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# Dual class shares, board of directors' effectiveness and firm's market value: an empirical study

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**Abstract** This study aims to identify whether a relationship exists between the controlling shareholders' voting power and outside directors' effectiveness in maximizing firms' financial performance. We analyze a panel data with 3057 observations for the 2000–2012 period using a random effects model, logit and probit regressions, and the two-stage model of Heckman in the Brazilian stock market. Our findings show that firms whose controlling shareholders use dual class shares to leverage their voting power have less independence from the board and worse financial performance and market value. Further, the percentage of outside directors tends to be ineffective in increasing the firm's value, and in changing the firm's chief executive officer (CEO) when (1) the controlling shareholder's voting power is leveraged, or (2) when the CEO assumes a position on the board of directors simultaneously. We interpreted that these results are in line with the arguments in favor of the existence of a new agency cost, which is related to the *undue obedience* of board members to authority, such as the largest controlling shareholder or the CEO in Brazilian listed firms.

**Keywords** Voting power · Dual class shares · Outside directors · Agency costs

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## 1 Introduction

The reasons for the factors that lead to an independent board of directors being effective in increasing a firm's market value have been the target of increasing debate in the literature on corporate governance. However, we argue that the existing theoretical approaches and the empirical evidence fail to explain this phenomenon sufficiently. Adams et al. (2010) and Huse et al. (2011) argue that the agency theory and the empirical evidence fail to establish a consistent relationship between the board's independence and the firm's market value. Although Claessens and Yurtoglu (2013) emphasize that most of the evidence shows that truly independent boards contribute to better firm performance and higher valuations, they also suggest that more studies should be done to identify how the ownership structure interacts with other corporate governance mechanisms to improve the firm's financial performance, especially in emerging countries. Additionally, Morck (2008) highlights that researchers should consider a new agency cost, which is related to the possible undue obedience of the outside directors to the firm's legitimized authorities, such as the controlling shareholders and the chief executive officer (CEO).

Specifically, this study's objective is to identify whether a relationship exists between the excess voting power of the controlling shareholders and the effectiveness of outside directors in increasing the firm's market value in the Brazilian stock market. To the best of our knowledge, no study has analysed this specific relationship. Furthermore, we argue that the Brazilian market is an interesting case to be studied owing to its peculiarities, such as changes in the early 2000s to its legal and institutional environment, which are presented in detail in Sect. 2.1.

To identify whether the undue obedience of outside directors tends to be a relevant issue in studies on corporate governance in Brazil, we consider that outside directors may adopt loyalty behaviours towards controlling shareholders and the CEO, as argued by Morck (2008). In addition, we assume that the controlling shareholders that can use a device to leverage their voting power, such as dual class shares issuance, are more likely to legitimize their authority over the outside directors. Adams and Ferreira (2008), Villalonga and Amit (2009), and Gompers et al. (2010) state that dual class shares issuance tends to be the easiest link to access the private benefits of control.

Thus, after considering unbalanced panel data for 13 years, ranging from 2000 to 2012, and controlling for possible self-selection bias in the decision regarding dual class shares issuance, our findings suggest two main conclusions.

The first is regarding the power that controlling shareholders have to reduce the outside directors' effectiveness for increasing the firm value. The evidence shows that the presence of a higher percentage of outside directors is more likely to be effective in achieving this goal; however, this phenomenon tends to occur only when the controlling shareholders do not use the dual class shares issuance to leverage their voting power. Furthermore, the evidence indicates that when a firm decides to issue shares without voting rights, the possible negative influence of the

controlling shareholder tends to be reduced when the difference between their voting rights and cash flows rights (*wedge*) is zero or negative, which is consistent with the positive effect of interest alignment.

The second conclusion is related to the possible negative influence of the CEO on the outside directors' effectiveness, when he/she assumes simultaneously the position of the chairman. The evidence indicates that outside directors are less likely to be effective in increasing the firm's value and its financial performance when there is a duality of individuals performing the two main positions in the firm. Similarly, we identify that outside directors are less likely to be effective to change the CEO when confronted with poor financial performance. This evidence is verified when the outside directors are working in firms whose largest shareholders use dual class shares to leverage their voting power and/or when the CEO simultaneously assumes a position on the board of directors, either as a chairman or as a regular member.

These results are robust, even after we consider the sample auto-selection bias in the firm's decision on the dual class shares issuance. Consequently, we identify that the negative effects due to the family influence on firms' operations are stronger than the positive effects. Hence, our evidence suggests that the dual class shares issuance is negatively related to the firm's financial performance in the Brazilian market. This result is consistent with the evidence shown by Gompers et al. (2010) for the US market.

We have interpreted that these findings contribute to the previous literature on corporate governance because they show that the outside directors' effectiveness depends on the preference of the controlling shareholder who appears to have a legitimized authority with the board of directors. In a complementary manner, this evidence supports the arguments developed by Morck (2008) and suggests that the undue obedience of the outside directors is a factor that increases the controlling shareholder's voting power, which is also consistent with the conclusions developed by Villalonga and Amit (2009) for the US market. The findings of this study are also in accordance with those identified by Jameson et al. (2014) in the Indian market.

A second possible explanation of these major findings is related to the specific contexts that can influence the effectiveness of the internal corporate governance mechanisms, such as the percentage of outside directors and no CEO duality. The studies that explain how the governance mechanisms can mingle with one another are developed by Rediker and Seth (1995), Ward et al. (2009), Aguilera et al. (2011), Yoshikawa et al. (2014), and Misangyi and Acharya (2014). The complementarity hypothesis between the percentage of outside directors and the absence of CEO duality appears to be supported in the results of this work, which are in accordance with the works developed by Meyer et al. (1992), Aguilera et al. (2008), and Tosi (2008). However, we consider that this explanation needs more empirical tests, particularly using the simultaneous equations modelling approach, including more corporate governance mechanisms to generalize the results.

The remainder of this paper is organized as follows: Sect. 2 presents a brief literature review and details on the legal and institutional changes in the Brazilian stock market. Section 3 describes the data and the empirical models proposed.

Section 4 presents an empirical analysis, and the final section presents the main conclusions, as well as policy and governance implications.

## 2 Literature review

### 2.1 Brazilian legal and institutional environment

The Brazilian stock market may be considered an interesting and special case to study due to three interesting issues, which follow.

The first is related to the legal environment on voting and non-voting shares, which in Brazil has undergone certain changes, particularly in the early 2000s, as previously highlighted by Silva and Subrahmanyam (2007), Gorga (2009), Carvalhal (2012), Bortolon and Leal (2014), and Black et al. (2014). These authors stress the large number of companies that have two classes of shares: common shares (with voting rights) and preferred shares (with non-voting rights).

Second, as previously highlighted by Gorga (2009) and Black et al. (2014), the institutional environment of the Brazilian market underwent one important change in the early 2000s related to the creation of the three ascending levels of corporate governance, namely, *level 1*, *level 2* and the "Novo Mercado" (New Market). According to Carvalhal (2012), these segments are designed for companies that voluntarily decide to offer high standards of disclosure and transparency, as well as better corporate governance practices. Black et al. (2014) argue that the quality of corporate governance in Brazil adopted by firms has improved over the years. The main reason for this evolution is the improvement of corporate governance at the firm level when migrating to another level with a higher standard of requirements, such as from level 2 to the New Market. According to this evidence, while positive changes in the Brazilian institutional environment are identified by Black et al. (2014), particularly in the voluntary practices adopted by firms, Gorga (2009) highlights certain weaknesses in the legal environment. For instance, she argues that, although a new law (Law 10303/01) enacted in 2001 reduced the threshold of nonvoting shares from two-thirds of the firm's total capital, as defined by the previous law, to at most 50%, this change is applicable only to firms that decided to go public after 2001.

Finally, there is a specific issue regarding the composition of the board of directors; the rules for the New Market and level 2 are stricter in relation to the number of members, the percentage of outside directors and the office term of directors than for level 1 and the traditional market. For the superior segments of corporate governance, such as level 1, level 2 and the New Market, there is a prohibition regarding the simultaneous accumulation of the positions of CEO and Chairman of the board; however, this restriction went into effect in September 5, 2011 with a grace period of 3 years from the membership date of the firm. Therefore, we should note that there is no rule, even at the New Market level, restricting the CEO from belonging to the board of directors as a regular member or a non-Chairman.

Table 1 shows the comparison between the three superior levels of corporate governance, which are voluntary practices adopted by firms, and the traditional market, which adheres to the regular Brazilian law.

**Table 1** Comparison between superior levels of corporate governance and the traditional market. *Source*: Adapted from BM&FBOVESPA (2016)[a]

| Category | Topic | New market | Level 2 | Level 1 | Traditional market |
|---|---|---|---|---|---|
| Ownership structure | Features of the shares issued | Only voting right shares | Allow nonvoting shares, but with additional rights | Allow voting and nonvoting shares (according to law) | |
| | Free float | At least 25% | | | No rule |
| | Public offering of shares | Efforts for ownership dispersion | | | No rule |
| | Granting of *tag along* | 100% (voting shares) | 100% to voting and nonvoting shares (80% to nonvoting shares until 5/9/2011) | 80% to nonvoting shares (according to law) | |
| Board of directors | Board of directors' composition | No <5 members, of which 20% are independent directors. Unified terms of up to 2 years | | No <3 members (according to law) | |
| | Prohibition the accumulation of the positions (from 5/10/2011) | CEO and chairman must be different people (grace period of 3 years from adherence) | | | No rule |

[a] Available in: http://www.bmfbovespa.com.br/pt_br/listagem/acoes/segmentos-de-listagem/sobre-segmentos-de-listagem/ access in 09/15/2016

As highlighted by Andrade et al. (2016), although these changes occurred when seeking incentives for the best practices of corporate governance in Brazil, there are other possible strategies for leveraging the controlling shareholders' voting power. For instance, there is the possibility of the firm belonging to the New Market level, where only the voting rights issuance is allowed; however, the CEO of this firm can be a regular member of the board of directors, although his/her position is not chairman, which may influence the effectiveness of the board to exercise its monitoring role. The evidence supporting this possibility is also found by Villalonga and Amit (2009) in the US market. The researchers' findings suggest that the CEO's dual leadership is associated with a higher voting power for controlling shareholders, in addition to serving as a familiar proxy for management.

### 2.2 Theoretical approaches, related empirical evidence and hypotheses development

Theoretically, agency theory proposes that the role of independent directors is monitoring the managers, as highlighted by Jensen and Meckling (1976) and Jensen (1993). Conversely, from the perspective of resource dependency theory, which was developed by Pfeffer and Salancik (1978) and Zahra and Pearce (1989), the role of independent directors is to support the definition of business strategies. Brickley and Zimmerman (2010) argue that, although the functions of supporting the definition of strategies and monitoring the managers are complementary roles of the independent directors, they barely perform both assignments effectively at board meetings.

One other perspective is developed by Morck (2008), who argues that the literature on social psychology can explain why the academic literature on finance has failed to identify a consistent link between a board of directors' independence and the firm's financial performance. In the work of Milgram (1963, 1974), the researcher argues that this relationship can be explained by behavioural aspects involved in the decision-making process for the board of directors.[1] Morck (2008) argues that the undue loyalty of members on a board of directors to the firm's authorities, such as the CEO or the controlling shareholder, is an important factor because the directors have the power to question and demand answers to prevent possible corporate scandals, as in the US market in the early 2000s. Moreover, Morck (2008) argues that this theory proposes a new agency cost, which could be related to undue obedience instead of the divergence of interests, as suggested by the agency theory.

However, from an empirical perspective, the evidence is inconclusive. In the US market, the negative relationship between the percentage of outside directors and a firm's financial performance is found in different studies, such as Bhagat and Black (1999), Agrawal and Knoeber (1996), and Klein (1998), who argue that there is an optimum proportion of outside directors that maximizes the firm's financial performance, as theorized by Harris and Raviv (2008). Anderson and Reeb (2004) find that the independent directors assume the important role of increasing the firm's

[1] The findings of the experiments developed by Milgram (1963, 1974) suggest that humans have a predisposition to suppress their internal ethical standards if they cause a conflict with an authority figure.

financial performance and, therefore, to compensate for the agency conflicts that arise in family-controlled businesses in the US market. Conversely, Villalonga and Amit (2009) highlight that the founding family's representativeness, through directors on the board, is a mechanism for leveraging the voting power. Recently, Sur et al. (2013) find that the board of directors' composition in firms listed in the US markets differs due to the controlling shareholder's preferences and that the institutional pressures for a higher percentage of outside directors can generate unforeseen effects on the firm's governance.

In emerging cross-country studies, such as Kim et al. (2007) and Dahya et al. (2008), the evidence suggests that, when there is the presence of controlling shareholders, the investors' legal protection at the country level tends to be a substitute mechanism for the independence of the board.

More recently, in a study on the Indian market, Jameson et al. (2014) find that the percentage of independent directors is not effective in mitigating the negative relationship that the controlling shareholders' presence, which is family groups, has on the firm's financial performance. These results contradict the findings reported by Anderson and Reeb (2004) for the US market.

In the Brazilian market, the literature provides inconclusive evidence. For example, Silveira et al. (2003), Andrade et al. (2009), and Gondrige et al. (2012) find no statistically significant relationship between the outside directors' percentage and the firm's financial performance.[2] Conversely, a negative relationship is found by Mendes-Da-Silva (2011) during the 1997–2007 period. Despite using different methodologies and datasets, we argue that these studies are assuming that the role of outside directors is independent of the practice of control enhancing mechanisms, such as the dual class shares issuance, which may be used by the controlling shareholders. Therefore, this study contributes to the literature on the Brazilian market and relaxes this assumption, which may have different implications on the board of directors' effectiveness that are not found in the Brazilian market context.

Given the inconsistencies of the empirical evidence shown above, which use the agency theory perspective, we identify the need to explore alternative perspectives, as previously highlighted by Adams et al. (2010), Huse et al. (2011). As also noted by Claessens and Yurtoglu (2013, p. 25), *a concentrated ownership can be beneficial, unless there is a disparity of control and cash flow rights*. Thus, we determine whether the undue obedience of outside directors to the CEO or to the controlling shareholders, as proposed in the theoretical work by Morck (2008), is a relevant factor to explain the relationship between the board of directors' independence and the firm's financial performance of firms listed on the Brazilian market. Thus, we developed the following two hypotheses:

**Hypothesis 1** The excess voting power of the controlling shareholders, through the dual class shares issuance, induces a lower effectiveness of the outside directors in maximizing the firm's financial performance and its market value.

[2] Silveira et al. (2003) found a positive relationship only in 1999 by using a databse during the 1998–2002 period.

**Hypothesis 2** The presence of the CEO on the board of directors, as the chairman or a regular member, induces a lower effectiveness of the outside directors in the practice of replacing the CEO.

If the hypotheses above are confirmed, it is possible to infer, based on the idea developed by Morck (2008), the rise in the undue obedience of outside directors towards the controlling shareholders or towards the CEO. However, we should highlight that there is another perspective to interpret these hypotheses that can explain the effectiveness of the corporate governance mechanisms and how they interact, as complementary or as substitutes of each other, as a bundle of related practices. The support for this alternative explanation is developed in studies conducted by Rediker and Seth (1995), Ward et al. (2009), Aguilera et al. (2011), Yoshikawa et al. (2014), and Misangyi and Acharya (2014). The substitutability hypothesis among the monitoring mechanisms is supported by Rediker and Seth (1995), Agrawal and Knoeber (1996), Dalton et al. (2003); the complementarity hypothesis is developed by Meyer et al. (1992), Aguilera et al. (2008), and Tosi (2008). Thus, the recent studies developed by Misangyi and Acharya (2014) and Yoshikawa et al. (2014) provide a possible alternative explanation on how the corporate governance mechanisms, such as ownership structure, the non-CEO duality and the percentage of outside directors interact with each other to increase the firm's financial performance and/or to implement CEO turnover.

## 3 Data

The study considers sample data for a period of 13 years between 2000 and 2012, which is the largest possible database since the origin of the corporate governance levels in the Brazilian equity market with the creation of the New Market in 2000. Thus, we collect the observations from firms that have sufficient information to achieve the objective proposed in this paper and exclude institutions within the financial sector. Subsequently, we build unbalanced panel data on 462 companies, composed of 3057 observations.

To avoid the inflation effects on the observed variables, the values were corrected by the IGP (Brazilian inflation index). The source used for collecting the data for financial variables was the Economatica database, in addition to the information regarding the ownership structure and other corporate governance variables available on the Brazilian Securities and Exchange Commission (CVM) website.

### 3.1 Empirical model

To develop the empirical model, we act in accordance with the recommendations of Morck (2008), Adams et al. (2010), Huse et al. (2011), Claessens and Yurtoglu (2013), Sur et al. (2013), and Jameson et al. (2014). These authors highlight that there is limited knowledge about the factors that enable the board of directors to be effective in increasing the firm's financial performance and its market value. For example, Sur et al. (2013) propose that further studies should consider the possible

interaction between ownership structure and the board of directors' features. Thus, we apply the argument of Morck (2008) related to the possible tendency of undue obedience and the loyalty of outside directors to the authority that hired them, either the controlling shareholders or the CEO. As obedience to authority is an unobservable factor, we assume that when controlling shareholders sacrifice the firm's value in exchange for private benefits of control, they will use devices to enhance their voting power, dual class shares issuance being one of these strategies, as highlighted by Shleifer and Vishny (1997), La Porta et al. (1999, 2000), Bebchuk et al. (2000), Faccio and Lang (2002), Morck et al. (2005) and Adams and Ferreira (2008).

Thus, to identify the outside directors' effectiveness in the presence of controlling shareholders that are able leverage their voting power, we developed two empirical models, as described below.

$$FinancialPerformance_{it} = \alpha + \beta_1 Out_{it} + \beta_2 Dual \times Out_{it} + \beta_3 Z_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

In Eq. 1, we are interested in the identification of the influence of the percentage of outside directors (*Out*) related to the presence or not of dual class shares issuance (*Dual*), which is a mechanism that allows the leveraging of voting power by the controlling shareholders and that affects the firm's financial performance, which is measured using the variable Tobins' $Q$ and the accounting measures, such as the return on assets (*ROA*) and the sales growth ($\Delta Sales$). Matrix $Z$ represents the set of control variables used in the model, available in the headers of the tables in the empirical analysis section. All variable definitions are available in Appendix 1. The terms $\mu$ and $\varepsilon$ represent the unobserved time-invariant heterogeneity and the random error term to firm $i$ in period $t$, respectively.

However, we argue that only the binary variable (*Dual*) is not sufficient to identify the ratio between the percentage of voting rights held by the controlling shareholder (*Vot*) in relation to the percentage of total cash flow rights held by the controlling shareholder (*Tot*). Therefore, to include the excess of the voting power (*Wedge*), we use a proxy developed by Cronqvist and Nilsson (2003), calculated as follows:

$$Wedge_{it} = \left(\frac{Vot_{it}}{Tot_{it}}\right) - 1 \quad (2)$$

Since we are interested in identifying whether the role of the outside director is influenced by the voting power excess of the controlling shareholder, we change the variable (*Wedge*) to a dummy variable (*DW*), which assumes the value 1 when $Wedge > 0$ and the value 0 if $Wedge \leq 0$. We argue that this procedure allows us to consider the entrenchment and alignment effects. These effects are originally identified by Morck et al. (1988) in the US market; in the Brazilian market, the evidence confirming these two effects are analysed by Okimura et al. (2007) and Caixe and Krauter (2013).

Consequently, we include the variable (*DW*) in the Eq. (1), replacing the variable (*Dual*) as shown in Eq. (3), to separate the possible effects that the leverage of the

voting power of the largest controlling shareholder exerts on the effectiveness of the outside directors' percentage.

$$FinancialPerformance_{it} = \alpha + \beta_1 Out_{it} + \beta_2 DW \times Out_{it} + \beta_3 Z_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

Furthermore, to identify the possible influence that the presence of one individual simultaneously holding the positions of CEO and chairman of the board exerts on the effectiveness of outside directors, we utilize Eqs. (1) and (3), considering two subsamples, with the binary variable related to CEO's duality leadership as a criterion to divide them.

To analyse the robustness of the results obtained from Eqs. (1) and (3), we include CEO turnover as the dependent variable, as shown in Eq. (4).

$$CEOTurnover_{it} = \alpha + \beta_1 Out_{it} + \beta_2 DW \times Out_{it} + \beta_3 L_1 \cdot QTobin_{it} + \beta_4 Z_{it} + \mu_i + \varepsilon_{it}, \quad (4)$$

where the dependent variable (*CEOTurnover*) is a dichotomous variable that takes the value 1 if there is a change in the individual holding the CEO position of firm $i$ in the period $t$, in relation to the same firm in the period $t - 1$, and the value of 0 otherwise. Regarding the main independent variables, in Eq. (4), we maintained the same variables as in Eqs. (1) and (3); however, we include the variable ($L_1$·*Tobin's Q*), which represents the CEO turnover sensitivity in relation to the market value of firm $i$ in period $t - 1$, which is obtained using one lag for the Tobin's *Q ratio*. Thus, we argue that the empirical model in Eq. (4) assesses whether the leveraging of the voting power adopted by the controlling shareholders affects the outside directors' effectiveness in their monitoring roles, through the CEO turnover. Furthermore, we argue that this procedure will provide a more robust result or an explanation for the results in Eqs. (1) and (3).

To estimate these equations, we use two different strategies, with the objective of mitigating possible endogeneity concerns. The first considers the unobserved heterogeneity through fixed or random effects using the criteria defined by Hausman (1978) and by Schaffer and Stillman (2010). To estimate Eq. (4), we use the Logit regression model applied to the panel data with the Hausman test to choose between a fixed or random effects model.

The second strategy considers the possible self-selection bias in the firm's decision whether or not to have dual class shares issuance. For this purpose, we use the two-stage model proposed by Heckman (1979), and in accordance with the suggestion of Gompers et al. (2010), we assume that the firm's decision to have dual class shares (*Dual*) is determined according to Eq. (5).

$$Dual_{it} = \alpha + \beta_1 Name_{it} + \beta_2 Z_{it} + e_{it}, \quad (5)$$

where *Name* is a binary variable that takes the value 1 if the firm's name is associated with the largest controlling shareholder's name and 0 otherwise. Similar to the procedure adopted by Gompers et al. (2010), we use this variable as an instrument that can directly affect the decision to have dual class shares and

indirectly affect the firm's financial performance.[3] The matrix $\mathbf{Z}_{it}$ is a set of exogenous variables considered and related to observable firm features that may affect the decision to have dual class shares. Finally, the variable $e_{it}$ represents the stochastic error term. As exogenous variables, we use the percentages of voting rights held by the largest and the five largest shareholders, *Vot1* and *Vot5*, respectively; firm size is defined by the natural logarithm of the total assets (*LnAt*). We also use the ratio of gross debt to total assets (*Debt*), the operational return on total assets (*ROA*), a binary variable related to the corporate governance index (C*GI*), the assets' tangibility (*Tang*), defined by the ratio between fixed assets and total assets, and dummy variables related to the firm's sector (*Industry*), the controlling shareholder nature (*Nat*) and time fixed effects (*Year*). However, these variables are included as exogenous variables in Eq. (1). Therefore, we consider an instrument suggested by Gompers et al. (2010) in their study of the US market, which involves the inclusion of a binary variable (*Name*) related to the association of a firm's name and the largest controlling shareholder.

## 4 Empirical analysis

All descriptive statistics are available in Appendix 2. The results show that, while it is high (68.20%), the percentage of firms using dual class shares issuance has decreased over time (see Fig. 3 in Appendix 2), possibly due to the creation of the New Market segment in 2000.[4] Conversely, the results show that the mean of the outside directors' percentage is high on average (85%), although the percentage of directors elected by dominant shareholders is high (78%); this suggests that it is likely for the board of directors to be dominated by the largest shareholder's interests, including those with a high percentage of outside directors.

The results using univariate statistics are shown in Table 2. To develop the mean and median comparisons, we consider different firms' features, divided into two dummy variables, *DW1* and *DW5*. Each of these variables assume a value of 1 when *Wedge* is positive for the largest shareholder and the top five largest shareholders, respectively, and 0 otherwise.

The data from Table 2 show that, in firms where there the controlling shareholders' voting power is leveraged ($DW1 = 1$; $DW5 = 1$), the controlling shareholders tend to have a higher percentage of voting rights (*Vot1* and *Vot5*) and consequently higher leverage levels of voting power (*Wedge1* and *Wedge5*). All these results are statistically significant, regardless of the criterion used to divide the two groups (*DW1* or *DW5*). We should note that the number of firms (*N*) having positive values for the variables *DW1* and *DW5* is higher than the number of firms

[3] Gompers et al. (2010) uses five instruments in their study; however, they suggest that the presence of the name of an individual in the firm's name is the most significant instrument. The other four possible instruments were not checked in this study due to the limitations in accessing the similar data for Brazilian firms in our sample.

[4] As highlighted in Sect. 2.1, the segment of "Novo Mercado" requires that firms issue only voting shares; the number of firms listed in this segment has increased substantially over the period analyzed in this study, in accordance with the works developed by Andrade et al. (2014) and by Black et al. (2014).

**Table 2** Tests of mean and median to firms' groups separated by the variables *DW1* and *DW5*

*DW1* and *DW5* are dummies equal to 1 if the wedge to the top largest controlling shareholder or top five largest controlling shareholder, respectively, is a positive value, and 0 otherwise, we use different variables related to firms' features, such as: boards' size (*BSize*); percentage of outside directors (*Out*); percentage of directors elected by dominant shareholder (*Elect*); percentage of voting shares held by the top and by the top five largest shareholders (*Vot1* and *Vot5*, respectively); wedge for the largest and the top five largest shareholders (*Wedge1* and *Wedge5*, respectively); firms' financial performance, such as Tobin's Q, operational return on total assets (*ROA*), ratio between the EBIT and Sales (*MEBIT*); return on equity (*ROE*), and sales growth ($\Delta Sales$); total assets growth ($\Delta Assets$); firms' payout (Payout); ratio between total liabilities and total assets (*Liab*); ratio between total debt and total assets (*Debt*), ratio between short-term-debt and total debt (short-term-debt); natural logarithmic of total assets (*LnAt*); tangibility (*Tang*). To compare means and medians, we use the Student's *t* and the Wilcoxon's tests, respectively

| Variable/group | $DW1 = 0$ | $DW1 = 1$ | *P* value | $DW5 = 0$ | $DW5 = 1$ | *P* value |
|---|---|---|---|---|---|---|
| *BSize* | | | | | | |
| N | 1316 | 1488 | | 1124 | 1680 | |
| Mean | 7.29 | 6.86 | 0.000 | 7.14 | 7.01 | 0.210 |
| Median | 7 | 7 | 0.000 | 7 | 7 | 0.019 |
| *Out* | | | | | | |
| N | 1316 | 1488 | | 1124 | 1680 | |
| Mean | 86.83 | 83.42 | 0.000 | 86.74 | 83.87 | 0.000 |
| Median | 87.5 | 83.33 | 0.000 | 87.5 | 85.71 | 0.000 |
| *Elect* | | | | | | |
| N | 574 | 779 | | 478 | 875 | |
| Mean | 0.74 | 0.80 | 0.002 | 74.01 | 79.91 | 0.000 |
| Median | 0.85 | 0.90 | 0.004 | 85.5 | 88.88 | 0.008 |
| *Vot1* | | | | | | |
| N | 1359 | 1663 | | 1167 | 1855 | |
| Mean | 40.01 | 62.46 | 0.000 | 43.74 | 57.80 | 0.000 |
| Median | 34.58 | 60 | 0.000 | 39.96 | 55.71 | 0.000 |
| *Vot5* | | | | | | |
| N | 1359 | 1689 | | 1202 | 1855 | |
| Mean | 75.04 | 87.79 | 0.000 | 72.01 | 88.68 | 0.000 |
| Median | 77.01 | 93.04 | 0.000 | 73.53 | 92.95 | 0.000 |
| *Wedge1* | | | | | | |
| N | 1359 | 1638 | | 1142 | 1855 | |
| Mean | −0.11 | 0.78 | 0.000 | 0.03 | 0.58 | 0.000 |
| Median | 0 | 0.65 | 0.000 | 0 | 0.37 | 0.000 |
| *Wedge5* | | | | | | |
| N | 1359 | 1698 | | 1202 | 1855 | |
| Mean | 0.05 | 0.43 | 0.000 | −0.00 | 0.44 | 0.000 |
| Median | 0 | 0.25 | 0.000 | 0 | 0.26 | 0.000 |
| *Tobin's Q* | | | | | | |
| N | 1359 | 1698 | | 1202 | 1855 | |
| Mean | 1.55 | 1.14 | 0.000 | 1.60 | 1.15 | 0.000 |
| Median | 1.22 | 1.02 | 0.000 | 1.26 | 1.01 | 0.000 |

**Table 2** continued

*DW1* and *DW5* are dummies equal to 1 if the wedge to the top largest controlling shareholder or top five largest controlling shareholder, respectively, is a positive value, and 0 otherwise, we use different variables related to firms' features, such as: boards' size (*BSize*); percentage of outside directors (*Out*); percentage of directors elected by dominant shareholder (*Elect*); percentage of voting shares held by the top and by the top five largest shareholders (*Vot1* and *Vot5*, respectively); wedge for the largest and the top five largest shareholders (*Wedge1* and *Wedge5*, respectively); firms' financial performance, such as Tobin's Q, operational return on total assets (*ROA*), ratio between the EBIT and Sales (*MEBIT*); return on equity (*ROE*), and sales growth (Δ*Sales*); total assets growth (Δ*Assets*); firms' payout (Payout); ratio between total liabilities and total assets (*Liab*); ratio between total debt and total assets (*Debt*), ratio between short-term-debt and total debt (short-term-debt); natural logarithmic of total assets (*LnAt*); tangibility (*Tang*). To compare means and medians, we use the Student's *t* and the Wilcoxon's tests, respectively

| Variable/group | *DW1* = 0 | *DW1* = 1 | *P* value | *DW5* = 0 | *DW5* = 1 | *P* value |
|---|---|---|---|---|---|---|
| *ROA* | | | | | | |
| N | 1359 | 1697 | | 1201 | 1855 | |
| Mean | 8.13 | 7.75 | 0.233 | 8.07 | 7.82 | 0.434 |
| Median | 7.64 | 7.66 | 0.7154 | 7.56 | 7.60 | 0.851 |
| *MEBIT* | | | | | | |
| N | 1354 | 1693 | | 1195 | 1852 | |
| Mean | 13.64 | 11.74 | 0.007 | 13.77 | 11.82 | 0.007 |
| Median | 12.6 | 11.2 | 0.003 | 12.8 | 11.3 | 0.007 |
| *ROE* | | | | | | |
| N | 1354 | 1694 | | 1196 | 1852 | |
| Mean | 7.99 | 4.61 | 0.000 | 7.50 | 5.22 | 0.017 |
| Median | 9.8 | 8.1 | 0.000 | 9.65 | 8.3 | 0.011 |
| Δ*Sales* | | | | | | |
| N | 1126 | 1412 | | 1006 | 1532 | |
| Mean | 7.71 | 1.68 | 0.000 | 8.03 | 1.94 | 0.000 |
| Median | 7.37 | 4.54 | 0.000 | 7.73 | 4.67 | 0.000 |
| Δ*Assets* | | | | | | |
| N | 1126 | 1412 | | 1006 | 1532 | |
| Mean | 6.28 | 2.01 | 0.000 | 6.45 | 2.23 | 0.000 |
| Median | 4.52 | 1.25 | 0.000 | 5.04 | 1.50 | 0.000 |
| *PayOut* | | | | | | |
| N | 1359 | 1698 | | 1202 | 1855 | |
| Mean | 0.51 | 0.56 | 0.000 | 0.50 | 0.56 | 0.000 |
| Median | 0.40 | 0.55 | 0.000 | 0.39 | 0.58 | 0.000 |
| *Liab* | | | | | | |
| N | 1359 | 1698 | | 1202 | 1855 | |
| Mean | 56.27 | 55.96 | 0.660 | 55.28 | 56.36 | 0.145 |
| Median | 57.5 | 56.6 | 0.509 | 56.7 | 56.2 | 0.294 |
| *Debt* | | | | | | |
| N | 1359 | 1698 | | 1201 | 1855 | |
| Mean | 26.03 | 25.69 | 0.591 | 26.44 | 25.45 | 0.120 |
| Median | 26.1 | 25 | 0.358 | 26.5 | 24.8 | 0.082 |

**Table 2** continued

*DW1* and *DW5* are dummies equal to 1 if the wedge to the top largest controlling shareholder or top five largest controlling shareholder, respectively, is a positive value, and 0 otherwise, we use different variables related to firms' features, such as: boards' size (*BSize*); percentage of outside directors (*Out*); percentage of directors elected by dominant shareholder (*Elect*); percentage of voting shares held by the top and by the top five largest shareholders (*Vot1* and *Vot5*, respectively); wedge for the largest and the top five largest shareholders (*Wedge1* and *Wedge5*, respectively); firms' financial performance, such as Tobin's Q, operational return on total assets (*ROA*), ratio between the EBIT and Sales (*MEBIT*); return on equity (*ROE*), and sales growth ($\Delta Sales$); total assets growth ($\Delta Assets$); firms' payout (Payout); ratio between total liabilities and total assets (*Liab*); ratio between total debt and total assets (*Debt*), ratio between short-term-debt and total debt (short-term-debt); natural logarithmic of total assets (*LnAt*); tangibility (*Tang*). To compare means and medians, we use the Student's *t* and the Wilcoxon's tests, respectively

| Variable/group | $DW1 = 0$ | $DW1 = 1$ | *P* value | $DW5 = 0$ | $DW5 = 1$ | *P* value |
|---|---|---|---|---|---|---|
| *Short-term-debt* | | | | | | |
| N | 1304 | 1615 | | 1143 | 1776 | |
| Mean | 39.44 | 46.98 | 0.000 | 41.10 | 45.23 | 0.000 |
| Median | 32.4 | 42.5 | 0.000 | 33.8 | 39.55 | 0.000 |
| *LnAt* | | | | | | |
| N | 1359 | 1698 | | 1202 | 1855 | |
| Mean | 14.70 | 14.36 | 0.000 | 14.67 | 14.40 | 0.000 |
| Median | 14.71 | 14.31 | 0.000 | 14.66 | 14.45 | 0.000 |
| *Tang* | | | | | | |
| N | 1359 | 1697 | | 1201 | 1855 | |
| Mean | 29.66 | 37.76 | 0.000 | 28.41 | 37.88 | 0.000 |
| Median | 27.55 | 37.46 | 0.000 | 25.72 | 37.52 | 0.000 |

having values equal to 0 or negative for the variables related to the leverage of voting power for the largest and to the top five largest shareholders ($DW1 = 0$; $DW5 = 0$). These results confirm that the expropriation risk due to the high concentration of voting shares and the excess voting power held by the controlling shareholders in the Brazilian market remains high.

To identify whether the compositions of the board of directors between the two groups analysed are different, the data from Table 2 show that the controlling shareholders that leverage their voting power have less members on the board of directors (*BSize*), a lower percentage of outside directors (*Out*), and a higher percentage of directors elected by the largest controlling shareholder (*Eleit*). These results are statistically significant except for the variable size of the board of directors (*BSize*) when we analyse the comparison of means between the groups divided by the variable (*DW5*). This evidence suggests that when the firm's controlling shareholders have dual class share issuance or if the variable (*Wedge*) is 0 or if it assumes a negative value, the firm is more likely to have a higher percentage of independent directors. Although the loyalty level of outside directors to the controlling shareholders who have appointed them is an unobservable variable, the differences in the composition of the board suggest that the controlling

shareholders' voting power is possibly associated with the role played by the outside directors.

In addition to the differences previously noted for the ownership structure and for the board of directors' composition, the data from Table 2 suggest that firm groups whose controlling shareholders have more voting rights as a percentage of their total cash flow rights tend to have worse ratios of financial performance. This result is obtained for all variables used to measure the firm's financial performance, such as *Tobin's Q*, *ROE*, *ROA*, and *Mebit*, which show higher values for the group of firms whose controlling shareholders do not leverage the voting power. This interpretation is statistically significant for all mean and median comparisons, except for *ROA*. Consistent with these results, the data from Table 2 show that the single class firms or firms with nonpunitive value for the controlling shareholders' wedge have higher sale and total assets growth, $\Delta Sales$ and $\Delta Assets$, respectively; this is also statistically significant.

Regarding the results using the variable *Payout*, the data show that firms whose controlling shareholders have positive values for the variable wedge tend to pay higher dividends; however, we should note that the additional dividend paid tends to be, on average, approximately 10% higher than the percentage paid by firms whose controlling shareholder does not leverage voting power. A possible explanation for this evidence may be found in the Brazilian legislation regarding publicly traded firms, which requires a 10% premium on the value of dividends paid on the shares without voting rights, in relation to the percentage paid to voting shares.

Regarding debt policy, the results from Table 2 suggest that firms whose controlling shareholders use the dual class shares to leverage their voting power have lower debt levels (*Liab* and *Debt*) and a higher ratio of short-term debt. However, we should highlight that the results are statistically significant only for the variables *Debt* and *Short-term-Debt*. These results suggest that the excess of voting power held by the controlling shareholders measured by variables *DW1* and *DW5* tends to be a constraint to obtain funds from financial institutions, such as banks, especially long-term debt.

Finally, the results show that the values for the variables of firm size (*LnAt*) and assets tangibility (*Tang*) for firms whose controlling shareholders use the dual class shares to leverage their voting power are higher. These results are statistically significant and suggest that the excess of voting power is related to larger firm size for older firms and to firms that are less likely to invest in intangible assets, such as research and development.

The correlation matrix in Table 3 shows that the percentage of outside directors is positively associated with the following variables: board's size (*BSize*), membership to corporate governance index (*CGI*), firm size (*LnAt*), and total debt (*Debt*). Conversely, the independence of the board of directors is negatively associated with the following: the CEO's simultaneous participation on the board of directors, either as the chairman (*CEOdu*) or a regular member (*CEOb*); the largest shareholder voting power (*Cont1*); the excess of voting power for the top five largest shareholders (*Wedge5*); the familiar nature of the largest controlling shareholder, either using the variable (*Fam*) or the variable (*Name*); the dual class shares

**Table 3** Correlation matrix

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Tobins' *Q* | 1 | | | | | | | |
| 2. Out | 0.13*** | 1 | | | | | | |
| 3. Elect | 0.02 | 0.03 | 1 | | | | | |
| 4. BSize | 0.04** | 0.37*** | 0.03 | 1 | | | | |
| 5. CEOdu | −0.09*** | −0.50*** | −0.09*** | −0.24*** | 1 | | | |
| 6. CEOb | −0.10*** | −0.70*** | −0.005** | −0.12*** | 0.52*** | 1 | | |
| 7. Vot1 | −0.12*** | −0.12*** | 0.10*** | −0.18*** | 0.08*** | 0.11*** | 1 | |
| 8. Wedge1 | −0.14*** | −0.06* | 0.03 | 0.04** | 0.01 | 0.00 | 0.26*** | 1 |
| 9. Vot5 | −0.20*** | −0.07* | 0.16*** | −0.08*** | 0.07*** | 0.04** | 0.50*** | 0.05*** |
| 10. Wedge5 | −0.16*** | −0.07*** | 0.01 | 0.04** | 0.07*** | 0.04** | 0.08*** | 0.64*** |
| 11. Fam | −0.01 | −0.20*** | −0.03 | −0.14*** | 0.15*** | 0.08*** | −0.17*** | 0.06** |
| 12. Name | −0.04** | −0.07*** | −0.001 | −0.00 | 0.07*** | 0.04** | 0.06*** | 0.17*** |
| 13. Dual | −0.29*** | −0.11*** | 0.12*** | −0.06*** | 0.11*** | 0.05*** | 0.28*** | 0.36*** |
| 14. CGI | 0.25*** | 0.22*** | −0.12*** | 0.21*** | −0.10*** | −0.11*** | −0.26*** | −0.05** |
| 15. LnAt | 0.03* | 0.29*** | 0.14*** | 0.48*** | −0.15*** | −0.09*** | −0.04** | 0.01 |
| 16. Debt | −0.06*** | 0.13*** | 0.07*** | 0.16*** | −0.05** | −0.08*** | −0.02 | 0.07 |
| 17. Short-term-debt | −0.03* | −0.20*** | −0.03 | −0.27*** | 0.11*** | 0.11*** | 0.05*** | 0.03 |

| Variable | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Tobins' *Q* | | | | | | | | | |
| 2. Out | | | | | | | | | |
| 3. Elect | | | | | | | | | |
| 4. BSize | | | | | | | | | |
| 5. CEOdu | | | | | | | | | |
| 6. CEOb | | | | | | | | | |

**Table 3** continued

| Variable | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|
| 7. Vot1 | | | | | | | | | |
| 8. Wedge1 | | | | | | | | | |
| 9. Vot5 | 1 | | | | | | | | |
| 10. Wedge5 | 0.07*** | 1 | | | | | | | |
| 11. Fam | −0.12*** | −0.03* | 1 | | | | | | |
| 12. Name | −0.01 | 0.14*** | 0.08*** | 1 | | | | | |
| 13. Dual | 0.53*** | 0.43*** | −0.12*** | 0.06*** | 1 | | | | |
| 14. CGI | −0.40*** | −0.10*** | 0.13*** | 0.06*** | −0.50*** | 1 | | | |
| 15. LnAt | −0.12*** | 0.01 | −0.23*** | 0.08*** | −0.08*** | 0.25*** | 1 | | |
| 16. Debt | −0.02 | 0.03** | 0.01 | 0.04*** | −0.05*** | 0.05*** | 0.25*** | 1 | |
| 17. Short-term-debt | 0.06*** | 0.05*** | 0.13*** | 0.00 | 0.08*** | −0.20*** | −0.45*** | −0.27*** | 1 |

***, **, * Statistical significance at the 1, 5, and 10% levels, respectively

issuance (*Dual*); and the short-term debt variable. All of these correlations ratios are statistically significant at the 1% level.

Although the results shown in Table 3 do not show a cause and effect relationship, they suggest that the concentration of control rights, the familiar nature of the largest controlling shareholder, and the use of the dual class shares to leverage the controlling shareholders' voting power are negatively associated with firm value and with the proportion of outside directors; however, they are positively associated with the percentage of directors elected by the controlling shareholder. In the next section, we explore the possible effects that a higher percentage of outside directors has on the firm's value when it is controlled by large shareholders who tend to contract with a lower proportion of independent directors.

### 4.1 Regression analysis

The data from Table 4 show that the percentage of outside directors ($\beta_1$) has a positive effect on the Tobin's $Q$ for firms, although it is statistically significant only in regression 4, after considering the interaction that separates firms with and without dual class shares, as shown in Table 4.

In regressions 1, 2, and 3 of Table 3, the coefficients of *Dual* and *DW1* show a negative and statistically significant relationship with Tobin's $Q$ ratio. These results suggest that the entrenchment effect due to the use of dual class shares issuance or the excess of voting power for the largest shareholder (*DW1*) tend to be more pronounced than the alignment effect. In regression 3, the coefficient of the variable *DW5* suggests a similar economic result using the excess of voting power for the five largest controlling shareholders, but it is not statistically significant.

Although the coefficients $\beta_2$ and $\beta_3$ are negative and have statistically significant relationships with Tobin's $Q$, it appears that the destructive effect on Tobin's $Q$ is larger for the variable *Dual* in comparison with *DW1*. This evidence suggests that the voting power has an intrinsic value for investors, and if there is a dual class share issuance, the largest controlling shareholder is able to implement the entrenchment behaviour. Another possible explanation is that the positive effect due to the presence of a controlling shareholder tends to be relatively smaller and/or cancelled if there is no voting right to all shares or if the main controlling shareholder uses the dual class shares issuance to leverage his/her voting power.

The interaction effects have negative signs and significant results in regressions 4 and 5, suggesting two possible implications. The first is that, when the controlling shareholder is able to leverage his/her voting power, he/she tends to reduce the decisional power of outside directors, since the presence of outside directors becomes less likely to be effective in decisions that increase the firm's value. Another possible explanation is that the controlling shareholder, who has excessive voting power, chooses outside directors with distinct objective other than to maximize the firm's value. We interpret that this evidence confirms hypothesis 1 developed in Sect. 2.2.

In contrast to the previous results, the small negative effect of the interaction between the outside directors' percentage and the dual class shares issuance (*Out* × *Dual*) suggests that the higher the percentage of outside directors, the lower

**Table 4** Voting power, percentage of outside directors, and firm's market value. *Source*: Developed by authors using research data

This table presents the results from Eqs. 1 and 3 using Tobins' Q as a dependent variable, and takes into account the entire sample period of 13 years, between the 2000 and 2012. The independent variables are the dummy variable (*Dual*) that assumes the value 1 if there are dual class shares in the firm *i* in period *t*, dummies *DW1* and *DW5*, which assume the value 1 when the wedge is a positive value for the largest controlling shareholder and to the top five largest shareholders, respectively, and 0 otherwise, and the interactions terms (*Out* × *Dual*, *Out* × *DW1*, *Out* × *DW5*) that are related to interaction between outside directors' percentage (*Out*) and the variables *Dual*, *DW1* and *DW5*, respectively. All regressions include control variables, such as firm size (*LnAt*), debt (*DivbAt*), membership to corporate governance index (*CGI*), asset's tangibility (*Tang*), operational performance (*ROA*), liquidity of shares traded (*liquidity*), controlling shareholder nature (*Natu*), a sector in which the firm operates, according to the criteria of Economática (*industry*), and time fixed effects, represented by yearly dummy variables (*year*). All variables are collected for each firm *i* in period *t*, and all regressions are estimated using the random effects model for panel data with robust estimation, according to the method developed by White (1980) and all regressions are estimated using the panel data models with robust estimation, according to the method developed by White (1980) and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test

| Tobin's Q | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $\beta_0$—intercept | 3.77*** | 3.44*** | 3.41*** | 3.41*** | 3.41*** | 3.35*** |
| $\beta_1$—out | 0.02 | 0.02 | 0.02 | 0.30* | 0.10 | 0.08 |
| $\beta_2$—dual | −0.34*** | – | – | – | – | – |
| $\beta_3$—DW1 | – | −0.11** | – | – | – | – |
| $\beta_4$—DW5 | – | – | −0.08 | – | – | – |
| $\beta_5$—Out × Dual | – | – | – | −0.003** | – | – |
| $\beta_6$—Out × DW1 | – | – | – | – | −0.14*** | – |
| $\beta_7$—Out × DW5 | – | – | – | – | – | −0.09 |
| $\beta_8$—control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 2788 | 2788 | 2788 | 2782 | 2788 | 2788 |
| N (groups) | 409 | 409 | 409 | 407 | 409 | 409 |
| F (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Xtoverid test* | 0.0016 | 0.0005 | 0.0006 | 0.0012 | 0.0013 | 0.0026 |
| Model | FE | FE | FE | FE | FE | FE |

FE and RE indicate the fixed and random effects model, respectively

***, **, * Statistical significance at the 1, 5, and 10% levels, respectively

the effect due to the use of the voting power leverage device is, although the result is still negative. Conversely, the negative effect on the variable Tobin's *Q* is more pronounced for *Out* × *DW1*; this evidence suggests that the outside directors' effectiveness in increasing the firm's value is offset when there is a positive value for the excess voting power (*Wedge*) to the largest shareholder. We also have checked the possible quadratic relation between the percentage of outside directors and the Tobin's *Q* variable, considering the groups separated by the variables *Dual* and *DW1*; the results are shown in Table 10 (Appendix 2). According to the data shown in Table 10, the relationship between the percentage of outside directors and Tobin's *Q* tends to follow an inverted U shape, although its relation is statically

**Table 5** Controlling shareholders' voting power, outside directors and their relationship with firm's financial performance. *Source*: Developed by authors using the research's data

This table shows results from Eqs. (1) and (3) using the sales growth ($\Delta Sales$) as dependent variable, which is calculated using the percentage change in firm's sale in year $t$ in relation to year $t-1$. The independent variables are the dummy variable *Dual* that assumes the value 1 if there are dual class shares in firm $i$ in period $t$; the dummies *DW1* and *DW5*, which assume the value 1 when the wedge is a positive value for the largest controlling shareholder and to the top five largest shareholders, respectively, and 0 otherwise; and the interactions terms *Out* × *Dual*, *Out* × *DW1*, and *Out* × *DW5* that are related to the interaction between outside directors' percentage (*Out*) and variables *Dual*, *DW1*, and *DW5*, respectively. All regressions include control variables such as firm size (*LnAt*), total debt by total assets (*Debt*), membership to corporate governance index (*CGI*), asset's tangibility (*Tang*), controlling shareholders' nature (*Natu*), firm's industry according to the criteria of Economática (*industry*), and time fixed effects, represented by yearly dummy variables (*year*). We use the panel data models with robust estimation, according to the method developed by White (1980), and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test. The sample period is from 2000 until 2012 year

| $\Delta Sales$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $\beta_0$—intercept | −131.43*** | −151.20*** | −138.93*** | −135.84*** | −140.62*** | −140.00*** |
| $\beta_1$—out | 0.70 | 0.73 | 0.71 | 4.67 | 0.66 | 0.95 |
| $\beta_2$—dual | −5.38** | – | – | – | – | – |
| $\beta_3$—DW1 | – | 0.15 | – | – | – | – |
| $\beta_4$—DW5 | – | – | −0.74 | – | – | – |
| $\beta_5$—Out × Dual | – | – | – | −0.05* | – | – |
| $\beta_6$—Out × DW1 | – | – | – | – | 0.12 | – |
| $\beta_7$—Out × DW5 | – | – | – | – | – | −0.34 |
| $\beta_8$—control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 2465 | 2465 | 2465 | 2465 | 2465 | 2465 |
| N (groups) | 384 | 384 | 384 | 384 | 384 | 384 |
| F (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Xtoverid test* | 0.0016 | 0.0005 | 0.0006 | 0.0012 | 0.0013 | 0.0026 |
| Model | FE | FE | FE | FE | FE | FE |

FE and RE indicate the fixed and random effects model, respectively

***, **, * Statistical significance at the 1, 5, and 10% levels, respectively

significant only when we consider the sub-sample of firms with a positive value for the wedge held by their largest shareholder ($DW1 = 1$).[5]

Table 5 shows the results using the accounting metric related to yearly sales growth ($\Delta Sales$) as the dependent variable in Eqs. (1) and (3). The results suggest the same interpretations we have previously performed using Tobin's $Q$.

[5] See the graphs results considering both linear and quadratic relation between the percentage of outside directors and Tobin's *Q ratio* in Figs. 3 and 4, in Appendix 2.

The results from Table 5 show that there is a negative effect of the variable *Dual* on sales growth, which is statistically significant in regression 1, suggesting that firms using dual class shares are less profitable than firms with voting rights for all shares. The coefficient $\beta_5$ in regression 4 is also negative and statistically significant, indicating that the outside directors' percentage tends to be ineffective in increasing the firm's operational performance when these directors are working in environments possibly dominated by controlling shareholders, who use the dual class shares issuance to leverage their voting power; this result supports hypothesis 1 developed in this study. Similar results are obtained when we use other financial performance variables as dependent variables, such as ROA.[6] Similar to what we have done with the Tobin's *Q ratio* as a dependent variable, we have checked the possible quadratic relation between the percentage of outside directors and the sales growth variable, considering the groups separated by the variables *Dual* and *DW1*; however, the results are not statistically significant, as reported by Table 11 (see Appendix 2).

The possible influence that the CEO exerts on the outside directors' effectiveness when simultaneously holding the position of chairman of the board is presented in Table 6. The results suggest that the effectiveness of a higher percentage of outside directors is negatively influenced by both the controlling shareholder, who is able to leverage his voting power, and the CEO when he simultaneously holds the chairman's position of the board of directors. This relationship is more pronounced for the dependent variable (*Tobin's Q*), in comparison with the accounting metric related to sales growth ($\Delta Sales$).

When the dependent variable is Tobin's *Q*, the data from Table 6 indicate that the distinction of the individuals holding the CEO and Chairman positions has a positive effect on the effectiveness of the outside directors' percentage in increasing firm value, since the coefficient is positive and statistically significant in regressions 1, 2, and 3.

Note that the positive sensitivity of Tobin's *Q* in relation to the outside directors' percentage, shown by *β1*, depicts the possible influence of the controlling shareholder, who uses the dual class shares issuance and leverages the voting power for the largest and the top five largest shareholders, as identified in regressions 1, 2, and 3, respectively.

Regarding the first three regressions, the estimates for the parameters $\beta_2$, $\beta_3$, and $\beta_4$ indicate that the effect of the outside directors' percentage tends to be negative on the Tobin's *Q ratio* when these directors are working in firms whose controlling shareholders are able to leverage the voting power. Furthermore, the negative effects of these interaction terms tend to be more pronounced when the largest controlling shareholder leverages his voting power ($\beta_3 = -0.18$). However, the results suggest that the presence of the CEO's duality leadership tends to reflect in the effectiveness of outside directors increasing the Tobin's Q only when the controlling shareholders do not leverage their voting power. This result is associated with the positive and statistically significant estimate for the coefficient $\beta_1$ in regressions 4, 5 and 6. However, the positive effect that outside directors exert on

[6] The results of other firms' financial performance metrics as dependent variables are available upon request.

**Table 6** Outside directors' effectiveness taking into accounts the duality of individuals holding the firm's CEO and chairman positions. *Source*: Developed by authors using research data

This table shows the results using the dependent variables (*Tobin's Q*) and the sales growth (Δ*Sales*) with subsamples separated by the accumulation or not of the CEO and chairman positions. The binary variable *Ceo_Chairman* equals 1 when there is a duality leadership and 0 otherwise. The independent variables are the percentage of outside directors (*Out*) and the interactions terms (*Out* × *Dual*, *Out* × *DW1*, *Out* × *DW5*) that are related to interaction between outside directors' percentage (*Out*) and the variables *Dual*, *DW1*, and *DW5*, which assume the value 1 if the firm has dual class shares issuance, the wedge is a positive value for the largest controlling shareholder and the top five largest shareholders, respectively, and 0 otherwise. All regressions include control variables such as firm size (*LnAt*), debt (*Debt*), the binary variable related to membership to corporate governance index (*CGI*), asset tangibility (*Tang*), controlling shareholder's nature (*Natu*), firm's sector according to the criteria defined by Economática (*industry*), and time fixed effects represented by yearly variables dummies (*Year*). For the dependent variable (Δ*Sales*), we exclude the control variables operational returns on assets (*ROA*) and firm's shares liquidity (*liquidity*). All variables are collected for each firm *i* in period *t*. We use the panel data models with robust estimation, according to the method developed by White (1980), and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test

| | Tobin's Q | | | | | | ΔSales | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ceo_Chairman = 0 | | | Ceo_Chairman = 1 | | | Ceo_Chairman = 0 | | | Ceo_Chairman = 1 | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| $\beta_0$—intercept | 3.55*** | 3.51*** | 3.37*** | 4.13** | 1.82** | 2.04** | −119.08*** | −123.49*** | −122.16*** | −222.87*** | −226.66*** | −227.22*** |
| $\beta_1$—out | 0.22 | 0.09 | 0.03 | 0.71** | 0.23* | 0.42** | −6.33 | −10.02 | −9.58 | 23.76 | 19.78 | 18.73 |
| $\beta_2$—Out × Dual | −0.003** | | | −0.008** | | | −0.06** | | | −0.03 | | |
| $\beta_3$—Out × DW1 | | −0.18** | | | −0.25** | | | −1.05 | | | 2.76 | |
| $\beta_4$—Out × DW5 | | | −0.09 | | | −0.45*** | | | −1.78 | | | 2.92 |
| $\beta_5$—control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 1883 | 1883 | 1883 | 817 | 817 | 817 | 1674 | 1674 | 1674 | 715 | 715 | 715 |
| N (groups) | 333 | 333 | 333 | 182 | 182 | 182 | 312 | 312 | 312 | 167 | 167 | 167 |
| F (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Xtoverid test* | 0.0008 | 0.0009 | 0.0013 | 0.0189 | 0.0534 | 0.1571 | 0.0002 | 0.0001 | 0.0002 | 0.0009 | 0.0004 | 0.0005 |

**Table 6** continued

This table shows the results using the dependent variables (*Tobin's Q*) and the sales growth (Δ*Sales*) with subsamples separated by the accumulation or not of the CEO and chairman positions. The binary variable *Ceo_Chairman* equals 1 when there is a duality leadership and 0 otherwise. The independent variables are the percentage of outside directors (*Out*) and the interactions terms (*Out* × *Dual*, *Out* × *DW1*, *Out* × *DW5*) that are related to interaction between outside directors' percentage (*Out*) and the variables *Dual*, *DW1*, and *DW5*, which assume the value 1 if the firm has dual class shares issuance, the wedge is a positive value for the largest controlling shareholder and the top five largest shareholders, respectively, and 0 otherwise. All regressions include control variables such as firm size (*LnAt*), debt (*Debt*), the binary variable related to membership to corporate governance index (*CGI*), asset tangibility (*Tang*), controlling shareholder's nature (*Natu*), firm's sector according to the criteria defined by Economática (*industry*), and time fixed effects represented by yearly variables dummies (*Year*). For the dependent variable (Δ*Sales*), we exclude the control variables operational returns on assets (*ROA*) and firm's shares liquidity (*liquidity*). All variables are collected for each firm *i* in period *t*. We use the panel data models with robust estimation, according to the method developed by White (1980), and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test

| | Tobin's Q | | | | | | ΔSales | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ceo_Chairman = 0 | | | Ceo_Chairman = 1 | | | Ceo_Chairman = 0 | | | Ceo_Chairman = 1 | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Model | FE | FE | FE | FE | RE | RE | FE | FE | FE | FE | FE | FE |

FE and RE indicate the fixed and random effects model, respectively

***, **, * Statistical significance at the 1, 5, and 10% levels, respectively

Tobin's $Q$ is lower than the possible negative effect of the controlling shareholders' authority using the dual class shares issuance to leverage their voting power. We can check this result that verifies that the positive sensitivity expressed by $\beta_1$ shows lower values than the negative sensitivities of $\beta_3$, and $\beta_4$ in regressions 5 and 6. This evidence suggests that a higher outside directors' percentage tends to be ineffective in increasing the firm's value when they are more likely to be obedient to the authority of the controlling shareholders who leverage their voting power.

A similar result occurs when the CEO has no duality leadership. We check the estimates for the parameters $\beta_2$, $\beta_3$, and $\beta_4$ in regressions 1, 2, and 3, which suggest that the outside directors' percentage tends to be ineffective in increasing the firm's market value in firms using dual class shares.

This evidence suggests that a higher outside directors' percentage tends to be ineffective in increasing the firm's value when they are more likely to be obedient to the authority of the controlling shareholders who leverage their voting power; the same situation occurs when the CEO has duality leadership.

The results from Table 6, using the firm's sales growth as the dependent variable ($\Delta Sales$), indicate that when there is no CEO duality leadership but there is a dual class shares issuance, the estimate for the parameter $\beta_2$, which is statistically significant only in regression 7, suggest that the outside directors' percentage tends to have a negative impact on the firm's sales growth. The estimates for parameters $\beta_2$ and $\beta_3$ do not show a statistically significant relationship with the dependent variable when we consider the presence of duality leadership.

In summary, the data from Table 6 present negative and positive aspects of a CEO's duality leadership exerting influence on the effectiveness of the outside directors' percentage to increase the firm's financial performance and its market value. These findings suggest that the negative effects are larger for two reasons. The first is that the effectiveness of the outside directors' percentage to increase the firm's value, although they are working under the controlling shareholders' power to practice entrenchment, depends on the distinction of individuals holding the firm's main positions, such as CEO and chairman of the board. The second possible reason is that the negative effects are more robust than the positive effects when we used the Tobins' $Q$ ratio as the dependent variable; this tends to have more informational power than the accounting metrics, such as firm's sales growth.

In addition to verifying the relationship between the voting power of the controlling shareholders and the effectiveness of outside directors to increase the firm's value, we choose to identify whether the leverage of voting power also affects the outside directors' effectiveness in monitoring the CEO (Table 7).

It is noteworthy that after considering the interaction variables, the effectiveness of a higher outside directors' percentage ($Out$) tends to be more pronounced when the firm has no dual class shares issuance, as shown by coefficient $\beta_1$ in regression 4, and when the percentage of total cash flow rights is higher than the percentage of voting rights held by the five largest controlling shareholders, as identified by the same coefficient in regression 6. This evidence indicates that the excess voting power held by the larger investors, which provides them legitimized authority, reduces the decision-making power of outside directors to change the CEO. Other evidence that is also aligned with this argument is presented by the

**Table 7** Determinants of CEO turnover

This table shows the results of Eq. (4), using the dependent variable *CEOTurnover* that assumes the value 1 if there is a change of CEO position in firm *i* during period *t* in relation to period $t - 1$, and 0 otherwise. The independent variables are the percentage of outside directors (*Out*); the dummy variable (*Dual*) that assumes value 1 if there are dual class shares to the firm *i* in the period *t*; the dummies *DW1* and *DW5*, which assume the value 1 when the wedge is a positive value for the largest controlling shareholder and to the top five largest shareholders, respectively, and 0 otherwise; and the interactions terms *Out* × *Dual*, *Out* × *DW1*, *Out* × *DW5* that are related to the interaction between outside directors' percentage (*Out*) and the variables *Dual*, *DW1*, and *DW5*, respectively. Furthermore, we include the interactions between the percentage of outside directors (*Out*) with the binary variables *CEOdu* and *CEOb*, which assume the value 1 if the CEO holds simultaneously a position on the board of directors, as a chairman, or as a regular member, respectively. All regressions include control variables such as Tobin's Q ratio lagged in one period ($L_1$·*Tobin's Q*), firm's size (*LnAt*), short-term debt, membership to corporate governance index (*CGI*), asset's tangibility (*Tang*). All regressions are estimated using the panel data models, according to the Hausman test

| Turnover-CEO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| $\beta_0$—$L_1$·Tobin's Q | −0.14 | −0.13 | −0.29** | −0.14 | −0.28** | −0.29** | −0.30** | −0.28** |
| $\beta_1$—out | 4.21*** | 4.23*** | 3.86*** | 4.39*** | 3.79*** | 4.13*** | 3.20*** | 1.85** |
| $\beta_2$—dual | −0.22 | | | | | | | |
| $\beta_3$—DW1 | | −0.13 | | | | | | |
| $\beta_4$—DW5 | | | −0.50* | | | | | |
| $\beta_5$—Out × Dual | | | | −0.002 | | | | |
| $\beta_6$—Out × DW1 | | | | | 0.19 | | | |
| $\beta_7$—Out × DW5 | | | | | | −0.46 | | |
| $\beta_8$—Out × CEOdu | | | | | | | −0.75** | |
| $\beta_9$—Out × CEOb | | | | | | | | −1.17*** |
| $\beta_{10}$—Vot1 | 0.0002 | 0.002 | 0.001 | 0.002 | 0.001 | 0.001 | 0.002 | 0.003 |
| $\beta_{11}$—LnAt | −0.02 | −0.02 | 0.21 | −0.02 | 0.30 | 0.22 | 0.28 | 0.33* |
| $\beta_{12}$—CGI | −0.17 | −0.12 | −0.13 | −0.16 | −0.05 | −0.11 | −0.15 | −0.11 |
| $\beta_{13}$—Short-term D. | −0.001 | 0.0008 | 0.001 | −0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| $\beta_{14}$—Tang | −0.002 | −0.002 | 0.001 | −0.002 | 0.001 | 0.001 | 0.001 | 0.000 |
| $\beta_{15}$—Industry | Yes | Yes | No | Yes | No | No | No | No |
| $\beta_{16}$—Natu | Yes | Yes | No | Yes | No | No | No | No |

**Table 7** continued

This table shows the results of Eq. (4), using the dependent variable *CEOTurnover* that assumes the value 1 if there is a change of CEO position in firm *i* during period *t* in relation to period $t - 1$, and 0 otherwise. The independent variables are the percentage of outside directors (*Out*); the dummy variable (*Dual*) that assumes value 1 if there are dual class shares to the firm *i* in the period *t*; the dummies *DW1* and *DW5*, which assume the value 1 when the wedge is a positive value for the largest controlling shareholder and to the top five largest shareholders, respectively, and 0 otherwise; and the interactions terms *Out* × *Dual*, *Out* × *DW1*, *Out* × *DW5* that are related to the interaction between outside directors' percentage (*Out*) and the variables *Dual*, *DW1*, and *DW5*, respectively. Furthermore, we include the interactions between the percentage of outside directors (*Out*) with the binary variables *CEOdu* and *CEOb*, which assume the value 1 if the CEO holds simultaneously a position on the board of directors, as a chairman, or as a regular member, respectively. All regressions include control variables such as Tobin's Q ratio lagged in one period ($L_1$·*Tobin's Q*), firm's size (*LnAt*), short-term debt, membership to corporate governance index (*CGI*), asset's tangibility (*Tang*). All regressions are estimated using the panel data models, according to the Hausman test

| Turnover-CEO | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| $\beta_{17}$—year | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 2165 | 2165 | 1472 | 2165 | 1472 | 1472 | 1452 | 1472 |
| Number of groups | 365 | 365 | 200 | 365 | 200 | 200 | 199 | 200 |
| Prob > $\chi^2$ | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hausman test | 0.0802 | 0.0511 | 0.0380 | 0.0859 | 0.0377 | 0.0469 | 0.0018 | 0.0448 |
| Model | RE | RE | FE | RE | FE | FE | FE | FE |

FE and RE indicate the fixed and random effects model, respectively

***, **, * Statistically significance at the 1, 5, and 10% levels, respectively

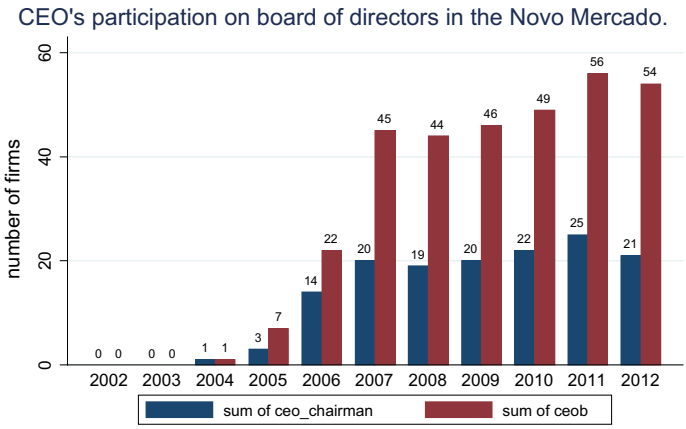


**Fig. 1** CEO's participation in the board of directors of firms listed on "Novo Mercado" (New Market) level. *Source*: Developed by authors using research data. *sum of ceo_chairman* is the sum of firms whose CEO assumes simultaneously the chairman position, *sum of ceob* is the sum of firms whose CEO assumes simultaneously any position in the board of directors

coefficients $\beta_8$ and $\beta_9$ in regressions 7 and 8, respectively, which show negative and statistically significant signs. These results suggest that the presence of the CEO on the board of directors, either as the chairman or as a regular member, tends to reduce the outside directors' monitoring power. Thus, this finding indicates that the controlling shareholders' excess of voting power and the CEO's presence on the board of directors tend to reduce the effectiveness of outside directors in changing the CEO in Brazilian listed firms, confirming hypothesis 2, which is developed in Sect. 2.2. Consequently, although dual class share issuance is a practice not allowed for firms listed on the New Market, it increases the number of CEOs participating on the board of directors in firms listed in the same special segment or the number of CEOs assuming the chairman or a regular position, as illustrated by Fig. 1.[7]

Regarding the control variables, the data from Table 7 show that a higher percentage of voting rights held by the largest shareholder (*Vot1*) and a higher participation by creditors through short-term debt (*Short-term-Debt*) do not affect the probability ratio of CEO turnover. Furthermore, we find no statistically significant relationship for the variables related to a firm's features, such as asset tangibility (*Tang*) and its adherence to the BM&FBOVESPA's corporate governance index (*CGI*). Thus, only firm size (*LnAt*) shows a statistically significant relationship in regression 8, whose positive sign suggests that larger firms are more likely to perform CEO turnover.

### 4.2 Robustness analysis

All results presented thus far have the assumption that the firm's decision to have dual class shares issuance is exogenous. Nevertheless, as argued by Gompers et al.

[7] As shown in Sect. 2, from 2011, the CEOs of firms listed on the New Market cannot hold the chairman position as well, although there is a grace period of three years for these firms to adopt this requirement after their decision to have shares listed on the New Market. Conversely, there are no restrictions for the CEO to assume a regular position on the board of directors.

**Table 8** Determinants of the dual class shares issuance (*Dual*) *Source*: Developed by authors using research data

This table shows the results from Eq. (5), which identifies the possible determinants of the firm's decision to have dual class shares issuance. We use a probit model having the binary variable (*Dual*) as a dependent variable, and as independent variables, we use a dichotomous variable (*Name*), which is related to the presence or not of top controlling shareholder's name in the firm's name, (*Fam*) that is the firm's familiar nature, which assumes the value 1 if one of the top 5 largest shareholder is an individual, and 0 otherwise; the percentage of voting rights owned by the largest controlling shareholder (*Vot1*) and by the top five largest shareholders (*Vot5*)' firm size (*LnAt*); debt to total assets (*Debt*); operational return on total assets (*ROA*); binary variable related to corporate governance index membership (*CGI*); assets' tangibility (*Tang*); and binary variables related to firms' industry (*Industry*), controlling shareholder's nature (*Nat*) and time fixed effects (*Year*). We follow Gompers et al. (2010), choosing a probit model of regression with robust estimation to estimate the parameters in a sample period from 2000 to 2012

| *DualClass* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $\beta_0$—intercept | 0.003 | −0.06 | −2.47*** | 0.80** | 0.48 | −2.06* |
| $\beta_1$—name | 0.41*** | – | 0.49*** | 0.48*** | – | 0.51*** |
| $\beta_2$—Vot1 | 0.008*** | 0.009*** | – | 0.007*** | 0.008*** | – |
| $\beta_3$—Vot5 | – | | 0.03*** | – | – | 0.03*** |
| $\beta_4$—LnAt | 0.02 | 0.03* | 0.04** | −0.007 | 0.01 | 0.02 |
| $\beta_5$—debt | −0.006*** | −0.006*** | −0.006*** | −0.008*** | −0.009*** | −0.008*** |
| $\beta_6$—ROA | −0.003 | −0.004 | −0.005 | −0.005 | −0.005 | −0.004 |
| $\beta_7$—CGI | −1.33*** | −1.29*** | −1.14*** | −1.12*** | −1.09*** | −0.92*** |
| $\beta_8$—Tang | 0.01* | 0.01*** | 0.009*** | 0.002* | 0.002** | 0.001 |
| $\beta_9$—Fam | – | 0.01 | – | – | 0.25*** | – |
| $\beta_{10}$—industry | No | No | No | Yes | Yes | Yes |
| $\beta_{11}$—Nat | No | No | No | Yes | Yes | Yes |
| $\beta_{12}$—year | No | No | No | Yes | Yes | Yes |
| N | 2997 | 2986 | 2997 | 2997 | 2986 | 2997 |
| Pseudo $R^2$ | 0.26 | 0.25 | 0.36 | 0.36 | 0.36 | 0.46 |
| LR (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

***, **, * Statistical significance at the 1, 5, and 10% levels, respectively

(2010) in the US market, this assumption needs to be tested. Therefore, to check the robustness of our results, we adopt the model proposed by Heckman (1979), which seeks to mitigate the possible self-selection bias that stems from samples that are not randomly selected, as may be the case of a sample chosen to have or not have the dual class shares issuance. Therefore, we perform the probit regression model to identify which propensity factors are related to the dual class shares issuance decision (Table 8).

The data from Table 8 show that the variables *CGI* and *Name* are the main factors affecting the dual class shares issuance decision in the Brazilian market; in addition, the estimated coefficients for $\beta_7$ and $\beta_1$, with negative and positive signs, respectively, show higher probability ratios that are statistically significant. The negative sign observed in the binary variable related to corporate governance index (*CGI*) membership is not a surprise, since this metric considers the incentives of equal rights among large and minor shareholders, particularly at the New Market

level, in which the firms are able to have only voting shares. The results regarding the variable *Name* are aligned with the findings of Gompers et al. (2010) and suggest that a powerful instrument to determine the dual class share issuance is the existence of the largest controlling shareholder's name in the firm's name, which is associated with larger personal participation in a firm's decisions, as it tends to be evidence of a high level of private control benefits. Similar results are found in the original paper by DeAngelo and DeAngelo (1985) and in more recent studies, such as Smart and Zutter (2003) and Smart et al. (2008), on the US market. Similarly, the results of the variable (*Fam*) confirm that the familiar firms are more likely to have dual class share issuance, regardless of the familiar proxy used. The metric (*Fam*) has a positive and statistically significant effect on the dependent variable, as shown in regression 5 by $\beta_9$.

As other determinants, we find that the variables *Vot1* and *Vot5* show positive and statistically significant signs, indicative of the odds ratio of these controlling shareholders leveraging their voting power through the dual class shares issuance, which is consistent with the entrenchment effect. In addition, we identified that the same ratio is obtained for the tangibility (*Tang*) variable, which indicates that firms with greater investments in tangible assets are more likely to adopt dual class shares, possibly due to less interest in investing in intangible assets, such as research and development, by firms whose controlling shareholders are more likely to entrench themselves. The level of debt to assets (*Debt*) shows a negative and statistically significant sign, indicating that the controlling shareholders of firms having higher levels of debt are less likely to use the dual class shares mechanism to leverage voting power, possibly due to financial restrictions.

Finally, the variable *ROA* is not statistically significant in any regressions in Table 8, although its sign suggests a negative relationship with the likelihood ratio of the firm to have dual class shares. After the inclusion of the dummy variables, controlling for industry, dominant shareholder's nature, and time effects, we find the same results, except for the firm size variable (*LnAt*), which is statistically significant only in regressions 2 and 3.

It is noteworthy that the results for the variable *Name* suggest that this dichotomy is possibly an instrument to dual class share variables in the second stage regression, having the firm's financial performance metrics as a dependent variable. There are two pieces of evidence that confirm this argument. The first is related to the low correlation that *Name* assumes with the variables Tobin's *Q*, *ROA*, and $\Delta Sales$, which are $-0.02$, 0.01, and 0.009, respectively. The second reason is that the coefficient of correlation for the variables *Name* and *Dual* is 0.11, which is statistically significant at the 1% level. This evidence is in favour of the validity of the instrument *Name*, which will be used in the second stage regressions of the Heckman model, as shown below.

The results from Table 9 also confirm the positive and negative effects for the variables *Out* and *Dual*, respectively, in all regressions.

These results show that, although the coefficient of the variable *Dual* is negative and statistically significant in all regressions, the Heckman's coefficient ($\lambda$) presents a positive and statistically significant relation in all regressions. This result indicates

**Table 9** Controlling shareholders' voting power, outside directors' percentage, and firm's financial performance. *Source*: Developed by authors using research data

This table uses the two-step self-selection model developed by Heckman (1979), identifying if dual class shares decision, defined by the binary variable *Dual* is endogenously determined. We use in all first stage regressions the probit model from regression 6 in Table 7. The Heckman's model adds in the second stage the lambda (λ) coefficient, which allows, in our case, to identify if there is the self-selection effect in the sample studied. The independent variables are the dummy variable *Dual* that assumes the value 1 if there are dual class shares in the firm *i* in period *t*; the interactions terms *Out*DW1* and *Out*DW5*) that are related to the interaction between outside directors' percentage (*Out*) and the variables *DW1* and *DW5*, respectively. As control variables, we use the firm size (*LnAt*), the debt by total assets (*DivAt*), the binary variable related to corporate governance index membership (*CGI*), assets' tangibility (*Tang*), and binaries variables related to firms' industry (*Industry*), controlling shareholder's nature (*Nat*), and time fixed effects (*Year*). The variables related to operational return on total assets (*ROA*) and the liquidity of shares traded (*Liquidity*) are included in regressions having Tobins'Q as dependent variable

| | Tobin's *Q* | | | Δ*Sales* | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 1 | 2 | 3 |
| $\beta_0$—intercept | 1.84* | 1.73* | 1.79*** | −7.04* | −7.84* | −7.52* |
| $\beta_1$—out | 0.42*** | 0.50* | 0.49* | 9.06** | 10.32** | 10.13* |
| $\beta_2$—dual | −0.70*** | −0.56*** | −0.62*** | −28.49*** | −27.24*** | −27.85* |
| $\beta_3$—Out × DW1 | | −0.17*** | | | −1.47 | |
| $\beta_4$—Out × DW5 | | | −0.10* | | | −0.80 |
| $\beta_5$—lambda (λ) | 0.23** | 0.22** | 0.23** | 13.66*** | 13.54*** | 13.65* |
| $\beta_6$—control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 2782 | 2782 | 2782 | 2461 | 2461 | 2461 |
| F (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

***, **, * Statistical significance at the 1, 5, and 10% levels, respectively

that the Heckman model is suitable for analysing the possible effects of *Dual* on the financial performance metrics, such as Tobins' *Q* and sales growth (Δ*Sales*).

One possible reason for the positive sign of λ is that unobserved characteristics of firms, which influence the decision of having dual class shares, are positively related to the financial performance metrics. For instance, the knowledge that controlling shareholders have regarding the firm's operations or the specific characteristics of ownership structure, such as the reputation of the family group control (unobserved variable in the first stage), are also possibly related to the value and financial performance in the second stage.

A second possible reason is that firms having dual class shares have characteristics that both affect the decision to issue non-voting shares and positively affect the firm's financial performance. However, after considering the positive effect of these unobservable variables, through λ, the net effect of the variable *Dual* remains negative on the firm's financial performance.

Finally, the results from Table 9 show that, even after we control for the self-selection bias, the main results previously obtained are virtually the same, despite the negative effect of the stronger interaction of *Out* × *DW1* on Tobin's *Q*, as well as the decreasing intensity of the effect of the interaction *Out* × *DW5* on the firm's

financial performance. These results reinforce that the excess voting power residing with the largest controlling shareholder tends to be a limiting factor for the outside director to assume a role of making decisions that increase the firm's market value.

## 5 Conclusions

The main conclusion of this study is that the outside directors' percentage is more likely to be effective in maximizing the firm's value and in implementing the CEO turnover when the following occur: (1) the firm's controlling shareholders do not use a mechanism to leverage voting power, as in dual class shares issuance; (2) if they use that mechanism, the voting power (*Wedge*) is equal to 0 or has a negative value; and (3) there is no dual leadership by the CEO. These results confirm the two hypotheses developed in this study, and a possible explanation for these findings is the behaviour of *undue obedience* that outside directors tend to assume towards the two main figures of authority, such as the largest controlling shareholder or the CEO, when he/she holds the position of chairman simultaneously. These findings still suggest that the entrenchment effect of controlling shareholder occurs either directly, through a mechanism to leverage voting power, or indirectly, through weakening of the decision-making power of the outside members on the board of directors.

As argued by Gompers et al. (2010), the negative relationship between ownership structure and firm value, once identified, does not imply that an agent is acting irrationally, but that the owner of a private firm can rationally prefer to sacrifice the firm's value to maintain the private benefits of control, and the dual class shares issuance is a powerful mechanism to reach this goal. In a similar way, the ineffectiveness of the presence of a higher percentage of outside directors also does not mean that such members are acting irrationally, but directors might adopt a behaviour of undue loyalty. This phenomenon is based on the theory of social psychology developed by Milgram (1963, 1974) and adapted to the context of corporate governance by Morck (2008).

Finally, we argue that this study presents a possible new agency cost in the Brazilian stock market, which tends to be a challenge for corporate governance reform, since the effectiveness of the board of directors would not only depend on the outside directors' percentage but also on the loyalty that these directors exhibit in relation to the controlling shareholders' preferences. This inference is also consistent with the main findings of Villalonga and Amit (2009), who found that the presence of outside directors can exacerbate the disproportionality of the one-share-one-vote principle rather than mitigate it as the agency theory proposes. This inference is also aligned with the findings of Jameson et al. (2014) in the Indian market, who found that independent directors appear to be costly for minority shareholders.

A potential limitation of this study is related to the usage of alternative mechanisms such as the shareholders' agreement and/or the indirect ownership structure, to leverage voting power. In addition, it would be interesting for future research to explore these effects and to investigate the agency costs related to undue

loyalty, to develop further analysis on the evidence documented in this research. Finally, we recommend that future studies investigate alternative explanations of why the internal corporate governance mechanisms can be more effective in specific contexts or under certain circumstances, such as (1) when the controlling shareholder uses a device, such as the dual class share issuance, to maintain the excess of voting power and (2) when the CEO is a regular member of the board of directors although not the Chairman. Thus, the works developed by Yoshikawa et al. (2014) and Misangyi and Acharya (2014) can be used to develop new theoretical and methodological approaches.

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**Compliance with ethical standards**

**Conflict of interest** The authors declare that they have no conflict of interest.

## Appendix 1: Variable definitions

| N | Variable | Measure | Period |
|---|---|---|---|
| 1 | Tobin's Q | Ratio between the market value of firm's assets and its book value | [2000–2012] |
| 2 | ROE | Return on equity. Ratio between the net profit and the total equity at the ending of the year [(*Net profit*/*Total equity*) × 100] | [2000–2012] |
| 3 | ROA | Return on assets. Ratio between the operating return and the total assets at the ending of the year [(*EBIT*/*Assets*) × 100] | [2000–2012] |
| 4 | Vot1; Vot5 | Percentage of control rights. This variable was measured to largest shareholder (*Vot1*) and top five largest shareholders (*Vot5*) | [2000–2012] |
| 5 | Tot1; Tot5 | Percentage of cash flow rights. This variable was measured to largest shareholder (*Tot1*) and top 5 largest shareholders (*Tot5*) | [2000–2012] |
| 6 | Wedge1; Wedge5 | Ratio between control rights (*Vot*) over cash flow rights (*Tot*). We used the following equation to figure out the wedge: [(*Vot*/*Tot*) − 1]. This ratio is measured to largest shareholder (*Wedge1*) and to top five largest shareholders (*Wedge5*) | [2000–2012] |
| 7 | DW1 | Dummy variable equals 1 if the wedge to the top largest controlling shareholder is a positive value and 0 otherwise | [2000–2012] |
| 8 | DW5 | Dummy variable equals 1 if the wedge to the top five largest controlling shareholders is a positive value and 0 otherwise | [2000–2012] |
| 9 | Dual | Equals 1 when there is a dual class shares on ownership structure, and 0 otherwise | [2000–2012] |
| 10 | Name | It is a binary variable that takes value 1 if the firm's name is associated with the largest controlling shareholder's name, and 0 otherwise | [2000–2012] |
| 11 | Fam | Equals 1 when the lowest one of the top five controlling shareholders is an individual, and 0 otherwise | [2000–2012] |
| 12 | BSize | Board size is defined as the total number of directors on the board | [2000–2012] |
| 13 | Outsiders | Percentage of outside directors | [2000–2012] |

| N | Variable | Measure | Period |
|---|---|---|---|
| 14 | Elect | Percentage of board members elected by the dominant shareholder | [2000–2008] |
| 15 | CEOdu | Duality equals 1 when the CEO is also Chairman and 0, otherwise | [2000–2012] |
| 16 | CEOb | Equals 1 when the CEO is also a board director and 0 otherwise | [2000–2012] |
| 17 | CEO-turnover | Equals 1 when the CEO's name in year $t$ is different than CEO's name in year $t-1$ | [2000–2012] |
| 18 | LnAt | Firm size. Natural logarithm of total assets | [2000–2012] |
| 19 | Liab | Total liabilities' value divided by total assets | [2000–2012] |
| 20 | Debt | Total firm's debt. Short term and long term debt by total asset | [2000–2012] |
| 21 | Short-term-debt | Short term debt by total debt | [2000–2012] |
| 22 | CGI | Dummy variable equals 1 if the firm is listed in the Corporate Governance Index, either at level 1, or at level 2, or at new market, and 0 if the firm belongs only to the traditional market | [2000–2012] |
| 23 | Tang | Tangibility. It is equals the ratio between fixed assets and total assets | [2000–2012] |
| 24 | TangR | Tangibility. It is equals the ratio between fixed assets and total sales | [2000–2012] |
| 25 | Industry | Firm's industry using the BM&FBOVESPA criterion | [2000–2012] |
| 26 | Nature | Firm's controlling shareholder nature, using the Securities and Exchange Commission of Brazil (CVM) criterion | [2000–2012] |

## Appendix 2: Descriptive statistics

| Measure | Mean | Min. | Max. | Median | Skewness | Kurtosis | CV | N |
|---|---|---|---|---|---|---|---|---|
| Tobin's Q | 1.33 | 0.55 | 5.72 | 1.08 | 2.84 | 13.39 | 0.595 | 3057 |
| ROA | 7.92 | −28.75 | 30.39 | 7.66 | −0.17 | 4.88 | 1.09 | 3056 |
| ROE | 6.11 | −101.1 | 54.4 | 8.8 | −2.08 | 9.76 | 4.24 | 3048 |
| Mebit | 12.58 | −48.8 | 56.1 | 11.9 | −0.45 | 5.35 | 1.54 | 3047 |
| ΔSales | 4.35 | −90.19 | 52.15 | 5.80 | −1.39 | 7.59 | 5.32 | 2538 |
| Vot1 | 52.37 | 0 | 100 | 51.64 | 0.23 | 1.94 | 0.52 | 3022 |
| Vot5 | 82.12 | 0.04 | 100 | 88.23 | −1.25 | 4.17 | 0.22 | 3057 |
| Tot1 | 43.54 | 0 | 100 | 38.99 | 0.56 | 2.39 | 0.57 | 2997 |
| Tot5 | 69.29 | 0.04 | 100 | 72.21 | −0.47 | 2.45 | 0.31 | 3057 |
| Wedge1 | 0.37 | −0.69 | 2 | 0.03 | 1.04 | 3.19 | 1.82 | 2997 |
| Wedge5 | 0.26 | −0.02 | 1.62 | 0.049 | 1.79 | 5.44 | 1.55 | 3057 |
| BSize | 7.06 | 1 | 17 | 7 | 0.64 | 3.38 | 0.38 | 2804 |
| Out | 0.85 | 0 | 1 | 0.85 | −0.65 | 3.12 | 0.16 | 2804 |
| Elected | 0.77 | 0 | 1 | 0.88 | −1.60 | 4.45 | 0.39 | 1353 |
| Liab | 56.09 | 16.1 | 111.3 | 57 | −0.78 | 2.48 | 0.34 | 3057 |
| Debt | 25.84 | 0 | 94 | 25.5 | −0.34 | 2.63 | 0.66 | 3056 |
| Short-term debt | 43.61 | 2.2 | 100 | 37.7 | 0.58 | 2.24 | 0.66 | 2919 |
| Ln assets | 14.51 | 10.44 | 17.69 | 14.56 | −0.11 | 2.64 | 0.11 | 3057 |
| ΔAssets | 3.911 | −41.65 | 46.73 | 2.62 | 0.16 | 3.90 | 4.20 | 2538 |

| Measure | Mean | Min. | Max. | Median | Skewness | Kurtosis | CV | N |
|---|---|---|---|---|---|---|---|---|
| Tangibility/sales | 95.37 | 0.87 | 1010.77 | 46.05 | 3.97 | 20.31 | 1.74 | 3056 |
| Tangibility/assets | 34.16 | 0 | 96.23 | 33.32 | 0.29 | 2.33 | 0.66 | 3056 |

In order to avoid outliers, the financial variables were winsorized at the 2.5% level

| Binary variable | N | (%) |
|---|---|---|
| (*Dual*)—dual class shares | 2085 | 68.20 |
| (*CEOdu*)—CEO's duality leadership (CEO and chairman positions) | 823 | 26.92 |
| (*CEOb*)—CEO's participation in the board of directors | 1644 | 53.78 |
| Chairman elected by the dominant controlling shareholder | 2015 | 65.91 |
| (*CEOTurnover*)—CEO turnover | 390 | 12.76 |
| Traditional market | 2062 | 67.45 |
| (*Level 1*)—level 1 of corporate governance | 265 | 8.67 |
| (*Level 2*)—level 2 of corporate governance | 108 | 3.53 |
| New market | 626 | 20.48 |
| (*CGI*)—corporate governance index | 995 | 32.55 |
| (*Fam*)—familiar nature of the firm's control | 1008 | 32.97 |
| (*Name*)—firm's name associated with the dominant shareholder's name | 461 | 15.08 |
| (*DW1*)—it equals 1 if the wedge to the largest controlling shareholder is a positive value and 0 otherwise | 1698 | 55.54 |
| (*DW5*)—it is equals 1 if the wedge to the top five largest controlling shareholders is a positive value and 0 otherwise | 1855 | 60.68 |

See Figs. 2, 3, 4 and Tables 10, 11.

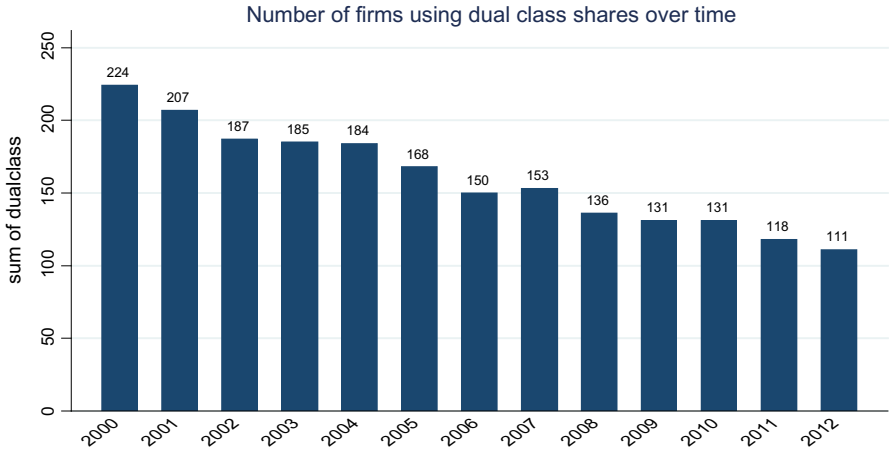


**Fig. 2** Number of firms using dual class shares over time in the Brazilian stock market. *Source*: Developed by authors using research data

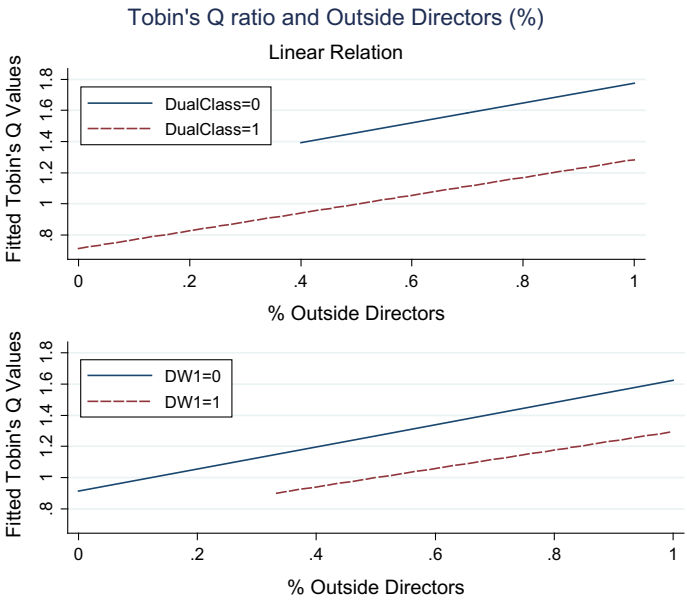


**Fig. 3** Linear relation between the Tobin's Q ratio and the outside directors percentage. *Source*: Developed by authors using research data. DW1 = dummy variable equals (1) if the wedge of the largest shareholder is a positive value, and (0) otherwise [although no reported, the descriptive statistics for the percentage of outside directors (*Out*) indicate that its minimum value is equal to 40%, when there is no dual class shares (*DualClass* = 0)]

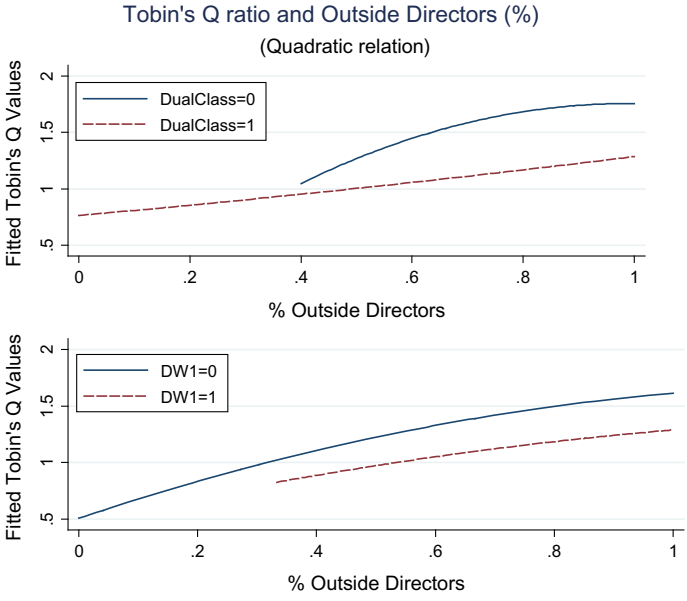


**Fig. 4** Quadractic relation between the Tobin's Q ratio and the outside directors percentage

**Table 10** Robustness check related to possible quadratic relationship between the outside directors' percentage, and firm's financial performance take into account different subsamples

This table shows the results using the dependent variables (*Tobin's Q*) and the sales growth (Δ*Sales*) with subsamples separated by the dummies variables (*Dual*), (*DW1*) and (*DW5*), which represent the dual class shares issuance, the wedge of voting power by the largest and the top five investors, respectively. The variables named (*Out*) and (*Out2*) indicates the percentage of outside directors and its quadratic values, respectively. The control variables used in all regressions are firm size (*LnAt*), total debt by total assets (*Debt*), membership to corporate governance index (*CGI*), asset's tangibility (*Tang*), operational return on total assets (*ROA*) and the liquidity of shares traded (*Liquidity*), controlling shareholders' nature (*Natu*), firm's industry according to the criteria of Economática (*industry*), and time fixed effects, represented by yearly dummies variables (*year*). All regressions are performed using the panel data models with robust estimation according to White (1980), and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test

| Tobin's Q | Dual class (*Dual*) | | (*DW1*) | | (*DW5*) | |
|---|---|---|---|---|---|---|
| | Dual = 0 | Dual = 1 | QW1 = 0 | QW1 = 1 | QW5 = 0 | QW5 = 1 |
| $\beta_0$—intercept | 5.10** | 2.21*** | 4.98*** | 1.13 | 2.74*** | 1.87** |
| $\beta_1$—out | −0.41 | 0.90 | 0.08 | 1.68* | 0.68 | 0.72 |
| $\beta_2$—Out2 | 0.34 | −0.58 | 0.02 | −1.13* | −0.32 | −0.46 |
| $\beta_3$—control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 899 | 1889 | 1316 | 1472 | 1108 | 1680 |
| N (groups) | 172 | 267 | 259 | 235 | 231 | 248 |
| F (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Xtoverid* | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Model | FE | FE | FE | FE | FE | FE |

FE and RE indicate the fixed and random effects model, respectively

***, **, * Statistically significance at the 1, 5, and 10% levels, respectively

**Table 11** Robustness check related to the possible quadratic relationship between the outside directors' percentage, and firm's financial performance take into account different subsamples

This table shows the results using the sales growth (Δ*Sales*) as a dependent variable with subsamples separated by the dummies variables (*Dual*), (*DW1*) and (*DW5*), which represent the dual class shares issuance, the wedge of voting power by the largest and the top five investors, respectively. The variables named (*Out*) and (*Out2*) indicates the percentage of outside directors and its quadratic values, respectively. The control variables used in all regressions are firm size (*LnAt*), total debt by total assets (*Debt*), membership to corporate governance index (*CGI*), asset's tangibility (*Tang*), controlling shareholders' nature (*Natu*), firm's industry according to the criteria of Economática (*industry*), and time fixed effects, represented by yearly dummies variables (*year*). All regressions are performed using the panel data models with robust estimation according to White (1980), and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test

| ΔSales | Dual class (*Dual*) | | *DW1* | | *DW5* | |
|---|---|---|---|---|---|---|
| | Dual = 0 | Dual = 1 | DW1 = 0 | DW1 = 1 | DW5 = 0 | DW5 = 1 |
| $\beta_0$—intercept | −21.05 | −192.21*** | −177.87*** | −193.12*** | −62.10 | −194.74*** |
| $\beta_1$—out | −32.75 | 0.55 | 20.11 | 84.67 | 56.30 | 56.55 |
| $\beta_2$—Out2 | 25.77 | −0.36 | −7.00 | −54.74 | −27.40 | −34.43 |
| $\beta_3$—control variables | Yes | Yes | Yes | Yes | Yes | Yes |

**Table 11** continued

This table shows the results using the sales growth (Δ*Sales*) as a dependent variable with subsamples separated by the dummies variables (*Dual*), (*DW1*) and (*DW5*), which represent the dual class shares issuance, the wedge of voting power by the largest and the top five investors, respectively. The variables named (*Out*) and (*Out2*) indicates the percentage of outside directors and its quadratic values, respectively. The control variables used in all regressions are firm size (*LnAt*), total debt by total assets (*Debt*), membership to corporate governance index (*CGI*), asset's tangibility (*Tang*), controlling shareholders' nature (*Natu*), firm's industry according to the criteria of Economática (*industry*), and time fixed effects, represented by yearly dummies variables (*year*). All regressions are performed using the panel data models with robust estimation according to White (1980), and the test developed by Schaffer and Stillman (2010)—*xtoverid*, replacing the Hausman test

| ΔSales | Dual class (*Dual*) | | *DW1* | | *DW5* | |
|---|---|---|---|---|---|---|
| | Dual = 0 | Dual = 1 | DW1 = 0 | DW1 = 1 | DW5 = 0 | DW5 = 1 |
| N | 763 | 1702 | 1115 | 1350 | 952 | 1513 |
| N (groups) | 158 | 255 | 237 | 223 | 213 | 236 |
| F (prob.) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *Xtoverid* | 0.057 | 0.000 | 0.040 | 0.000 | 0.071 | 0.000 |
| Model | RE | FE | FE | FE | RE | FE |

FE and RE indicate the fixed and random effects model, respectively

***, **, * Statistically significance at the 1, 5, and 10% levels, respectively

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