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Board diversity and firm performance: an empirical investigation in the Brazilian market

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ABSTRACT

This article investigates the diversity of the boards of directors of Brazilian companies listed on the BM&FBovespa with respect to gender, age, educational attainment and independence, to ascertain whether there is a relationship between any of these diversity measures and firm performance. The study covers all companies without majority control, a type of corporate structure that first appeared in Brazil in 2005. The results indicate that greater diversity in the educational disciplines and the presence or absence of independent board members negatively affect performance, while diversity in years of schooling has a positive effect. The presence of women board members is small, but firms that have at least one female director outperform those that do not.

Keywords: Corporate governance; board of directors; diversity; majority control.

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1. INTRODUCTION

The great conflict in the field of corporate governance is that between shareholders and managers, the agency problem. Jensen & Meckling (1976) analyzed this problem from the standpoint of ownership structure theory. The company is a legal fiction, in which contractual relationships are established and through which assets are purchased and sold without the interference of all interested parties. In particular there is an agency relationship between the principals (shareholders) and the agents (managers). The agents can appropriate resources from the firm or not exert the necessary effort to create value for the shareholders. The principals can limit the effects of this divergence of interests by establishing controls, but this means incurring costs for auditing and information systems as well as demanding that the board of directors be formed of members that properly look out for the shareholders' interests.

The board of directors is therefore the key body to monitor the firm's management. Fama & Jensen (1983) examined the aspects of the separation between ownership and control and the board's monitoring activity, stressing that to be effective in protecting shareholder interests, the board "must always have the power to hire, fire and compensate the top-level decision managers and to ratify and monitor important decisions" (Fama & Jensen, 1983, p. 311). The literature on corporate governance pays considerable attention to the role of boards, with agency theory being the dominant theme (Van Aes, Grabrielsson & Huse, 2009).

Since the start of the hostile takeovers in the 1980s, investors have increasingly sought to interfere in the political life of companies with initiatives to improve corporate governance practices, through self-regulation actions such as the creation of the committee by the London Stock Exchange together with other entities, leading to the Cadbury Report in 1992, and in Brazil, the creation of the New Market (*Novo Mercado*) trading segment by the BM&FBovespa in 2000. This concern has been accompanied by regulators and lawmakers, as shown, for example, by passage of the Sarbanes-Oxley Act in 2002 by the American Congress.

The purpose, composition and functioning of the board of directors are among the governance aspects most discussed by executives, directors, investors, regulators and commentators. Books, articles, consultants and gurus teach the best practices to be adopted

by boards while corporate governance codes list recommendations that firms should follow. The Organization for Economic Cooperation and Development (OECD) has issued governance principles and the New York Stock Exchange has established rules that require listed companies to have a board formed by a majority of independent members (Bech, Jenkinson & Mayer, 2005).

Nevertheless, all the emphasis on best practices and improving the functioning of boards did not prevent the occurrence of spectacular corporate meltdowns, such as the ignominious cases of Enron and Worldcom at the start of the millennium. And even if those episodes can be classified as outliers due to the glaring criminal behavior of those involved, the global crisis that hit with a vengeance in 2008 is full of occurrences of agency problems of huge proportion. Hundreds of financial institutions either failed or teetered on the brink, destroying shareholder value and drastically shrinking the credit market, and in the final analysis, the entire global economy. The financial crisis once again brought to the fore the question of why the directors of those institutions were unable to foresee the problems that resulted from excessive risk exposure (Rost & Osterloh, 2009).

While in Brazil the banking system emerged relatively unscathed (mainly due to more stringent regulation), the same question can be asked about the directors of various listed companies, leaders in their markets, such as Aracruz (Aracruz Celulose S.A, 2008) and Sadia (Sadia S.A, 2008), both of which suffered huge losses from positions in derivatives, driving them to the verge of bankruptcy, from which the only escape was to be taken over by competitors.

The objective of this article is to investigate the composition of the boards of directors of listed Brazilian firms without majority control regarding the variables of gender, age, education and independence or not of their members, to ascertain whether there is a relationship between these aspects and the market performance, and if so, the direction of that influence. This study is the first of its type in Brazil. The reason for choosing companies without majority control is that for them the agency problem is present in the classic form defined by Jensen & Meckling (1976) and Fama & Jensen (1983): the conflict between executives and shareholders, with the board of directors playing the pivotal role for mediation and control. This type of ownership structure (dispersed) is a relatively recent phenomenon in Brazil, because the first listed firm without a majority shareholder or shareholding group dates from June 2005. When there is majority

control (still the predominant pattern in Brazil), the agency problem shifts to the relationship between the majority and minority shareholders.

The main contribution of this article is to present evidence that greater diversity with respect to educational specialization (college degree discipline) and in the presence or absence of independent board members negatively affects the firms' results, while diversity in the number of years of schooling has a positive effect. The results also suggest that despite the small presence of women directors, firms that have at least one female board member have significantly better market performance than those that do not.

This article is organized into five sections including this introduction. Section 2 summarizes the previous studies on which ours is based and presents the research hypotheses; section 3 describes the database and the research methodology; section 4 presents the results; and section 5 concludes.

2 BOARDS OF DIRECTORS AND DIVERSITY

In recent years a growing number of studies have stressed the need for a more in-depth examination of the behavioral processes that occur within and surrounding boards for a better understanding of the necessary conditions for effective corporate governance. These studies are distributed among various disciplines and use a variety of methods and assumptions, so that the "behavioral" study of boards is not yet a coherent alternative to the perspective of agency theory (Van Aes, Gabrielsson & Huse, 2009).

Rost & Osterloh (2009) argue that the main reason why the directors of financial institutions did not foresee the fragility of their balance sheets in the run-up to the 2008 crisis was the growing homogeneity of the boards, with a lack of varied educational backgrounds and different viewpoints, leading to herd behavior and uniform group thinking (groupthink).

The concept of groupthink was created by Irving Janis in 1972 and was widely discussed in the 70s and 80s. The concept was developed to explain decision making processes that can lead to errors, catastrophes and forms of extremism. Strategic blunders like the Nazi's decision to invade the Soviet Union in 1941 and Ford's ill-fated launch of the Edsel in 1958 are examples of group thinking caused by an incomplete analysis of the alternatives and objectives, failure to examine the risks of the choice made and insufficient information, processed in biased form (Sunstein, 2009).

The groupthink mentality makes people with perceptions outside the comfort zone of the consensus of a determined group avoid expressing their ideas and opinions. In this context, members belonging to a certain group try to minimize conflict and reach consensus, in detriment to other objectives. The symptoms of groupthink are a stereotyped view of enemies or competitors, excessive rationalization and pressures for uniformity, besides self-censorship connected to the illusion of unanimity. The causes are connected to cohesion, isolation, the lack of a leader who encourages debate and social and ideological homogeneity of the group members (Sunstein, 2009).

Sunstein (2009) proposes what he considers to be a more useful concept than groupthink to explain extremism and error: group polarization. Members of a group usually wind up taking a more extreme position, in the direction of their inclinations, than they had before starting to deliberate. This is a pattern that is not limited to a particular era, nation or culture. On the contrary, it is present in hundreds of studies involving scores of countries.

The members of a group will tend to extremism, and if the group is dominated by self-confident people, it will move in the same direction. The defense against extremism is a system of freedom of expression, diversity of opinions and checks and balances, in which one power counteracts another (Sunstein, 2009). For small groups, Glaeser & Sunstein (2009) advocate intellectual and cultural diversity. Both for public and private institutions, an unbiased decision-making process tends to maintain decision makers in balance.

The multicultural vision first reached the field of education, more precisely in schools in the United States, in the 1960s, and according to Ogbu (1992) fostered the pride of minorities, helping students develop a new view of their culture, and reduced prejudices and stereotypes. In companies, the first approach was in the direction of diversity of the workforce. In the area of management, Robinson & Dechant (1987) argued that diversity, with emphasis on the presence of women, would improve the growth perspectives by improving comprehension of markets and increasing creativity, innovation and quality in the solution of problems, besides facilitating the relationship with the natural cultural diversity of global markets.

The concern over diversity on boards is not recent, although the literature is still scanty. Based on the literature suggesting that diversity would affect the dynamics of groups, improving the decision-making process, Erhardt, Werbel & Sharader (2003) investigated the impact of board diversity on the performance of 112 large listed American

companies. The hypothesis was that greater demographic diversity among the board members would increase organizational performance. Demographic diversity was measured by the representation of women and ethnic minorities on board while firm performance was measured by return on assets (ROA) and return on investment (ROI). The results supported the hypothesis that greater board diversity leads to better performance.

Carter, Simkins & Simpson (2003), based on the fact that one of the key elements of agency theory is that board independence is critical for its functioning in the best interests of shareholders, investigated the impact of diversity on independence, finding that agency theory does not provide a clear prediction of the relation between board diversity and firm value. They examined this relation in 637 large American companies, considering the percentage of women and minorities (African Americans, Asians and Hispanics) on the board of directors as the measure of diversity and Tobin's q as the measure of firm value. The authors concluded that a positive relationship exists between the participation of women and minorities on the board and firm value. The empirical results obtained by Carter et al. (2008), with data from American companies in the period from 1998 to 2002, supported the existence of a positive relationship of participation on the board and also on committees of the board, but Adams & Ferreira (2009) considered this evidence to be hard to interpret after applying testing procedures to deal with the existence of omitted variables. Adams & Ferreira (2009), however, observed that the presence of women appears to have a significant impact on governance of boards, with women being more willing to join committees that monitor executive performance. This behavior can be explained by the investigation carried out by Sapienza, Zingales & Maestripieri (2009), who using samples composed of MBA students concluded that women on average are more averse to risk than men in making financial decisions.

One of the important aspects of these results is that they were obtained with data on listed American firms without a majority controller, where the agency problem is essentially between executives and stockholders, with the board of directors having the function of mediation and control. When a company has a majority controller or controlling group, the fundamental governance problem is the controller's possible opportunism in detriment to the minority shareholders (Bebchuk & Weisbach, 2010). Working with data from companies listed on the Istanbul Stock Exchange, in which firms with majority control predominate, Ararat, Aksu & Cetin (2010) did not find evidence that

diversity in the board composition in relation to gender, age and education influence the market performance of Turkish companies.

3. DATA AND METHODOLOGY

3.1 Data

The existence of companies without majority control (a single controller or controlling group subject to a shareholder agreement) is a new phenomenon in the Brazilian capital market, a paradigm shift (Gorga, 2008). The first such listed company in Brazil was the retailer Lojas Renner, in June 2005, when the then controller sold nearly all the firm's equity capital to the market in dispersed form by means of a public offering (Lojas Renner SA, 2005). From a legal standpoint nothing new happened in the company's governance, since according to the Law of Corporations, the holders of common shares elect the board in all cases. The difference was the fact that under majority control, the controller elected virtually the entire board, through which it monitored the management actions. Without a majority controller, and in the case of Lojas Renner, without any controlling group, the board's functions took on new importance, in a model like that of most listed American companies. Other companies, in a wave of IPOs and other public offerings in 2006 and 2007, also ceased having a majority controller. As of this writing, there are 35 companies listed on the BM&FBovespa with more than 50% of their capital dispersed in the market, or in the market jargon, with "free float" of more than 50%.

Despite the dispersion of a significant part of the shares in the market, many of these companies still have a single shareholder or organized group of shareholders that exercises some power of control due to the size of the holding. This situation was presented in classic form by Jensen & Meckling (1976), who modeled their theory of the ownership structure starting from a situation in which the owner and manager are the same to that in which the owner floats shares in the market. If, for example, 60% of the shares are dispersed in the market, the managers/shareholders can spend \$1 in their own benefit but only have to pay 40 cents. If 80% of the shares are dispersed in the market, the unproductive expense in benefit of managers will only cost 20 cents, and will cost managers nothing when all the capital is dispersed. In the case of our sample, it is possible that in some firms the composition of the board is still determined partly by shareholders with substantial control power, possibly preventing the board from exercising its oversight role completely in favor of all the shareholders. This can also occur at the extreme in

which the capital is fully dispersed, where management, led by the CEO, can neutralize the board's power.

Our sample consists of all the firms listed on the BM&FBovespa with free float of more than 50% on December 31st of each year of the study period (2005 to 2009). We used the data from December 31, 2005 to identify the companies with more than 50% of their shares dispersed in the market, for which we noted the composition of the board of directors. We followed the same procedure for 2006 to 2008. We also examined the financial statements of the chosen companies for December 31st of 2006 to 2009. The sample consisted of two companies in 2006, thirteen in 2007, twenty-six in 2008 and thirty in 2009, for a total of 71 observations. The full list of companies is in the appendix. The composition of the board was that on April 30th of each year, since most changes in the board happen in March and April, the months in which most companies hold their annual general meetings to meet the legal requirements.

The data were obtained from the following sources:

a) Financial statements, stock prices and number of shares issued: Economática.

b) Shares outstanding in the market and board composition: Websites of the BM&FBovespa (www.bmfbovespa.com.br - empresas > empresas listadas > empresa selecionada > informações financeiras > ano) and Brazilian Securities Commission - CVM (www.cvm.gov.br – participantes do mercado > companhias abertas > ITR, DFP, IAN e outras informações). The data are found on the IAN form – Annual Information, “Chart 02 – Professional Experience and Education of each Director” of “Group 02 – Administration”, in the form of a résumé for each director, and “Group 03 – Distribution of Capital”. We gathered the information on the directors by reading each résumé. When there was any information omitted from this source (which mainly happened regarding age), we consulted the prospectuses of public offerings, available at the same websites.

c) Director independence: We used the same sources as in the previous item. We considered the classification of independent declared by the company, according to the rules of the New Market listing segment of the BM&FBovespa. These rules consider a board member to be independent when he or she does not have and has not had any connection with the company over the past three years, is not a controlling

shareholder or a relative to the second degree of such a person, is not a supplier or customer of the company, in the quality of proprietor or employee, in a magnitude that implies loss of independence, is not a spouse or relative to the second degree of any director or officer of the company and does not receive any remuneration from the company other than for being a director.

As suggested by Carter, Simkins & Simpson (2002), Carter et al. (2008) and Ararat, Aksu & Cetin (2010), we used Tobin's q as the measure of firm market performance, similar to the approximate form proposed by Chung & Pruitt (1994): approximate $qtobin_{i,t} = (MVE + DEBT)/TA$, where MVE is the firm's share price multiplied by and the number of common shares outstanding; DEBT is the sum of the firm's short-term liabilities net of short-term assets plus the book value of its long-term debt; and TA is the book value of total assets. Note that we did not consider preferred shares in the calculation because of the fact all the firms in the sample were listed in the New Market trading segment, whose rules do not allow issuance of nonvoting shares.

The average Tobin's q of the sample was 1.14, meaning that the value of the companies according to the classic concept in corporate finance, including not only the market value of its shares, but also the value of the net debt, was 14% greater than the value of the assets.

Table 1 presents the descriptive statistics of some characteristics of the sample, such as the composition of the board of directors and size of the firms. The average number of years of schooling was 16.9, slightly more than the number required for a four-year college degree (16 years). The average age was 53 and the average number of degree disciplines per board was 4.2. Finally, the participation of women was low, at only 4.4% of the total members. A similar measurement was made by Adams & Ferreira (2009) for American companies in the period from 1996 to 2003, in which the authors found a figure of 8.11%.

The average percentage of independent board members was 40.3%. The explanation for the high percentage is that the New Market listing rules require that 20% of the board members be independent. The average number of board members was 6.9, with a total of 488 directors for the sample firms. The fact of being listed in the New Market also influenced this result because according to its rules, the board must be composed of at least five members, while the general rule for listed corporations in Brazil is at least three

members. The average free float was 73.6%, ranging from 51.3% to 100%. The percentage of observations where there was no combination of chairman of the board and CEO was 81.7%. Finally, the average value of the firms' total assets was R\$ 3.46 billion.

Table 1: Descriptive statistics of companies without majority control

	Mean	Standard Deviation	Minimum	Maximum
Years of schooling of board members	16.9	0.62	15.3	18.4
Number of degree areas of board members	4.2	1.25	2.0	7.0
Gender – women board members (%)	4.4	7.39	-	28.6
Age (years)	53.0	5.40	40.2	61.7
Independence of board members (%)	40.3	18.65	14.3	83.3
Number of board members	6.9	1.64	5.0	12.0
No combination of chairman/CEO (%)	81.7	-	-	-
Tobin's q	1.14	0.83	0.1	3.3
Return on assets - ROA (%)	5.8	5.72	(10.3)	21.2
Total assets (million reais)	3.462.1	5.656.6	305.5	25.700.0
Free float shares (%)	73.6	17.64	51.3	100.0
Total number of directors	488			
Number of observations	71			

Source: Economática and BM&FBovespa. Data processed by the authors.

3.2 Construction of the diversity indexes

Authors such as Carter, Simkins & Simpson (2002) and Erhardt, Werbel & Sharader (2003) have measured the diversity of boards regarding gender by means of the percentage of female directors. But this method has an inherent logical contradiction, because it assumes that a board formed only of women would have reached the maximum diversity possible. Bar, Niessen & Ruenzi (2007) proposed a diversity measure derived from the biological sciences, as did Ararat, Aksu & Cetin (2010). For this article, as done by the above authors, we used an estimation of intellectual diversity and diversity of opinions, of the type advocated by Glaeser & Sunstein (2009) and Sunstein (2009). In this setup, we considered variables regarding gender and age of board members (common to various of the cited authors), educational attainment (Bar, Niessen & Ruenzi, 2007; Ararat, Aksu & Cetin, 2010; Hambrick & Mason, 1984) and composition between independent and non-independent directors (Ararat, Aksu & Cetin, 2010). Carter et al. (2008) observed that the investigation of the effect of the presence of independent directors carried out by various authors has reached contradictory conclusions. The models used have measured the

relationship between greater or lesser participation of independent board members and market performance. In contrast, here we estimated how the diversity of composition, measured by the ratio between independent and non-independent directors, affects firm performance.

In line with the observations of Harrison & Klein (2007) that the composition of different types or sources of information, knowledge or experience among the members of groups can be best represented by the indexes of Blau or Teachman (entropy), we defined the following diversity index:

$$D_{i,t} = 1 - \sum_{j=1}^k P_{i,j,t}^2 \quad (1)$$

In the above formula (1), $P_{i,j,t}$ is the proportion of the board members of firm i on date t that belong to category j ; and k is the number of possible categories, given the board size or nature of the variable measured. We standardized $D_{i,t}$ through division by the theoretical maximum value, given by $((k - 1)/K)$, so that for any of the five variables the minimum value is zero (total homogeneity) and the maximum is 1 (maximum diversity).

The variables and parameters for estimating the diversity index are described below:

- a) Diversity index for years of schooling ($years_education_{i,t}$): the members of the board of firm i were classified into five categories: 1 – up to 8 years, considered to have a primary education; 2 – up to 11 years, meaning a high school diploma; 3 – up to 16 years, a college diploma, 4 – up to 18 years, master's degree; and 5 – more than 18 years, doctorate degree or postdoctoral study. For any board, the number of possible categories (k) was 5. The maximum diversity index would be 1 if the directors were equally distributed in the five categories and zero if all fell in one category.
- b) Diversity index for educational disciplines ($educational_disciplines_{i,t}$): we identified the discipline of the degree held by each board member of firm i , such as engineering, economics, business administration, etc. Each discipline was assigned to a category. The maximum number of categories (k) possible for a board was the number of members. The maximum index of 1 would mean each director had a different educational discipline and zero if all had the same training.

- c) Diversity index for gender ($gender_{i,t}$): here the directors of firm i were classified into two categories: 1 – male and 2 – female, so that the number of categories (k) was 2. The maximum diversity index would be 1 if the board was divided equally between men and women and zero if all were men or women.
- d) Diversity index for age ($age_{i,t}$): the directors of firm i were classified into five age categories: 1 – 25-35 years, 2 – 36-45 years, 3 – 46-55 years, 4 – 56-65 years and 5 – over 65 years. Again, the maximum number of categories (k) was 5. The diversity index would be 1 if the members were distributed evenly in the five categories and zero if all were in a single age range.
- e) Diversity index for independence ($independence_{i,t}$): the directors of firm i were classified into two categories: 1 – independent, 2 – non-independent, so that the number of categories (k) was 2. An index of 1 would indicate that the members were equally divided between independent and non-independent, and zero if all were either independent or not independent.

Table 2 presents the statistical description of the diversity indexes. The index is low in the case of gender because of the rarity of female board members, while it is at an intermediate level in the case of years of schooling and high for educational discipline, age and ratio between independent and non-independent directors.

Table 2: Diversity Indexes

VARIABLE	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
Years of schooling	0.538	0.187	0.000	0.888
Educational discipline	0.786	0.153	0.225	1.000
Gender	0.151	0.250	0.000	0.816
Age	0.743	0.182	0.000	0.969
Independence or not	0.826	0.170	0.49	1.000
Total number of directors	488			
Number of observations	71			

Source: Economática and BM&FBovespa. Data processed by the authors.

3.3 Method for measurement of the relationship between board diversity and firm performance

We used regression analysis for the investigation, based on the following equation (2), developed from the models of Carter et al. (2008), Ararat, Aksu & Cetin (2010) and Bar, Niessen & Ruenzi (2007), originally constructed to measure the impact of the diversity of asset management teams on the performance of investment funds.

$$qtobin_{i,t} = \alpha + \beta_1 years_education_{i,t-1} + \beta_2 educational_disciplines_{i,t-1} + \beta_3 gender_{i,t-1} + \beta_4 age_{i,t-1} + \beta_5 independence_{i,t-1} + \beta_n \Gamma_{i,t-1} + \beta_m \Phi_{i,t-1} + \varepsilon_{it}$$

The variable $qtobin_{i,t}$ measures the market performance of firm i in year t . The levels of diversity in years of schooling, educational discipline, gender, age and independence of the board members in year $t-1$ are measured, respectively, by the variables $years_education_{i,t-1}$, $educational_disciplines_{i,t-1}$, $gender_{i,t-1}$, $age_{i,t-1}$ and $independence_{i,t-1}$, in the form of the diversity indexes. As detailed in item 3.1, we considered that the board composition at the end of the previous year $t-1$, including any changes made in the first four months of the year (up to April 30th, the last date for holding the annual general meeting), influenced the firm's performance in year t , as reflected in Tobin's q , estimated from the financial statements at the end of year t . Finally, Γ is the vector of control variables that can affect the market performance and Φ is the vector of dummy variables representing the years.

The vector Γ was constructed to avoid the omission from the model of variables that could have affected the firms' market performance. We identified five variables. The first two, return on assets (roa) and the logarithm of total assets (log_assets), as proposed by Carter et al. (2008), have the objective of maintaining each firm's characteristics constant. Return on assets is related to net revenue and book value per share, with predictive power on Tobin's q (Carter, Simkins & Simpson, 2003), while the firm size, in this case measured by the value of total assets, is used as a control variable because it is associated with the return on the shares (Fama & French, 1993).

The other three variables measure aspects of the governance structure. The first of them is the number of board members ($board_size$), associated negatively with the firm's market performance: the larger the board, the worse the market performance (Yermack, 1996). The second variable ($ceo_chairman$) is a dummy that assumes the value of zero

when the same person is the chief executive officer and the chairman of the board, and 1 otherwise. Carter et al. (2008) argued that the combination of these positions can be associated with worse financial performance. We included the third variable, the percentage of free float shares (*free float*), as a proxy for the board's power to influence the company's management, since the larger the free float of voting shares, the lower will be the chance of shareholders with large stakes to exercise control. We did not use dummy variables to indicate the firms' economic sectors due to the small sample size and the fact that all the companies were in individual sectors, with the exception of the real estate sector (seven firms) and management software sector (two firms). The dummy variables to identify sectors were not significant in preliminary tests, so we excluded them from the final model.

As advocated by the research on groupthink, the absence of new insights and diverging opinions can be crucial factors causing misguided decisions. Decisions of the board of directors without a careful analysis for definition of the firm's guidelines can have a negative impact on its market performance. Therefore, we tested the following hypothesis:

Hypothesis H0: The diversity of the board of directors does not affect the firm's market performance. As explained above, the board diversity was represented separately by years of schooling, educational discipline, gender, age and independence of the board (with the aim of measuring the impact of each diversity aspect), while performance was measured by Tobin's q .

4. RESULTS

Table 3 presents the model's estimation. The Breusch-Pagan test ($F: 1.35$; p -value: 0.2130) and White test ($\text{Chi}^2: 71.0$; p -value: 0.4442) did not reject the hypothesis of homoskedasticity. In turn, White's special test, indicated for cases in which the variance changes with the expected value, rejected homoskedasticity at a high level of significance ($F: 7.67$; p -value: 0.001). Based on the contradictory results of the tests and since a procedure to correct for heteroskedasticity would not be suitable, given the small sample size, we decided to adjust the standard errors, by employing robust procedures for the t and F statistics. The results presented in Table 3 demonstrate that the variables, as a set, were

statistically significant (F-test: 10.8; p-value: 0.00), with high explanatory power (R^2 : 0.62).

Diversity of years of schooling. The H_0 was rejected at the 10% level. The estimator indicated a positive relationship between Tobin's q and diversity in years of schooling. Since the average diversity of the sample firms was intermediate (Table 2) and the average number of years of schooling was concentrated at the baccalaureate level (Table 1), it can be argued that there would be increased effectiveness of boards if their members had more varied years of schooling.

Diversity of educational discipline. The results show a negative relationship between diversity in areas of educational specialization of board members and firm performance, which cannot be rejected at the 5% level. Therefore, firms with boards formed of people with diverse educational backgrounds would perform worse, a conclusion counter to the arguments developed in this study about the positive effects of diversity. We can suggest an explanation for this result. As can be seen in Table 2, the average diversity of the firms in the sample is high, so it can be suggested that while the boards are formed of members with varied educational areas, some of these disciplines do not give the directors the skills necessary to understand the firm's business activities. In this case, the variable could be partially capturing the effects of another variable that is omitted but negatively correlated with it, namely the capacity of the directors to understand the firm's activities and provide input with authority at meetings of the board and its committees. The observation of Zingales (2000) can be mentioned here, that in the "new firm", competition at the global level demands a process of innovation in search of quality, which can only be generated by talented employees. This requires technically qualified leadership. It is possible that the board members only manage to make a positive contribution to the results if they are capable at the strategic and monitoring levels with technical qualification.

Table 3: Estimation of the model – robust standard errors

VARIABLE	ESTIMATOR
Constant	4.273*** (0.729)
Years of schooling – diversity index (<i>years_education</i>)	0.741* 0.430
Educational disciplines – diversity index (<i>educational_disciplines</i>)	-1.097** (0.475)

Gender – diversity index (<i>gender</i>)	0.183 (0.357)
Age – diversity index (<i>age</i>)	-0.607 (0.416)
Independence – diversity index (<i>independence</i>)	-0.927** (0.459)
Return on assets (%) (<i>roa</i>)	0.022* (0.013)
Logarithm of total assets (<i>log_assets</i>)	-0.111* (0.058)
Number of board members (<i>board size</i>)	-0.056 (0.049)
No combination of positions – CEO and board chairman (<i>ceo_chairman</i>) (%)	-0.490** (0.227)
Free float shares (%) (<i>free float</i>)	0.011** (0.004)
Dummy 2007	0.530 (0.811)
Dummy 2008	-0.528 (0.731)
Dummy 2009	0.072 (0.768)
Number of observations	71
R ²	0.62
F-statistic	10.8***
Jarque-Bera test	0.042
P-value	0.979***

Source: Económica and BM&FBovespa. Data processed by the authors.

Statistical significance: ***(1%), **(5%) and *(10%).

Diversity of gender. With respect to gender diversity of the board members, it was not possible to reject the hypothesis that this diversity item does not affect the firm's market performance. Therefore, at first it cannot be affirmed that the findings of Carter, Simkins & Simpson (2002) and Carter et al. (2008) for American companies, that the presence of women on board has a positive impact on market performance, also apply to Brazilian companies without a majority controller. However, the results are coherent with those of Adams & Ferreira (2009), which also were not conclusive about the presence of women on boards, nearly always formed in the majority by men.

We should stress that the gender diversity index of Brazilian firms is very low, with men making up the overwhelming majority: of the 71 boards observed during the study

period, only 20 had a least one woman. Table 4 shows the comparison of the averages of the variables for the boards with and without women. *T*-tests of the differences of means showed that they are significant at the 5% level for Tobin's *q* and return on assets. By this comparison of the means, the market performance is boosted by having at least one female board member. It is also possible to conclude from Table 4 that those companies had a higher free float percentage in the study period. These results raise a possibility, suggested by some authors, like Demsetz & Villalonga (2001), that there is an endogenous relationship between firm performance and ownership structure – and governance – in which the firm's performance has just as great a chance of affecting the ownership structure as the latter, among other factors, has in determining performance. We can thus suggest that firms with better performance are more likely to invite women to join the boards.

Table 4: Comparison of the means of boards for companies with and without female board members

VARIABLE	BOARD W/O WOMEN	BOARD WITH WOMEN	DIFERENCE	T-TEST
Number of observations	51	20		
Total number of directors	351	137		
Total number of women directors	0	21		
Years of schooling – diversity index	0.52	0.59	0.07	1.44*
Years of schooling – average of the board members	16.9	17.0	0.1	0.62
Educational disciplines – diversity index	0.79	0.76	(0.03)	-0.70
Educational disciplines – average of the board members	4.0	4.5	0.5	1.40*
Age - diversity index	0.76	0.71	(0.05)	-1.04
Age – average of members	52.4	54.3	1.9	1.35*
Independence/non-independence – diversity index	0.82	0.83	0.01	0.23
Independent members (%)	39.3	42.9	3.6	0.72
Average number of directors	6.88	6.85	(0.03)	-0.07
No combination of positions – CEO and board chairman (%)	80.4	85.0	4.6	0.44
Tobin's <i>q</i>	1.0	1.5	0.5	2.27**
Return on assets – ROA (%)	4.8	8.2	3.4	2.33**
Total assets (million reais)	3,933.7	2,259.4	(1,674.3)	-1.124
Free float shares (%)	71.3	79.5	8.2	1.78**

Source: Prepared by the authors. Statistical significance: ***(1%), **(5%) and *(10%).

Diversity of age. The hypothesis that the age diversity of the board members does not have an impact on performance was not rejected.

Diversity of independence. The hypothesis that the diversity between independent and independent directors does not affect performance was rejected at the 5% level, demonstrating that this is an aspect that affects the market performance, but in negative form. Although the literature contains contradictory results in relation to the presence of independent board members, in this case, as in the example of the diversity in educational disciplines, the possibility can be considered that the presence of independent directors, with deficient knowledge about their firms' business activities, might detract from performance. Once again, the results might be different with the inclusion of a variable to measure the capacity of directors to understand business matters specific to their firms. Another possibility is that the firms' dispersed ownership structure – the average free float of the sample is 73.6%, as shown in Chart I – is leading to entrenchment of management, including the independent directors, who look out more for their own interests or those of the top executives. Santos, Silveira & Barros (2009), for example, identified the existence of social ties among directors that sit on the boards of multiple firms (board interlocking), with a negative effect on firm value.

Control variables. Of the control variables, the board size was not statistically significant at the 5% level. The observation made by Yermach (1996) that larger boards impair the market performance does not seem to hold for the Brazilian market. The free float percentage was significant at 5%, indicating a positive, albeit small, effect on performance with increased share dispersal in the market. There was also statistical significance, at the 10% level, for the variables *roa* (return on assets) and *log_assets* (logarithm of total assets), the first with a positive coefficient and the second with a negative one.

The variable regarding combination or not of the positions of CEO and board chairman in the same person was significant at 5%, with a coefficient of -0.011. The separation of the two positions would have a negative effect on the market performance, a result that contradicts the recommendations of most codes of good governance practices.

None of the dummy variables was statistically significant – the hypothesis of coefficients equal to zero could not be rejected for any of them – indicating there was no impact of the years from 2007 to 2009 on Tobin's *q*. This is a surprising result considering

that these were years during which the financial crisis unfolded, which severely affected stock prices.

5 CONCLUSIONS

The empirical results from this study of listed Brazilian companies without majority control indicate there is a relationship between diversity of educational aspects of the board members and the firm's market performance, although in different directions (positive for years of schooling and negative for educational disciplines). Diversity regarding the composition between independent and non-independent directors also was significant, with a negative impact on performance. Finally, the presence of women board members in the sample was very small, but those firms with at least one female director presented significantly better market performance than those without any women on their boards.

The results have implications for improvement of corporate governance in Brazil. The emergence of companies without a majority controller is usually associated with the implementation of the New Market. It is no accident that all the firms meeting this qualification were listed in this trading segment of the BM&FBovespa. The New Market rules have the declared intention of requiring that the companies listed there follow some corporate governance practices considered recommendable. When it was set up in December 2000, the rules did not contemplate the possibility of the emergence of companies without a single majority controller or controlling group, a structure then nonexistent in the country. The basic legislation on corporations, consolidated in the 1970s, was drafted in the assumption that companies had a single controller.

The recent reforms of the Code of Best Corporate Governance Practices (Brazilian Corporate Governance Institute - IBGC, 2009) were in a contrary direction to some of the results presented in this article. The IBGC Code was changed to recommend that the posts of chairman of the board and chief executive officer be held by different people and to encourage the formation of boards with more independent members. Similar provisions were proposed by the BM&FBovespa for the New Market (Valor Econômico, 2009), but the firms listed in that segment exercised their veto right to reject the changes. This veto was depicted in the press as a retreat on the path to good governance practices. The results of this study suggest further reflection may be in order.

This study presented in this article has some limitations. The sample size is small, although covering all the listed companies without majority control up to the time of the

study. The estimation of negative relationships between board diversity in the educational disciplines and in the combination of independent and non-independent directors with firm performance, measured by Tobin's q , can be an indication that we omitted variables from the model, one of them measuring the qualification of the directors regarding level of knowledge of the particular firm's business area.

We therefore recommend further research on the themes developed here, with the inclusion of more recent data. It would also be desirable to find proxies for the omitted variable mentioned above.

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APPENDIX

The companies without majority control considered in this study were the following:

2006	2007	2008	2009
DASA	ABNOTE	ABNOTE	ABNOTE
Lojas Renner	Brasilagro	AGRA	AGRA
	DASA	Bematech	Bematech
	Datasul	BM&FBovespa	BM&FBovespa
	Embraer	BR Malls	BR Brokers
	Eternit	Brasilagro	BR Malls
	Klabin-Segall	Cia Hering	Brasilagro
	Lojas Renner	Cremer	Cia Hering
	Lupatech	DASA	CR2
	Odontoprev	Drogasil	Cremer
	Perdigão	Embraer	Cyrela Realty
	Rossi Residencial	Eternit	DASA
	TOTVS	Gafisa	Drogasil
		GVT	Embraer
		Ind. Romi	Eternit
		Klabin-Segall	Gafisa
		Log-In	GVT
		Lojas Renner	Ind. Romi
		Lupatech	Iochpe Maxion
		MetalfRio	Klabin-Segall
		Odontoprev	Log-In
		PDG Realty	Lojas Renner
		Perdigão	Lupatech
		Rossi Residencial	MetalfRio
		São Carlos	Odontoprev
		TOTVS	PDG Realty
			Perdigão
			Portobello
			São Carlos
			TOTVS