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The relation between diversity in the board of directors and c-level executives of Brazilian public companies and share returns

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Resumo/Abstract

This research has the objective of investigating the way how the diversity of individual characteristics of board members and C-level executives of Brazilian public companies relate to their share returns, taking into consideration the discussions involving the impacts of group dynamics on corporate governance. It is argued that increased diversity should be positively related to share returns due to: the mitigation of the negative effects of groupthink and social networks; and to the stimulation of cognitive conflicts, contributing to better decision making, monitoring improvement and to the generation of investment opportunities. Two studies are made, using complementary data bases: a panel data base, containing surface-level data for all Brazilian public companies between 2011 and 2018; and a cross-section data base, containing deeper-level information for the 64 companies included in the IBOVESPA index on 31/12/2017. The empirical analyses provide evidence of a positive relation between diversity of board members and share returns and that this relation is established both directly and intermediated through better monitoring and an incentive to the generation of investment opportunities. When the models for the C-level executives are analyzed, however, the results are less consistent. These conclusions support the understanding that environments of collegiate decision making, such as boards of directors, are



more apt to channel the positive effects of diversity over share returns. The deviant behavior at the C-level may be attributed to the functional and hierarchic structure of this body, which make it less apt to channel the positive effects of diversity over share returns.

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Abstract

This research has the objective of investigating the way how the diversity of individual characteristics of board members and C-level executives of Brazilian public companies relate to their share returns, taking into consideration the discussions involving the impacts of group dynamics on corporate governance. It is argued that increased diversity should be positively related to share returns due to: the mitigation of the negative effects of groupthink and social networks; and to the stimulation of cognitive conflicts, contributing to better decision making, monitoring improvement and to the generation of investment opportunities. Two studies are made, using complementary data bases: a panel data base, containing surface-level data for all Brazilian public companies between 2011 and 2018; and a cross-section data base, containing deeper-level information for the 64 companies included in the IBOVESPA index on 31/12/2017. The empirical analyses provide evidence of a positive relation between diversity of board members and share returns and that this relation is established both directly and intermediated through better monitoring and an incentive to the generation of investment opportunities. When the models for the C-level executives are analyzed, however, the results are less consistent. These conclusions support the understanding that environments of collegiate decision making, such as boards of directors, are more apt to channel the positive effects of diversity over share returns. The deviant behavior at the C-level may be attributed to the functional and hierarchic structure of this body, which make it less apt to channel the positive effects of diversity over share returns.

Key words: Corporate governance. Diversity. Group dynamics. Share returns.

1. Introduction

The objective of this paper is to analyze the relation between diversity among individuals acting as board members and c-level executives in Brazilian public companies and their share returns, adopting an empirical approach to investigate the existence of this relation and the way it is established. This subject was chosen not only because of its social implications, but also because diversity is one of the few attributes which may provide insight on the way how board members and c-level executives interact in groups, even under severe constraints to access their interactions directly. Accordingly, the fact that the main corporate governance bodies are collegiate, combined with the increasing awareness of investors on subjects related to equality, stakeholders' interests and corporate ethics, makes it even more crucial to understand how people interact in groups and how group dynamics impact the quality of corporate governance and shareholders' returns.

The hypotheses that guide this research state that the proposed relation exists, is positive and is established both directly and indirectly. These hypotheses are based on three different research lines, which support the basic assumption that groups composed by different people working together tend to make better decisions than groups composed by similar people: social networks (Fracassi & Tate, 2012; Subrahmanyam, 2008), groupthink (Janis, 1972; Fracassi & Tate, 2012) and cognitive conflicts (Charreaux, 2004; Torchia, Calabrò, & Morner, 2015; Wirtz, 2011; Wirtz, 2015). This literature provides a consistent theoretical basis to sustain that higher diversity is, in average, positively related to share returns directly, due to an improved collegiate decision making, and indirectly, due to an improvement of monitoring (mitigating the effects of social networks and groupthink) and to

an enhanced capacity of generating investment opportunities (due to a higher level of cognitive conflicts).

It should be noted that most works on this subject aim at analyzing the effects of specific personal characteristics or adopt an exclusively theoretical approach, without engaging in any empirical investigation (e.g., Charreaux, 2004; Janis, 1972; Subrahmanyam, 2008; Wirtz, 2011; Wirtz, 2015). The few exceptions that adopt empirical approaches are the works by Fracassi and Tate (2012) and Torchia, Calabrò and Morner (2015): the first presents an empirical model which investigates how the existence of connections between CEOs and board members affect corporate governance and share returns, while the second aims at investigating the occurrence of cognitive conflicts based on deep-level diversity attributes. In view of that, the approach presented in this paper contains a relevant contribution to the literature, since it (i) proposes a robust empirical model with the objective of statistically investigating the association between diversity and share returns; and (ii) tests specifically the consistency of the three research lines mentioned above, investigating the channels through which diversity relates to share returns in an integrated way.

In order to increase the robustness of our results, this paper also uses two data bases, with complementary characteristics: (i) a panel data base, containing surface-level data for all Brazilian public companies for the period between 2011 and 2018; and (ii) a cross-section data base, containing deeper-level information for the 64 companies included in the IBOVESPA index on December 31, 2017. With this approach, it is possible to investigate the impacts of diversity under different and complementary perspectives, discussing the relevance of both the depth and time projection of the information.

It should also be noted that Brazil was chosen not only due to data availability, but also because of its representativeness among emerging economies, both in terms of size and maturity of its capital market (Brazil had the second largest market capitalization among emerging economies at the beginning of our sample period, according to the World Bank development indicators). Also, Brazil's institutional characteristics are fairly comparable to other emerging economies, mainly in Latin America, which reinforces its representativeness.

As main results, our empirical analyses behave consistently with the previously mentioned hypotheses, providing evidence of the existence of a positive relation between diversity and share returns for boards of directors. When the models for diversity among C-level executives are analyzed, however, the results are less homogeneous. Our findings have both academic and practical implications, to the extent that they provide new insight on the way how the behavioral characteristics of the individuals participating in the main corporate governance bodies influence share returns. These insights are relevant both for society as a whole, considering the relevance of the current discussions on corporate diversity, and to business professionals (analysts, investors and regulators), who may use our conclusions as additional guidance for their recommendations and policies.

2. Literature review

As mentioned, the effects of group dynamics on corporate governance were analyzed under three different research lines. All these approaches have their roots in other fields, such as sociology and psychology, but researchers have found a relevant application for them in understanding of the impacts of interpersonal relations within corporate governance.

The social network approach is based on the hypothesis that, since the number of board members in a given firm is small, their need to establish interpersonal connections ("social networks") may have substantial impact on the quality of corporate governance (Fracassi & Tate, 2012; Subrahmanyam, 2008). With a social network established between board members and between these and the CEO, incentives to monitor the CEO's activities

tend to decrease, since this monitoring may pose a risk for each member's personal circle. In other words, people tend to prefer sacrificing firm returns over their personal relations.

Following a similar path, the groupthink approach is originated from psychology (Janis, 1972), and stipulates that a lower diversity of the members of a given group (boards of directors, for instance) may lead to a restriction of the perspectives of analysis due to the homogeneity of the participants involved in the discussion (Fracassi & Tate, 20120). Such restriction of perspectives, called groupthink, tends to lead to an impairment of the group's monitoring and decision-making capacities.

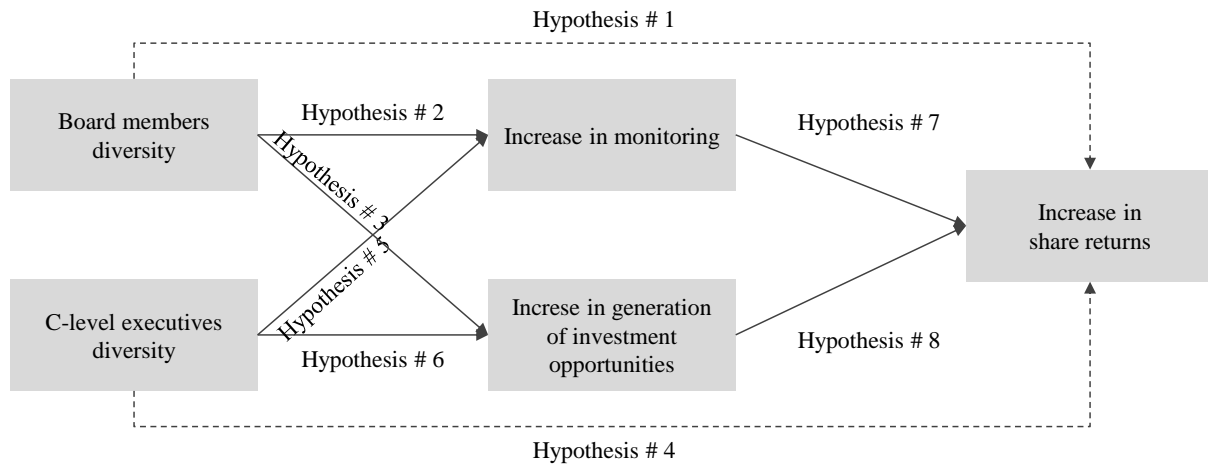
Finally, the cognitive conflict approach is based on the hypothesis that an environment with more diverse characteristics increases the occurrence of cognitive conflicts, defined as different mental standards among its members. The existence of cognitive conflicts within a given group tends to foment broader discussions, with members analyzing subjects under different perspectives. It is expected, therefore, that an increased level of cognitive conflicts within board members and c-level executives may contribute to make these bodies more strategic and capable of acting as propulsors of investment opportunities (Charreaux, 2004; Torchia, Calabrò, & Morner, 2015; Wirtz, 2011; Wirtz, 2015).

Considering the context of this research, the main theoretical implications of the research lines mentioned above are that a positive relation between diversity and share returns should be expected:

- i. **Directly, due to an improved decision-making capacity:** an improved decision-making capacity of more diverse groups may be directly attributed to the mitigation of the negative effects related to social networks and groupthink and to a higher level of cognitive conflicts. An improvement of decision-making capacity is expected to be positively related to share returns per se.
- ii. **Indirectly, due to an improved monitoring capacity:** more diverse groups are expected to have improved monitoring capacity due to the mitigation of the effects related to social networks and groupthink. Better monitoring, on its turn, is expected to be positively related to share returns, since it tends to decrease firms' inherent risk due to better results forecasting. The term monitoring is used in this paper to refer to the capacity of a given body to surveil, verify and observe the actions of agents and firms' results, with the objective of assuring that they are aligned with the interests of the principals they represent. It can be understood both under an operational perspective, taking into consideration aspects such as the number and duration of meetings, and a qualitative perspective, which intends to assess the actual achievement of the objectives of the monitoring process – in this sense, it is possible to relate to the earnings management literature, assuming that the higher the quality of monitoring the lower the occurrence of earnings management (Cumming, Leung, & Rui, 2015; Hili & Affes, 2012; Peni & Vähämaa, 2010; Ye, Zhang, & Rezaee, 2010).
- iii. **Indirectly, due to an improved capacity of generating investment opportunities:** more diverse groups are expected to have an enhanced capacity of generating new investment opportunities, due to an increased occurrence of cognitive conflicts. Any action capable of generating incremental cash flow for the firm, either within existing businesses or through the identification of new businesses, is understood as an investment opportunity and tends to have a positive impact on share returns.

The implications above can be translated into the eight different hypotheses which guide this research. These hypotheses are summarized by the figure below:

Figure 1 – Summary of the hypotheses discussed



Source: the authors.

It should be me noted that the existence of the relations stated in hypotheses # 7 and 8 is important for the validity of the previous hypotheses analyzing the indirect relation between diversity and share returns (hypotheses # 2, 3, 5 and 6). It I said because there must be a positive relation between the channels and share returns to support the statement that they act as channels through which diversity exerts influence over share returns.

3. Methodology

3.1. Data collection and samples

Data collection was one of the most relevant challenges for the elaboration of the analyses presented in this paper, for both conceptual and operational reasons. On the conceptual side, given that this work aimed at investigating behavioral aspects, it was a challenge to identify variables which were at the same time capable of representing individuals' behaviors and suitable for the calculation of a diversity index to be used in a statistic model. Given the impossibility of administering complete psychological questionnaires for a large number of individuals in firms' boards of directors and c-level, we made the decision of focusing on the collection of all the information available about these individuals in public sources, mainly the firms' Reference Forms filed at the Brazilian Securities Commission (CVM, 2008).

Despite not being able to depict deeper level diversity attributes, such as individuals' beliefs, values and psychological characteristics, it is our understanding that the variables collected are adequate for the purpose of this work, because: (i) people with different sex, age, education and experiences tend to have different cognitive and behavioral processes; and (ii) the aim of this work is not to analyze the impact of each characteristic individually, but to investigate the impact of the diversity of these characteristics.

Table 1 summarizes the main characteristics of the two data bases used.

Table 1 – Description of the data bases used in the study

	Data Base # 1	Data Base # 2
Format	Panel data	Cross-section
Period	31/12/2011 to 31/12/2018	31/12/2017

Sample	357 Brazilian firms with shares traded in B3 (São Paulo Stock Exchange)	64 firms of the IBOVESPA index
Charac- teristics	<ul style="list-style-type: none"> • Sex • Age • Education 	<ul style="list-style-type: none"> • Sex • Age • Educational background: university degree and MBA (institutions, subjects and years). • Professional experience: firms and years.
Source	Perlin, Kirch, & Vancin, 2018.	Manual collection of the information contained in the firms' Reference Forms.

Source: the authors.

It should be noted that the choice for the 64 firms included in data base # 2 was not random, but supported by the fact that these are the largest firms in Brazilian capital market, representing approximately 80% of its total financial volume. For that reason, it is our understanding that, despite contemplating a relatively small number of firms, data base # 2 contains a sample which is representative to understand the Brazilian context.

All financial information used for the calculation of dependent and control variables were obtained through a local platform, named *Comdinheiro* (2019).

3.2. Variables description

Our research used different sets of variables to represent the relations proposed in the eight hypotheses presented. Despite the different structures of the two data bases, the variables used for both studies followed the same configuration for easier comparison.

Starting by the dependent variables: (i) return was calculated as the variation of share value between the year (December 31) of the board/c-level composition under analysis and the following year (December 31); (ii) quality of monitoring was calculated in accordance with model proposed by Dechow, Sloan and Sweeney (1995), which aims at estimating a discretionary accruals ratio per firm that is a good indicator of the occurrence of earnings management and, therefore, poorer monitoring – given the inversed interpretation of this variable, it was multiplied by -1 to align the interpretation of its results with the other dependent variables in our regression models (i.e. the lower the occurrence of earnings management, the better the monitoring); (iii) investment opportunities were measured by the ratio between firms' market value and book value, which is commonly used by literature to represent market's expectation on the capacity of the firm to generate future investment opportunities (Serra & Saito, 2016; Trambacos & Albanez, 2016).

As for diversity, we created different indexes based on an indicator of shared information through a pairing technique. To build this indicator we standardized the data in both data bases and, for each characteristic, we paired all information per individual with all information for the same characteristic of all other individuals within the same firm, year and body, attributing value 1 for the cases where the information were the same and 0 for the cases where they were different. After that, the amount of shared information was divided by the total information available for that characteristic for each combination of firm, year and body, with the objective of determining the percentage of shared information between the members of boards of directors and c-level executives, for that characteristic, for each firm, in each year. Once this calculation was made for each set of characteristic-firm-year-body, a single indicator was obtained by the extraction of the main component through a factorial analysis, with scores calculated for each year and body. The factorial analysis was not used for indicator # 3, to the extent that the information is already treated by year, mitigating any relevant risk of arbitrary weighting.

The procedure above was used to calculate different diversity indexes, based on the different sets of characteristics available in each data base. This approach was useful, because it allowed us to capture different dimensions of diversity, comparing more surface-level attributes to deeper-lever attributes. In a summary, the indexes used in our research contemplated the following sets of variables:

- Data base # 1 (panel data): age, sex and education (university degree).
- Data base # 2 (cross-section):
 - Indicator # 1: age, sex and education (university degree).
 - Indicator # 2: educational background (university degree and MBA) and professional experience (firms worked for).
 - Indicator #3: educational background (university degree and MBA) and professional experience (firms worked for), matched per year.

It should be highlighted that, due to the construction rationale described above, the level of diversity in a given group increases as the indicator decreases, to the extent that the percentage of shared information decreases. For that reason, the expected sign of the coefficients of this variable in the regression models is a negative one, meaning that a higher level of shared information (i.e. a lower diversity) is negatively related to share returns.

Control variables were defined with the objective of capturing the effects of other variables which are traditionally linked to share returns (Fama & French, 1993; Novy-Marx, 2013; Aharoni, Grundy, & Zeng, 2013; Fama & French, 2015), as described in Table 2. Dummy variables per year were also used to control for year specific effects in data base # 1. It should be noted that the relation between these variables and the dependent variables representing monitoring and the generation of investment opportunities has not been fully analyzed by the literature.

All variables were winsorized at the 5th and 95th percentiles. Firms with negative net worth or negative beta were removed from the analysis. Observations with missing values were removed from data base # 1, but kept in data base # 2 – the information collected for data base # 2 was so granular that a certain degree of incompleteness should be considered as inherent to it.

The variables and their expected relation with the dependent variables are summarized by the Table 2.

Table 2 – Summary of the variables used in the study

Variable	Indicator	Expected relation with		
		Return	Monitoring	Invest. Opport.
<u>Dependent</u>				
Return	Share return	N/A	N/A	N/A
Monitoring	Discretionary accruals model	+	N/A	N/A
Investment opportunities	Market-to-book ratio	+	N/A	N/A
<u>Explanatory</u>				
Diversity	Pairing indicator	-	-	-
<u>Control</u>				
Size	Ln of total assets	-	?	?
Risk	Beta	+	?	?
Profitability	ROIC	+	?	?
Capital concentration	% of shares owned by the shareholder with largest participation in voting rights	-	+	?

Source: the authors.

3.3. Statistical procedures

The data collected were analyzed both through descriptive statistics procedures and regression models. Regression models for data base # 1 used a fixed effects regression approach, due to its better conceptual adequacy for studies in finance. Regression models for data base # 2 used a standard linear multiple regression model approach. In both studies, the standard errors were robust to heteroskedasticity and clustered at the firm level, to account for the possible serial correlation of the error terms. For each hypothesis, an equation model was elaborated in order to test its plausibility. Table 3 summarizes all the models:

Table 3 – Summary of the statistic models

Hypothesis	Equation
1	Share return = f (Board diversity + Control variables)
2	Monitoring = f (Board diversity + Control variables)
3	Investment opportunities = f (Board diversity + Control variables)
4	Share return = f (C-level diversity + Control variables)
5	Monitoring = f (C-level diversity + Control variables)
6	Investment opportunities = f (C-level diversity + Control variables)
7	Share return = f (Monitoring + Control variables)
8	Share return = f (Investment opportunities + Control variables)

Source: the authors

It should be noted that the statistical models elaborated in this study do not have the ambition to establish a causality relation between diversity and share returns, nor of predicting the behavior of other observations out of the samples used. Given the complexity of this discussion, our aim is exclusively to assess the existence of associations in our samples which help to understand the relation between diversity and share returns, isolating the effects of other relevant variables.

4. Results

4.1. Data base # 1 – panel data

4.1.1. Descriptive statistics (data base # 1)

Table 4 summarizes the main aspects of the information contained in data base # 1 (panel data base), regarding the personal characteristics of the analyzed individuals and related diversity indexes elaborated for each body.

Table 4 – Descriptive statistics for the characteristics of individuals and diversity indexes for boards of directors and c-level executives for data base # 1

		Boards of Directors										
		N	Mean	Min.	p25	p50	p75	Max.	Std. Dev.	Var. Coef.	Skewness	Kurtosis
Sex	% Men	479	87,1%	0,0%	80,0%	100%	100%	100%	0,21	0,24	-2,45	9,86
	% Women	479	12,9%	0,0%	0,0%	0,0%	20,0%	100%	0,21	1,62	2,45	9,86
Age	% <30	479	1,9%	0,0%	0,0%	0,0%	0,0%	40,0%	0,07	3,71	3,84	16,74
	% 30 – 39	479	10,0%	0,0%	0,0%	0,0%	16,7%	66,7%	0,16	1,57	1,84	6,23
	% 40 – 49	479	20,4%	0,0%	0,0%	16,7%	33,3%	100%	0,2	0,96	0,79	3,1
	% 50 – 59	479	31,4%	0,0%	16,7%	33,3%	42,9%	100%	0,21	0,66	0,4	2,78
	% 60 – 69	479	21,2%	0,0%	0,0%	16,7%	33,3%	83,3%	0,19	0,89	0,67	2,83
	% > 70	479	15,1%	0,0%	0,0%	11,1%	28,6%	100%	0,18	1,2	1,24	4,31
Occupation	% Business	479	45,9%	0,0%	30,0%	42,9%	66,7%	100%	0,25	0,55	0,05	2,58

% Engineering	479	33,7%	0,0%	16,7%	33,3%	50,0%	100%	0,23	0,68	0,29	2,56	
% Law	479	14,1%	0,0%	0,0%	7,7%	22,2%	75,0%	0,18	1,3	1,37	4,18	
% Health	479	2,2%	0,0%	0,0%	0,0%	0,0%	54,5%	0,08	3,71	4,14	20,07	
% Other	479	4,1%	0,0%	0,0%	0,0%	0,0%	60,0%	0,1	2,32	3,1	14,79	
Diversity Index	369	0,02	-1,58	-0,26	-0,05	0,26	2,04	0,50	-	1,04	5,47	
C-Level Executives												
	N	Mean	Min.	p25	p50	p75	Max.	Std. Dev.	Var. Coef.	Skewness	Kurtosis	
Sex	% Men	912	88,5%	0,0%	83,3%	100%	100%	0,22	0,24	-2,22	7,98	
	% Women	912	11,5%	0,0%	0,0%	0,0%	16,7%	100%	0,22	1,88	2,22	7,98
Age	% <30	912	0,5%	0,0%	0,0%	0,0%	100%	0,05	9,62	12,18	181,3	
	% 30 – 39	912	13,4%	0,0%	0,0%	0,0%	22,5%	100%	0,23	1,74	1,94	6,49
	% 40 – 49	912	30,3%	0,0%	0,0%	25,0%	50,0%	100%	0,31	1,04	0,7	2,41
	% 50 – 59	912	34,4%	0,0%	0,0%	33,3%	50,0%	100%	0,33	0,96	0,61	2,32
	% 60 – 69	912	16,2%	0,0%	0,0%	0,0%	31,0%	100%	0,26	1,62	1,8	5,69
	% > 70	912	5,2%	0,0%	0,0%	0,0%	0,0%	100%	0,2	3,85	4,14	19,19
Education	% Business	912	46,0%	0,0%	20,0%	50,0%	66,7%	100%	0,34	0,74	0,24	1,95
	% Engineering	912	39,5%	0,0%	0,0%	33,3%	66,7%	100%	0,35	0,87	0,37	1,95
	% Law	912	8,9%	0,0%	0,0%	0,0%	12,5%	100%	0,19	2,12	2,94	12,89
	% Health	912	1,4%	0,0%	0,0%	0,0%	0,0%	80,0%	0,07	4,9	6,95	64,35
	% Other	912	4,2%	0,0%	0,0%	0,0%	0,0%	75,0%	0,11	2,69	3,08	12,55
Diversity Index	575	0,02	-1,02	-0,25	-0,05	0,29	1,54	0,55	-	0,60	3,53	

Source: elaborated pursuant to the data available in Perlin et al. (2018).

Note: percentages above refer to the average participation of each characteristic per firm and year. Due to the wide range of educational backgrounds (and related descriptions) of the individuals in the data base, the different subjects in each field were standardized in the five categories above.

The analysis of Table 4 leads to relevant findings, the most important of which is the fact that diversity is relatively scarce in both bodies, especially regarding sex. The overall analysis of the results shows a clear predominance of men, in their middle to old ages (between 40 and 70 years old for boards and between 40 and 60 years old for c-level) and with a degree in business or engineering. This lack of diversity reflects in relatively low values for both diversity indexes, which present a rather relevant positive skewness.

Table 5 summarizes the main descriptive statistics of the dependent and control variables used in the models, which behave as expected.

Table 5 – Descriptive statistics of dependent and control variables for data base # 1

	N	Mean	Min.	p25	p50	p75	Max.	Std. Dev.	Var. Coef.	Skewness	Kurtosis
Return	1.374	0,1	-0,51	-0,21	0,03	0,31	1,37	0,43	4,45	0,97	3,88
Monitoring	1.183	-0,02	-0,24	-0,08	-0,03	0,04	0,28	0,12	-7,62	0,55	3,38
MB ratio	1.312	1,92	0,3	0,7	1,3	2,44	7,1	1,78	0,93	1,63	4,95
Ln Assets	1.567	8,24	5,05	7,07	8,24	9,5	11,14	1,65	0,2	-0,09	2,24
Beta	1.628	0,64	0,01	0,24	0,58	0,97	1,58	0,45	0,71	0,43	2,21
ROIC	1.567	5,71	-7,71	1,73	5,4	9,29	23,31	6,99	1,23	0,33	3,4
Concentration	1.924	54,14	2,01	29,26	51	78,4	100	28,75	0,53	0,21	1,86

Source: Comdinheiro (2019).

4.1.2. Results of the regression models (data base # 1)

Table 6 summarizes the results of the regression models elaborated to test our hypotheses with the information contained in data base # 1.

Table 6 – Summary of the regression models results for data base # 1

Hypothesis Dependent Var.	Boards of Directors			C-Level Executives			Channels	
	(1) Share returns	(2) Monitoring	(3) Investment Opport.	(4) Share returns	(5) Monitoring	(6) Investment Opport.	(7) Share returns	(8) Share returns
Diversity Index	-0.328* (2.39)	-0.0435 (0.87)	-1.041 (1.54)	-0.209* (2.26)	-0.0123 (0.38)	-0.267 (1.19)		
Monitoring							0.130 (1.10)	
MB ratio								0.124*** (6.80)
Ln Assets	-0.0881 (-0.85)	-0.0311 (-0.44)	-1.487* (-2.02)	-0.313 (-1.68)	-0.0728 (-1.20)	-1.362*** (-3.35)	-0.215** (-3.15)	-0.107 (-1.96)
Beta	0.121 (0.59)	0.0122 (0.21)	0.162 (0.29)	0.522*** (3.94)	-0.00446 (-0.11)	-0.625* (-2.06)	0.208*** (3.83)	0.186** (3.29)
ROIC	0.0357*** (4.89)	-0.00216 (-0.67)	0.0162 (0.69)	0.0293*** (3.95)	-0.00627* (-2.45)	0.0128 (0.69)	0.0301*** (7.20)	0.021*** (6.59)
Concentration	0.000923 (0.10)	0.000610 (0.29)	-0.00388 (-0.25)	0.00248 (0.44)	-0.00174 (-1.85)	-0.0190* (-2.17)	0.00238 (1.57)	0.00230 (1.24)
Year	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
Cons.	0.672 (0.62)	0.189 (0.32)	14.63* (2.55)	2.131 (1.31)	0.660 (1.24)	14.59*** (4.26)	1.197* (2.03)	0.134 (0.29)
N	190	176	203	312	293	328	885	1086
R²	0.490	0.0570	0.354	0.405	0.113	0.142	0.388	0.432

Source: models elaborated with data from Perlin et al. (2018) and Comdinheiro (2019).

Note: each column presents the results for the fixed effects regression models, with robust standard errors. The numbers represent, for each variable and model, in the first line the coefficient and in the second line, in brackets, the respective standard errors. The significance levels of 10%, 5% and 1% are represented by *, ** and ***, respectively.

Starting with the models that address the effects of diversity in the boards of directors (models # 1 to 3), it is possible to observe that the first model, which analyzes the direct relation between diversity and share returns, presents a negative coefficient, with statistical significance at the level of 10%. This behavior is consistent with the expectation and supports the hypothesis of the existence of a positive relation between diversity in the board of directors and share returns. In addition, the fact that the coefficient of the diversity index in models 2 and 3 is also negative, even though not statistically significant, is an additional element to support the hypotheses stated, given the consistency of behavior in all scenarios.

As for the models addressing the effects of diversity among c-level executives (models # 4 to 6), results show exactly the same behavior as the previous ones. All three models exhibit a negative coefficient for the diversity index, with statistical significance at the level of 10% in the first model, providing evidence of a positive relation between diversity among c-level executives and share returns.

Regarding models # 7 and 8, which test the relation between monitoring and investment opportunities and share returns, it is possible to conclude that they overall behave in accordance with the expectations, indicating a positive relation between these variables. In both cases, the coefficient sign is positive, with statistical significance at the level of 1% for the market-to-book ratio, which represents the generation of investment opportunities.

Having the considerations above in mind, it is our overall understanding that the statistic models presented are generally aligned with the proposed hypotheses, providing evidence of a positive relation between diversity in the boards of directors and among c-level executives and share returns. Our results dialogue with the research lines presented in the literature review, providing evidence that this relation takes place both directly, with more consistent results due to the statistical significance observed in models # 1 and 4, and

indirectly, through: (i) improved monitoring, due to the mitigation of the effects related to social networks (Subrahmanyam, 2008; Fracassi & Tate, 2012;) and groupthink (Janis, 1972); and (ii) increased generation of investment opportunities, due to the occurrence of cognitive conflicts (Charreaux, 2004; Wirtz, 2011; Torchia, Calabrò, & Morner, 2015; Wirtz, 2015).

Finally, an important limitation to be remarked regarding the results involving data base # 1 refers to the occurrence of missing values, which is a consequence of the removal of observations which did not have complete information. Considering, however, that (i) the amount of information used is still relevant; and (ii) that the gaps in the data are random, it is our understanding that the observed sample reduction should not be considered relevant for the validity of our conclusions.

4.2. Data base # 2 – Cross-section

4.2.1. Descriptive statistics (data base # 2)

Tables 7 and 8 summarize the main aspects of the information contained in data base # 2 (cross-section data base), regarding the characteristics of the individuals who are members, first of the boards of directors and, second, c-level of the Brazilian firms contemplated in our study.

Table 7 – Descriptive statistics for the characteristics of members of boards of directors for data base # 2

Sex	#	%	Institution of graduation	#	%	Professional experience	Nº	%
Male	667	89,9%	USP	76	13,4%	Bradesco	316	6,0%
Female	75	10,1%	FGV	46	8,1%	Itaú-Unibanco	232	4,4%
Total	742		PUC RJ	36	6,3%	Banco do Brasil	114	2,2%
			UFRJ	35	6,2%	Vivo S.A.	95	1,8%
Age	#	%	UFMG	32	5,6%	Vale	84	1,6%
<30	4	0,6%	Univ. Mackenzie	22	3,9%	Gerdau	61	1,2%
30-39	27	3,8%	PUC SP	17	3,0%	Grupo ABI + 3G	59	1,1%
40-49	104	14,8%	UFRGS	13	2,3%	Petrobrás	59	1,1%
50-59	221	31,4%	FAAP	11	1,9%	TIM	56	1,1%
60-69	205	29,1%	PUC MG	9	1,6%	Santander	54	1,0%
>70	144	20,4%	Other	272	47,8%	Eletrobrás	47	0,9%
Total	705		Total	569		BNDES	43	0,8%
						Votorantim	42	0,8%
						Duratex S.A.	40	0,8%
Education	#	%	Institution of MBA	#	%	GPA	40	0,8%
Engineering	177	31,1%	FGV	15	11,1%	Klabin S.A.	36	0,7%
Business	120	21,1%	UFRJ	12	8,9%	CSN	35	0,7%
Economics	114	20,0%	IBMEC	11	8,2%	Cemig	35	0,7%
Law	74	13,0%	USP	9	6,7%	ENGIE	35	0,7%
Accounting	29	5,1%	Fund. Dom Cabral	8	5,9%	Odebrecht	35	0,7%
Psychology	8	1,4%	Univ. Pennsylvania	5	3,7%	Other	3.743	71,2%
Pedagogy	5	0,9%	Univ. Chicago	5	3,7%	Total	5.261	
Journalism	4	0,7%	Stanford Univ.	5	3,7%			
Medicine	3	0,5%	FIA	4	3,0%			
Publicity	3	0,5%	INSEAD	4	3,0%			
Other	32	5,6%	Other	57	42,2%			
Total - Degree	569		Total	135				
MBA	135							
Total - Education	704							

Source: manual collection of data contained in the firm's Reference Forms, available on CVM (2018).

Table 8 – Descriptive statistics for the characteristics of c-level executives for data base # 2

Sex	#	%	Institution of graduation	#	%	Professional experience	#	%
Male	474	91,2%	USP	61	15,1%	Bradesco	306	9,0%
Female	46	8,9%	FGV	28	6,9%	Banco do Brasil	251	7,4%
Total	520		UFMG	23	5,7%	Itaú-Unibanco	184	5,4%
			PUC MG	14	3,5%	Santander	161	4,7%
Age	#	%	PUC RJ	12	3,0%	CCR	111	3,3%
<30	1	0,2%	UFRGS	10	2,5%	WEG	93	2,7%
30-39	19	3,8%	UFRJ	10	2,5%	Grupo ABI + 3G	80	2,4%
40-49	195	38,8%	FAAP	8	2,0%	Cielo	59	1,7%
50-59	197	39,2%	PUC SP	8	2,0%	Vale	59	1,7%
60-69	86	17,1%	Univ. Mackenzie	8	2,0%	Gerdau	46	1,4%
>70	4	0,8%	Outras	223	55,1%	EcoRodovias S.A.	44	1,3%
Total	502		Total	405		ABN Amro	36	1,1%
						CPFL	36	1,1%
						EDP	35	1,0%
Education	#	%	Institution of MBA	#	%	CSN	34	1,0%
Engineering	147	36,3%	FGV	28	16,0%	Citibank	34	1,0%
Business	92	22,7%	USP	23	13,1%	MRV	32	0,9%
Economics	54	13,3%	IBMEC	16	9,1%	Eletrobrás	28	0,8%
Law	52	12,8%	Fund. Dom Cabral	12	6,9%	Embraer	28	0,8%
Accounting	27	6,7%	INSEAD	7	4,0%	Magazine Luiza	26	0,8%
Ext. Commerce	4	1,0%	UFRJ	6	3,4%	Outras	1.716	50,5%
Psychology	4	1,0%	INSPER	5	2,9%	Total	3.399	
Systems Analysis	3	0,7%	MIT	5	2,9%			
Publicity	3	0,7%	FIA	4	2,3%			
Journalism	2	0,5%	UFMT	4	2,3%			
Other	17	4,2%	Outras	65	37,1%			
Total - Degree	405		Total	175				
MBA	175							
Total - Education	580							

Source: manual collection of data contained in the firm's Reference Forms, available on CVM (2018).

Starting with the analysis of the characteristics of the members of boards of directors, it is possible to see that the overall distribution is similar to the one verified in data base # 1, which is a sign of consistency. Data shows that members of boards of directors are also predominantly men, in their middle to old ages and with a degree in business or engineering. The main differences to be noted are (i) the higher participation of individuals above 60 years old in this data base, probably because the firms in this data base are the largest ones in the country, requiring more experienced board members; and (ii) the relevance of Economics, which was consolidated with Business in data base # 1.

In addition, it is interesting to notice that most board members have their degrees from top tier national institutions, both public and private, but that less than a quarter of them have an MBA – most of which also from top tier national institutions. Regarding work experiences, the three most frequent firms are the country’s largest banks followed by several other large Brazilian firms. Despite the relative concentration in the financial sector, it is possible to say that the professional background of board members is varied and extensive, with an average of 7,1 experiences per person.

Regarding c-level executives, the main descriptive statistics also behave similarly to data base # 1 and to the observed in the boards of directors in data base # 2: prevalence of men, in their middle to old ages (40 to 60 years old mainly), with degrees in business and engineering. In addition, the predominance of national top tier educational institutions remains, with a higher participation of individuals with MBA (approximately 35%), and varied professional experiences, although a bit smaller than in the observed in the boards of directors (about 6,5 experiences per person).

Using the information in the Tables 7 and 8, it was possible to elaborate the diversity indexes, as summarized by the Table 9.

Table 9 – Descriptive statistics of the diversity indexes for data base # 2

Body	Index	N	Mean	Min.	p25	p50	p75	Max.	Std. Dev.	Var. Coef.	Skewness	Kurtosis
Boards of Directors	Index # 1	55	0,00	-1,02	-0,26	0,07	0,25	1,23	0,41	-	-0,15	3,83
	Index # 2	55	0,00	-0,13	-0,10	-0,04	0,04	0,51	0,15	-	1,82	5,76
	Index # 3	56	0,01	0,00	0,00	0,00	0,01	0,23	0,04	2,60	4,53	24,48
C-Level Executives	Index # 1	55	0,00	-0,75	-0,30	0,02	0,21	0,78	0,34	-	0,05	2,47
	Index # 2	52	0,00	-0,63	-0,42	-0,20	0,20	2,62	0,64	-	2,13	8,30
	Index # 3	55	0,02	0,00	0,00	0,01	0,03	0,25	0,04	1,70	4,09	23,76

Source: indicators elaborated from the manual collection of data contained in the firm’s Reference Forms, available on CVM (2018).

Note: as described in section 3.2, the diversity indexes were elaborated through a pairing method, considering the following variations: (i) index # 1: age, sex and university degree; (ii) index # 2: educational background (university degree and MBA) and professional experience (firms work for); and (iii) index # 3: educational background (university degree and MBA) and professional experience (firms work for), matched per year.

Despite a difficult direct comparison for being relative indexes, the main conclusions from the Table 9 are similar to the ones observed in data base # 1: relatively low level of overall diversity and relatively lower level of diversity in the c-level when compared to the boards of directors.

Finally, Table 10 summarizes the descriptive statistics of the dependent and control variables, all of which behave as expected.

Table 10 – Descriptive statistics of dependent and control variables for data base # 2

	N	Mean	Min.	p25	p50	p75	Max.	Std. Dev.	Var. Coef.	Skewness	Kurtosis
Retorno	53	0,35	-0,24	0,10	0,31	0,51	1,37	0,37	1,06	0,75	3,48
Monitoram.	48	-0,04	-0,23	-0,12	-0,05	0,02	0,28	0,11	-2,88	0,87	3,88
MB ratio	54	2,98	0,30	1,13	1,96	4,26	7,10	2,23	0,75	0,79	2,21
Ln Ativo	55	10,02	7,68	9,32	10,22	10,83	11,14	0,96	0,10	-0,56	2,33
Beta	55	0,91	0,20	0,65	0,89	1,10	1,58	0,38	0,41	0,36	2,38
ROIC	55	8,13	-4,32	5,24	7,06	11,38	22,85	5,61	0,69	0,57	3,40
Concentração	56	39,14	5,35	18,63	43,44	52,11	96,70	22,21	0,57	0,36	2,55

Source: Comdinheiro (2019).

4.2.2. Results of the regression models (data base # 2)

Tables 11, 12 and 13 summarize the results of the regression models elaborated to test our hypotheses with the different diversity indexes and other information contained in data base # 2, pursuant to the previously described methodology.

Table 11 – Summary of the regression models results for boards of directors with data base # 2

Hypothesis Dependent Variable	(1)			(2)			(3)		
	Share returns	Share returns	Share returns	Monitoring	Monitoring	Monitoring	Investment Opport.	Investment Opport.	Investment Opport.
Index # 1	-0.135 (-1.24)			0.0392 (0.86)			-1,086 (-1.86)		
Index # 2		-0.498* (-2.17)			-0.0235 (-0.48)			-0.316 (-0.34)	
Index # 3			-1.462 (-1.74)			-0.199 (-0.35)			-1.172 (-0.44)
Ln Assets	0.0550 (1.20)	0.0780 (1.66)	0.0535 (1.11)	-0.0299 (-1.74)	-0.0273 (-1.47)	-0.0283 (-1.61)	-0.474 (-2.01)	-0.484 (-1.97)	-0.500* (-2.04)
Beta	0.377** (2.80)	0.438** (3.07)	0.444** (2.90)	0.0659 (1.86)	0.0753 (2.00)	0.0692 (1.70)	-0.999 (-2.00)	-0.736 (-1.46)	-0.677 (-1.35)
ROIC	0.00409 (0.45)	0.00330 (0.32)	0.00553 (0.55)	0.00773 (1.91)	0.00629 (1.47)	0.00616 (1.41)	0.169*** (4.67)	0.176*** (4.54)	0.180*** (4.66)
Concentration	0.00262 (1.25)	0.00270 (1.28)	0.00287 (1.35)	-0.000818 (-1.22)	-0.00122 (-1.66)	-0.000992 (-1.42)	-0.00134 (-0.12)	-0.00159 (-0.14)	-0.00269 (-0.24)
Cons.	-0.929* (-2.21)	-1.204** (-2.81)	-0.973* (-2.27)	0.156 (1.04)	0.141 (0.86)	0.154 (0.98)	6.975** (3.01)	6.810** (2.86)	6.927** (2.91)
N	54	54	55	47	47	48	54	54	55
R²	0.312	0.337	0.308	0.265	0.260	0.232	0.451	0.416	0.415

Source: models elaborated with data from CVM (2018) and Comdinheiro (2019).

Note: each column presents the results for the multiple regression models, with robust standard errors. The numbers represent, for each variable and model, in the first line the coefficient and in the second line, in brackets, the respective standard errors. The significance levels of 10%, 5% and 1% are represented by *, **, and ***, respectively.

Starting again with the models that address the effects of diversity in the boards of directors (models # 1 to 3), it is possible observe a very similar behavior as the models elaborated for data base # 1. Despite the predominance of coefficients without statistical significance, the model using diversity index # 2 to test the direct relation between diversity and share returns exhibits a negative coefficient and is statistically significant, at the level of 10%. Overall, results are consistent: eight out of the nine models elaborated present a coefficient with a negative sign, the exception being the model elaborated to test the monitoring channel with diversity index # 1.

In a summary, it is our understanding that results provide evidence to support the hypotheses that the relation between diversity and share returns takes place both directly and

indirectly, through improved monitoring and increased capacity to generate investment opportunities. Once more, results are more robust for the direct relation, due to the statistical significance observed with index # 2 in model # 1. It should also be noted that these results face much fewer missing value issues, when compared to data base # 1.

Table 12 – Summary of the regression models results for c-level executives with data base # 2

Hypothesis Dependent Variable	(4)			(5)			(6)		
	Share returns	Share returns	Share returns	Monitoring	Monitoring	Monitoring	Investment Opport.	Investment Opport.	Investment Opport.
Index # 1	-0.130 (-0.85)			0.0505 (1.36)			0.132 (0.18)		
Index # 2		0.00244 (0.03)			0.0133 (0.84)			0.246 (1.04)	
Index # 3			-1.882 (-2.00)			-0.0671 (-0.26)			0.783 (0.15)
Ln Assets	0.0595 (1.20)	0.0518 (0.97)	0.0490 (1.00)	-0.0337 (-1.91)	-0.0306 (-1.68)	-0.0289 (-1.61)	-0.510* (-2.14)	-0.521* (-2.02)	-0.494 (-2.00)
Beta	0.405** (2.95)	0.406* (2.66)	0.472** (3.01)	0.0631 (1.80)	0.0646 (1.63)	0.0705 (1.61)	-0.680 (-1.42)	-0.731 (-1.46)	-0.802 (-1.56)
ROIC	0.00350 (0.36)	0.00744 (0.60)	0.00822 (0.80)	0.00797 (1.78)	0.00585 (1.30)	0.00624 (1.37)	0.181*** (4.46)	0.171*** (4.09)	0.175*** (4.33)
Concentration	0.00281 (1.31)	0.00264 (1.22)	0.00322 (1.54)	-0.000883 (-1.35)	-0.00104 (-1.47)	-0.000990 (-1.41)	-0.00375 (-0.32)	-0.00711 (-0.66)	-0.00316 (-0.30)
Cons.	-1.004* (-2.16)	-0.947 (-2.00)	-0.971* (-2.20)	0.199 (1.29)	0.186 (1.16)	0.158 (1.01)	7.039** (3.03)	7.330** (2.95)	7.025** (2.94)
N	54	51	54	47	45	47	54	51	54
R²	0.306	0.285	0.325	0.272	0.223	0.231	0.408	0.401	0.410

Note: each column presents the results for the multiple regression models, with robust standard errors. The numbers represent, for each variable and model, in the first line the coefficient and in the second line, in brackets, the respective standard errors. The significance levels of 10%, 5% and 1% are represented by *, ** and ***, respectively.

As for the models addressing the effects of diversity among c-level executives (models 4 # to 6), results present a totally different behavior when compared to those obtained in data base # 1. The models exhibit diverging signs for the diversity indexes coefficients, with a prevalence of a positive sign and no statistical significance. In a more detailed way: (i) models testing the direct relation between share returns and diversity exhibit coefficients with a negative sign for diversity indexes # 1 and 3, with no statistical significance; (ii) models testing the relation between monitoring and diversity exhibit a coefficient with negative sign only for diversity index # 3, with no statistical significance; and (iii) models testing the relation between the generation of investment opportunities and share returns exhibit coefficients with positive sign in all scenarios, with no statistical significance.

Overall, the presented models exhibit a behavior which is not consistent with the research lines discussed. It should be noted, however, that the fact that none of the models exhibit a statistically significant coefficient for the diversity indexes indicates that no clear case can be supported in the opposite direction either, leaving the question open on whether diversity among c-level executives can influence share returns or not. Our considerations to try to explain this behavior are debated in the conclusion of our work.

Table 13 – Summary of the regression models results for hypotheses # 7 and 8 with data base # 2

Hypothesis	(7)	(8)
Dependent Variable	Share returns	Share returns
Monitoring	-0.401 (-1.11)	
MB ratio		0.0285 (1.04)
Ln Assets	-0.23*** (-5.52)	-0.210*** (-4.94)
Beta	0.187 (1.44)	0.275* (2.23)
ROIC	0.0225*** (3.62)	0.0115 (1.25)
Concentration	0.000304 (0.14)	-0.000451 (-0.21)
Cons.	2.249*** (5.55)	2.050*** (4.92)
N	46	52
R²	0.477	0.445

Note: each column presents the results for the multiple regression models, in accordance with the correction proposed by White (1980). The numbers represent, for each variable and model, in the first line the coefficient and in the second line, in brackets, the respective standard errors. The significance levels of 10%, 5% and 1% are represented by *, ** and ***, respectively.

Finally, the models testing the secondary relation between the channels and share returns also exhibit diverging results. The model testing the relation between monitoring and share results exhibits a negative sign for the coefficient of monitoring, which is contrary to the expected and to the observed in the model with data base # 1. The reason for this behavior is unclear and probably related to specificities of these firms in this specific year. This deviating result, however, should be of little concern, considering that the analysis made in data base # 1, which exhibits a behavior aligned with the expectation, comprises a larger number of firms and a longer period.

As for the market-to-book ratio, variable used to represent the generation of investment opportunities, the model exhibits a behavior aligned with the expectation, exhibiting a positive coefficient for this variable. The fact that the coefficient does not show statistical significance should not be of a relevant concern either, because, similarly to the previous model, the analysis made in data base # 1 exhibits a similar behavior and statistical significance at the level of 1%, with a much larger data base.

4.3. Robustness tests

In order to test the robustness of the results presented in the previous sections, we elaborated several additional models with alternative variables for each of the attributes and regression specifications (these especially for data base # 2). The results of these tests were not tabulated for this paper, but exhibit a behavior that is generally consistent with the ones presented above.

5. CONCLUSIONS

Our study had the objective of investigating the relation between diversity in Brazilian firms' boards of directors and c-level and their share returns, under an empirical approach. Based on the literature, our expectation was to find a positive relation between these variables, established both directly and indirectly, through improved monitoring and increased capacity of generating investment opportunities. Despite diverging results among the models, our understanding is that the overall results support our hypotheses for the boards of directors, while leaves space for debate regarding c-level executives.

Regarding the models which analyze the behavior of diversity in boards of directors, it is our understanding that our results provide consistent elements to support our hypotheses. It should be noted that the only two models exhibiting statistical significance for the diversity index exhibit negative coefficient, which is consistent with our hypotheses. Although both of these models refer to the direct relation between diversity in the boards of directors and share returns, it is our understanding that the consistence of the coefficient sign in practically all models partially compensates for the absence of statistical significance in the other models.

As for the models which analyze the impacts of diversity among c-level executives, on the other hand, our results show a more inconsistent behavior making it impossible to reach a final conclusion. While the models addressing the direct relation between diversity among c-level executives and share returns indicate a possible positive relation, mainly considering that the coefficient for the diversity index in the model with data base # 1 exhibits negative sign and statistical significance at the level of 10%, the other two models have more deviant behaviors. It is our understanding that such results may be attributable to the functional and hierarchic characteristics of firms' c-level.

First of all, it should be noted that, differently from the boards of directors, c-level executives do not have an intrinsically monitoring function. On the contrary, each executive is in charge of the daily decisions within their specific scope, being the object of the monitoring by the board of directors. In addition to that, firms' c-level are organized under a hierarchic structure, which sets the CEO as the final decision-maker - who makes decisions in accordance with their own beliefs and biases. As a consequence of these characteristics, it is our understanding that the c-level may be less suitable to channel the benefits of diversity over share results, which may help to understand the results obtained in our models.

Finally, the overall results obtained in hypotheses # 7 and 8 are aligned with our expectations, mainly considering the results obtained in data base # 1, which contemplate a much larger volume of data.

In a summary, it is our understanding that our research has a relevant contribution for corporate governance research, to the extent that it provides new empirical evidence of the ways through which the behavioral characteristics of the individuals participating in the main corporate governance bodies influence share returns. Our research also contributes to society as a whole by providing evidence of the relevance of diversity within a corporate context, which is a topic of crucial importance at the moment. Lastly, our results also have practical implications for analysts, investors and regulators, to whom they serve as additional elements for their recommendations for investment and new policies.

It should be acknowledged, however, that our conclusions have limitations both regarding the data bases used and the statistical models adopted. Despite being representative of the analyzed phenomenon, the data bases used cover specific periods and firms and have missing values (particularly data base # 1), which restrict their scope to a specific perimeter of analysis. In addition, as previously mentioned, the regression models used in this paper do not have the objectives of establishing causality relations or permitting an extrapolation of the results to observations out of the sample, which also limits the scope of our research. These limitations leave space for future research opportunities aiming at exploring the impacts of diversity in different periods, firms and corporate governance bodies (e.g., audit committee).

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