Jensen (1986) shows that, without the pressure of a disciplinary force, the executives do not issue the optimum level of debt, as debt reduces discretionary actions with regard to cash flow. Along these lines, Berger et al. (1997) concluded that stronger monitoring from the board should reduce the entrenchment of executives, with a positive influence on the level of leverage.

This study suggests that the improvement of the monitoring function through board diversity, as suggested by Ararat et al. (2010), Adams et al. (2015) and Anderson et al. (2011), has a positive effect on the debt index. This means we can infer that board diversity complements the control of agency costs.

Following the theoretical lines of resource dependence, Hillman and Dalziel (2003) suggest that diversity through expertise, experience, relationship, and legitimation improves monitoring by the board. This means that both perspectives, that of Agency Theory and that of Resource Dependence, could interpret the results of this study as being evidence that diversity does indeed positively affect debt, through improvements to the monitoring process.

These results also agree with the findings of Harford et al. (2008), who showed that stronger company boards, with greater monitoring, also bring about higher debt. Silveira et al. (2008) confirmed a positive correlation between the IGOV20 Governance Index (the dimensions and structure of the property and board) and financial leverage in Brazil.

Greater adherence to best practices by the board (that of stronger boards) means a higher level of debt. However, these conclusions do not agree with the results obtained by Silva et al. (2011), whose study shows a negative relationship between the proxy of the board and debt, both long-term and total. The authors interpret their results as a sign that companies with best Governance practices tend to use more short-term debts than long-term, and that short-term debt has the potential to discipline the managers. However, it must be pointed out that the proxy used refers to general characteristics of boards rather than specific diversity characteristics of a board.

CONCLUSIONS

Diversity or heterogeneity of the board of directors has been encouraged, in both corporate research and academic research, and is growing in prominence. As such, it is increasingly important to understand the associations between diversity and corporate decisions. In this context, the goal of this work was that of establishing the influence of board diversity upon decisions related to capital structure. The first contribution of this study lies in the definition and calculation of the diversity index. Evidently, defining a proxy for diversity is a highly complex task. The diversity index adopted considers differences in the structure of the board, the social diversity of the board members, and functional diversity, including educational and professional aspects.

In line with many studies on the issue, the second contribution of this study is the confirmation that board diversity is positively related to company debt. One possible interpretation from the practical standpoint is that a diversified board allows a more aggressive investment and financing policy. The board diversity can mean not only better monitoring but also decisions taken with greater confidence, considering the experience and expertise of the board.

The empirical studies involving boards are subject to econometric problems due to endogeneity, as the "governance structures arise endogenously because economic actors chose them in response to the governance issues they face" (Adams et al., 2010, page 59). In this way, despite the mitigation processes adopted, one cannot assure the elimination of all the effects resulting from endogeneity. Roberts and Whited (2012) teach us that, except for controlled experiments, "there is no way of making sure that the endogeneity problems can be eliminated, or sufficiently mitigated, to ensure appropriate inferences" (p. 86).

Another possible limitation arises from possible errors in measuring the variables. The accurate mensuration depends on the quality of data made available by the companies. For example, if a company fills incorrect information about its board members in the FRE of the CVM, it can distort the diversity variables. Despite all the care taken for data collection, including a double-check for consistency, the possibility of errors in mensuration must not be ruled out.

Diversity in the board of directors is somewhat unexploited. Its possible benefits within the corporate world should be further discussed, and academic research may bring new information that will contribute to the development of corporate processes. Future studies may involve econometric aspects, especially because of the endogeneity of the CG variables. The techniques based on a dynamic panel or simultaneous equations may be addressed in

the studies on the effects of board diversity. Furthermore, it is also possible to explore the contingency aspects that also have a bearing on the relationships of diversity, such as policies and corporate performance.

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