



The contextual factors behind CEO duality: an empirical analysis of Brazil's case

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Abstract

Our econometric analyses used logistic regression to test the relation between CEO duality, a dummy variable equal to one if there is duality and 0 otherwise with independent variables regarding firm characteristics (firm age, size and economic sector), corporate governance (ownership structure, CEO age and governance level), and firm economic and financial performance. Our sample consisted of a balanced panel of 160 Brazilian publicly traded companies listed on B3 S.A., with data from 2010 to 2016. Our results indicate that CEO duality was positively related with higher CEO age and superior financial performance. Conversely, CEO duality was negatively related with firm size, belonging to special listing segments, belonging to regulated sectors, board size and foreign capital ownership. Our results are robust to different specifications and different econometric techniques.

Keywords: CEO Duality. Board of Directors. Corporate Governance. Stewardship Theory.

1. INTRODUCTION

The board of directors (BOD) is the firm's main instrument of governance in the alignment of interests within an organization. According to the literature, there are two types of board leadership structure: (i) CEO duality, when the same person occupies the roles of chief executive officer and chairperson of the board, and (ii) CEO non-duality, or separation of roles, when different individuals occupy these two functions. Because there is a market orientation toward CEO non-duality — which is fomented by institutional instruments, best-practice governance codes and international governance standards, and which include the categorization of firms according to their leadership structure — many companies have opted to abandon CEO duality in favor of the separation of roles in recent years. Nonetheless, empirical studies contest the effectiveness of such practice. For instance, Linck, Netter & Yang (2008) pose that the imposition of a unique leadership structure to all companies by regulators may undermine the performance of some kinds of companies.

Instead of a consensus, the theory shows that it is possible to find support for either type of leadership structure, depending on one's theoretical framework. On the one hand, agency theory provides support for the separation of roles. On the other hand, stewardship theory offers support for CEO duality. In this context, empirical studies can be of vital importance to advance knowledge on the topic and inform policy adequately. This study takes advantage of a unique period in an important emerging country (Brazil), when specific policies were enacted to deliberately encourage the adoption of CEO non-duality by Brazilian firms. A regulation introduced in 2011 established that companies listed in Brazil's major stock exchange, B3 S.A, could only achieve (or keep) the highest level of corporate governance if they adhered to the separation of roles leadership structure. Companies whose leadership structure was CEO duality had at most three years to change their leadership model. If they did not switch to a separation of roles structure, they would become ineligible for special governance listing segments of Brazilian stock market. As many companies wanted to be labeled as possessing “good governance practices”, which is fundamental to attracting investors, they did adjust their leadership structure to conform to the new established regulations.

The rationale behind this policy, based on the tenets of agency theory (Jansen & Meckling, 1976) was to improve governance mechanisms adopted by listed Brazilian companies. The Brazilian capital market is characterized by a large number of family businesses, with a high degree of ownership concentration (Valadares & Leal, 2000). In this context, CEO duality has been associated with a leadership structure that is characteristic of family businesses and which is less prone to effective monitoring of CEO behavior. Thus, the implementation of strong and independent boards of directors, which have not been co-opted by management, should improve management oversight, facilitate effective monitoring, and better represent shareholder interests (Ward, Brown & Rodriguez, 2009; Michael & Pearce, 2004; Strebel, 2004; Weir & Laing, 2003; Hart, 1995).

Nonetheless, one of the central premises of this study is that the belief of a “best leadership structure” can be misleading and does not capture many important aspects of a company. That is, the effectiveness of a given leadership structure will depend on various contextual factors. By not acknowledging such factors, the single-leadership-structure-fits-all policy may in fact lead to a sub-optimal performance and to the potential loss of firm value in some cases. To clarify those cases is one of the objectives of this study.

Although our central premise transcends the Brazilian context, we posit that by taking a detailed look at the unique period in Brazil in which companies were induced to change their board leadership structure, it is possible to (i) shed new light on the aspects related to the voluntary adoption of each type of leadership structure, and (ii) elucidate which positive aspects related to CEO duality were overlooked when the regulation that homogenized the companies’ leadership structure took place.

We aimed to identify the factors — both internal and external to the organization — that were common to the companies adopting CEO duality prior to the introduction of the regulation and during the transition period. In sum, we seek to identify the factors that influenced the option for CEO duality at a time when companies listed in special segments still had the opportunity to freely choose between CEO duality and the separation of roles. A representative sample of 160 companies was utilized, involving companies organized by economic sector, type of ownership (e.g., state, private, institutional, etc.), size, and other characteristics, in the period between 2010 and 2016.

This work brings novel and useful contributions regarding three themes. First, instead of focusing only on the relationship between board leadership structure and performance (e.g., Dalton & Dalton, 2011; Amaral-Baptista, Klotze & Melo, 2011; Elsayed, 2007, Silveira, Barros & Famá, 2003; Donaldson & Davis, 1991), we focus on the influence of contextual factors in the adoption of a firm's leadership structure. Second, we articulate issues regarding the “passing the baton theory” (Vancil, 1987) and the company's option for CEO duality, adding the element of succession planning into the conceptual framework of board leadership structure, an integration that is lacking in current research. Third, we analyze the effects of an intervention — an external shock — that sought to improve the governance level of a country's whole capital market. Thus, the analysis of Brazil's case offers a unique opportunity to verify the factors that were associated with the firm's choice of its leadership structure before, during and after the policy that homogenized this aspect in every company listed in a special segment.

2. LITERATURE REVIEW

2.1 Agency Theory and the Case for the Separation of Roles

The agency theory analyzes the contract and relationship between two parts: the agent and the principal. For Jensen & Meckling (1976), an agency relationship is when one or more individuals (principal) choose another person (agent) to perform a service on their behalf, which involves delegating some authority to the agent. Considering that all parts of the relationship aim to maximize their own utility, there is good reason to believe that the agent will not always act in the best interests of the principal.

Studying the conflict of interest is fundamental for the agency theory approach. The separation of the roles of CEO and COB would be one of the mechanisms designed to promote control over the conflict between the CEO's interests and the principal's. One of the central functions of the board is to monitor the performance of top management. Thus, allowing the CEO to fulfill both roles would compromise the desired system of controls and balances (Rechner & Dalton, 1990).

From this point of view, the roles of CEO and COB should be delegated to different people in order to deal effectively with the agency problem. The separation of positions is seen as an effective mechanism to diminish the influence and domination power of the CEO — along with their potential opportunistic behavior — and to promote the separation between decisions regarding the company's control and its management. At the core of the agency theory is the view that the board and management must be independent of each other to avoid firm loss of value via practices such as managerial entrenchment (Eisenhardt, 1989, Fama & Jensen, 1983).

The view that the roles of CEO and COB should be separated have indeed resonated in the market, as shown by the historical examination of market behavior. In 1990, a study conducted in the United States with all companies listed in Standard and Poor's 500 showed that 80% of those adopted CEO duality (Rechner & Dalton, 1990). Since then, driven by the arguments of the agency theory and governance activism toward the separation of roles, a substantial change has occurred. In recent years, the proportion of in S&P 500 companies adopting the CEO duality has dropped to 40% (Krause, Semadeni & Cannella, 2014).

2.2 Stewardship Theory and the Case for CEO Duality

The stewardship theory, stemming from the study of human relations, is an approach that opposes the basic premise of agency theory. From its viewpoint, the model of the self-interested person, that rationally seeks to maximize their own personal economic gain, gives way to other type of models arising from the fields of organizational psychology and organizational sociology (Donaldson & Davis, 1991).

According to stewardship theory, self-fulfillment, satisfaction by performing challenging jobs, exercising responsibility, and realizing one's potential, gaining recognition of peers and superiors, are the understood as an individual's central motivations. Besides, managers would not be motivated only by individual goals, they will act as stewards of the organization's interests, aligning the agent's motivation with the objectives of the principal (Davis, Schoorman & Donaldson, 1997).

This reflective view of the leadership structure in corporate governance propitiates other types of understanding about the importance (or lack thereof) of the separation of roles. Finkelstein and D'Aveni (1994) argue that the duality structure can clarify the authority of decision-making, reduce conflicts, and reassure shareholders.

For Brickley, Coles and Jarrell (1997), the biased posture toward the separation of roles has ignored critical issues: what are the incentives of the chief of the board to stay aligned with the interests of the company? And the interests of the principal? The argument that agency costs would be reduced if the CEO's behavior is controlled by the COB does not question the agency costs to control the behavior of the COB themselves. Moreover, in large complex companies no one on the board has greater reputational and financial capital at risk in the future performance of the organization than the CEO. Thus, the CEO position has an inherent incentive mechanism that is lacking in the COB position.

For Sundaramurthy and Lewis (2003), CEO duality favors the decision-making environment of the company in a collaborative approach, where the board is called for advice and support in formulating the strategy, with a better understanding of the daily operational situation, being able to promote alignment from the points of view of strategy and management.

2.3 The Search for the Ideal Leadership Structure

Dalton and Rechner (1989) analyzed a random sample of 141 Fortune 500 companies between 1978 and 1983 and measured performance using shareholder returns and found no significant difference regarding duality or separation structures. In a later study, the authors used measures based on accounting, but the results were completely different. They found that firms with a leadership structure of separation of roles outperformed companies with CEO duality in each year of the study, in three performance measures of financial accounting (ROI, ROE and profit margin).

In contrast, Donaldson and Davis (1991), who pioneered bringing elements of the stewardship theory to test the effectiveness of a given leadership structure, found a significantly higher average shareholder return in companies that followed the CEO duality structure, using a sample of 337 companies in the United States.

Following these two schools of thought, a sequence of studies with different performance metrics corroborating one or another point of view were conducted. Also, some studies showed no correlation at all between either duality or separation leadership structures and company performance. The empirical evidence was, thus, inconclusive and somehow gave momentum to the debate that questioned the logic of a universal leadership structure (Krause, Semadeni & Cannella, 2014).

2.4 A New Approach: Costs and Benefits

The evolution of empirical studies on the best practices of corporate governance pointed out that board leadership structure is a theme too complex to be treated as a dichotomy (i.e., either CEO duality or the separation of roles is always the best choice; see Krause, Semadeni & Cannella, 2014). The novel approach turns the attention to the circumstances in which a given type of leadership structure might be more appropriate to the company and considers the costs and benefits of both leadership structures (Faleye, 2007). That is, both CEO duality, which is associated with lower board supervision and stronger CEO power, and CEO non-duality, which is associated with stronger board oversight and weaker CEO power, (Finkelstein & D'aveni, 1994) have advantages and disadvantages.

According to Elsayed (2010), it is most likely that the appropriate leadership structure will vary according to the type of firm, industry, and country — i.e., both agency theory (CEO non-duality) and stewardship theory (CEO duality) may be valid under certain conditions. In this sense, both theories are seen as complementary points of view, each of them bringing some contribution within a more comprehensive framework. Thus, contrary to the predominant view of minimizing agency costs, the author calls the attention to some overlooked associated with the non-duality structure. They include: (i) the COB's compensation, (ii) increasing agency cost in controlling the COB's conduct, (iii) incomplete flow of information between the CEO and the COB, (iv) inconsistency in the decision-making process as a result of such conflict, (v) confusion as a result of the existence of two versions of leadership discourse, (vi) incomplete knowledge of the board about routine work, (vii) lack of accountability for performance, and (viii) a decrease in the company's ability to adapt to a rapidly changing environment. In the following paragraphs, we explore some studies

that have brought important theoretical and empirical contributions to the understanding of the contextual factors behind the choice of a given board leadership structure.

Brickley, Coles & Jarrell (1997) found some evidence of the use of leadership structure regarding firms' succession transitions. The authors noticed that a significant number of firms utilize the functions of president, CEO, and COB as part of their succession plans in a process that rewards with a more prominent role the good performance of an individual during a probationary period in which the person accumulates diverse leadership functions. Vancil (1987) studied in detail how this process occurs in twelve American companies and, given the similarities between them, he systematized the information in a process called "passing the baton". The model utilizes three roles: the CEO, the COB, and the president. It is important to note that, in the Brazilian context, it is customary to make no distinction between the CEO and the president, leaving only the CEO and the COB in the model. In the process of passing the baton, a former CEO who has recently left the position will pass the baton to a new professional, who will retain the title of president during a probationary period, in order to allow the board to monitor the new CEO in action. The probationary period also provides an opportunity for the transmission of relevant information until, when prepared, the new professional assumes the position of CEO. If the new CEO passes the test, demonstrating excellent performance, this CEO, next to retirement, usually earns the additional title of COB, and the previous chairperson leaves office. At this point, the CEO often centralizes the three functions: CEO, COB and president. After a few years, the CEO leaves the operational position, and prepares a new successor, maintaining the continuity of the process. Vancil (1987) concluded that the transition period — in which the titles of CEO and COB are separate — is deliberately structured to allow the board to eventually replace the current CEO.

Linck, Netter and Yang (2008) analyzed the evolution and the determinants of the leadership structure using a sample of nearly 7,000 companies from 1990 to 2004 in the United States. The authors tested the hypothesis that firms are more likely to have a duality-type structure when the CEO approaches retirement and has greater perceived skill, and when information asymmetry is high because of the cost of information transmission. Evidence was found that CEO duality is positively related to CEO age and CEO's tenure. This study also

highlights the relationship between a firm's leadership structure and its succession planning, bringing the argument that firms can reward their high-ability CEOs by also giving them the role of COB.

Palmon and Wald (2002), using the event study methodology, estimated the impact of the change in the leadership structure of US firms under the hypothesis that the benefits of a leadership separation structure are positively related to the size of the company. The authors found abnormal negative returns for small firms and abnormal positive returns for large companies, associated with the event of changing the leadership structure from CEO duality to separation of roles. However, when companies migrate from a separation to a CEO duality structure there was no significant relationship in terms of abnormal returns for all companies. The study highlights the importance of company size in the choice of leadership structure.

Linck, Netter and Yang (2008) found that firms with high growth opportunities, high R&D expenditures, and high stock return volatility were associated with less independent boards. When experiencing rapid growth, the company demands more specific information, which would increase the cost of information asymmetry. In this context, a duality leadership structure would be more beneficial, given the increased difficulty in keeping both leadership positions always informed. The authors, however, found no evidence to support this hypothesis.

Faleye (2007) posed that the cost of sharing information between the CEO and the COB increases along with organizational complexity, due to the increased potential for distortions in the communication process. Using a sample of 1883 firms, the author found that organizational complexity increases the probability of CEO duality.

Finally, Elsayed (2010) looked at the determinants of the board's leadership structure in Egyptian companies. His study revealed that size, company age, and ownership structure are the most determining factors in the leadership structure in that country. The author verified that CEO duality is negatively related to the size of the company, but there is a positive association between the duality and the age of the company. That is, smaller and more mature companies are more prone to CEO duality. In addition, with respect to the ownership structure, firms that have institutional, private and foreign ownership would be less prone to CEO duality.

In this context, studies that seek to relate a firm's leadership structure only to performance have lost their prevalent status. This is because superior performance does not suggest by itself that the top executives of the corporation and the board of directors are acting in their own best interests (Rechner & Dalton, 1990). Therefore, it is important to integrate, with originality, elements of this new approach, bringing together contextual aspects for a better understanding of the effects associated with different board leadership structures.

2.5 Board Leadership Structure: Brazil's Case

Seeking to improve the corporate governance environment in Brazil, a number of institutional initiatives has been implemented in recent years. The Brazilian Securities and Exchange Commission (CVM) has launched the Corporate Governance recommendations booklet, the Brazilian Corporate Governance Institute (IBGC) promoted a code of corporate governance best practices, and B3 S.A. started the special listing segments, which labels companies that meet specific requirements of corporate governance best practices. These institutions, which represent some of the main corporate governance activism in the country, explicitly mention their orientation towards a separation of roles leadership structure.

In 2000, four B3 S.A. special listing segments were created, introducing categories for companies that voluntarily complied with certain governance rules. Table 1 summarizes the rules and categories regarding the board leadership structure. CEO duality has been banned for the most advanced categories since May 10th, 2011 (with a three-year tolerance for companies to comply).

Table 1. Special Listing Segments of B3 S.A

Criterion	Special Listing Segments of BM&F BOVESPA					Traditional
	Bovespa Mais	Bovespa Mais Level 2	New Markets	Level 2	Level 1	
Disallowance of CEO duality	No rules	No rules	The same person cannot occupy the roles of CEO and COB (firms were given 3 years to comply)			No rules

Source: B3 S.A. (2018).

Thus, CEO duality is only allowed for companies listed on Bovespa Mais and Bovespa Mais Level 2, which presuppose an initial level of governance. New Markets is the higher degree of Corporate Governance in B3 S.A. In other

words, to increase its governance level, a company must switch from CEO duality to a separation of roles structure. The ban, established in 2011, allowed three years of tolerance for the change in the board leadership structure to be carried out.

It is valid to mention an emblematic case that occurred in Brazil in the three-year period in which companies were still allowed to maintain CEO duality. One of the listed companies opted to withdraw from the special listing segment — foregoing a series potential benefits — in order to maintain its CEO duality leadership structure. The company concluded that the benefits would not compensate for the additional costs involved in switching its board leadership structure, a strong anecdotal evidence that contextual factors are relevant in this kind of decision-making.¹

Regarding the academic production, studies in Brazil have traditionally focused on its relationship with performance, overlooking contextual factors. Silveira, Barros and Famá (2003) examined the relationship between corporate governance and financial performance in Brazilian listed companies. The study showed a significant negative correlation at 10%, only for the variable “return on operational assets” (ROOA) in the year 2000, suggesting that, in the year in question, the companies that adopted the separation of roles structure obtained, on average, a better financial performance. The authors acknowledge, however, the problem of endogeneity as a strong limitation of the study.

Amaral-Baptista, Klotzle and Melo (2011) conducted a study with Brazilian public companies in 2008 and observed a positive relationship between CEO duality and return on equity (ROE). The authors interpreted this result under the hypothesis that CEO duality is conducive to superior performance due to superior strategic direction and execution. The authors caution, however, that no statistically significant associations were found between CEO duality and return on assets, return on equity or book value, even though such measures were

¹ Ennes, J. (2012, Abril 18). Unipar deixa Nível 1 da bolsa para reduzir custo. Valor Econômico. Disponível em: <http://www.valor.com.br/empresas/2629186/unipar-deixa-nivel-1-da-bolsa-para-reduzir-custo>.

Ennes, J. (2012, Abril 18). Unipar será primeira empresa a sair de nível governança. Disponível em: <http://www.valor.com.br/empresas/2628378/unipar-sera-primeira-empresa-sair-de-nivel-governanca>.

Meibak, D. & Ennes, J. (2012, Abril 18). Unipar confirma saída do Nível 1 de governança. Disponível em: <http://www.valor.com.br/empresas/2639084/unipar-confirma-saida-do-nivel-1-de-governanca>.

consistently positive in all regressions. The authors suggested, as future research, studies seeking to verify the specific situations and circumstances in which CEO duality may be beneficial to Brazilian listed companies.

On the whole, the theory suggests that there is not a single best governance practice regarding a firm's board leadership structure. Thereby, it is important to assess the benefits and costs of each board leadership structure taking heed of contextual factors that can be either internal or external to the company. Several factors can be considered as possible predictors of a company's leadership structure. This study brings together a series of elements that were previously studied in isolation to build a more comprehensive model of which variables are associated with each type of leadership structure. Each variable in our model corresponds to an element that has appeared in at least one empirical study related to the theme of corporate governance. Table 2 shows each variable utilized in our study, along with their theoretical support and studies in which the variable has appeared.

Table 2. Variables description, measures, and source.

Factor	Related Variables	References
Firm Size	Total Assets Revenue Market Value Large Companies Small Companies	Palmon and Wald (2002); Elsayed (2010); Prevost et al. (2002); Linck, Netter & Yang (2008)
Financial Leverage	Financial Leverage	La Porta et al. (2000) Silveira et al (2008) Mariano, D Ferreira, & M Ferreira (2017)
Board Size	Board Size	Silveira, Barros and Famá (2003); Brickley, Coles and Jarrell (1997)
Profitability	EBITDA ROA	Silveira, Barros and Famá (2003); Amaral-Baptista, Klotze & Melo (2011)
Growth Phase	Average Growth	Linck, Netter and Yang (2008); Prevost et al. (2002)
Special Listing Segment	Special Listing Segment	Silveira, Barros and Famá (2003)
Type of Control	Private Shareholding State Shareholding Foreign Shareholding	Elsayed (2010); Prevost et al. (2002)

Sector	Agriculture, Livestock, and Forestry Manufacturing Industries Commerce, Repair of Motor Vehicles, and Personal and Household Objects Construction Production and Distribution of Electricity, Gas and Water Financial Intermediation Extractive Industries Others Transport, Storage and Communications Regulated Sector	Silveira, Barros and Famá (2003)
Firm Age	Firm Age	Elsayed (2010)
CEO age	CEO age	Linck, Netter and Yang (2008); Brickley, Coles, and Jarrell (1997)

Source: Elaborated by the authors.

3. METHODOLOGY AND DATA

The sample consisted of 160 Brazilian publicly-traded companies listed on B3 SA (Bolsa Brasil Balcão SA), with continuous data from 2010 to 2016. Companies that did not have information about the CEO and COB positions were excluded from the sample.

The temporal scope (2010- 2016) aimed to obtain the highest possible amount of information that met the criteria of reliability and standardization. In 2009, the CVM introduced its “*formulário de referência*”, or *reference formulary* (CVM Instruction 480, published in the Federal Official Gazette (DOU) on December 9th, 2009). The instruction required the filling of more precise and detailed information on the part of the publicly traded companies, which was either unavailable or not easily found before. Thus, the temporal scope of this study was chosen due to the availability of standardized data, starting in 2010, the first year of the CVM reference formulary. As an early indication of the effectiveness of the measures fomenting the separation of roles, in 2010 there were 34 cases of CEO duality while in 2016 there were only 15 cases. Our data covered the period until 2016, comprising the last available reference formulary, seeking to capture a follow-up period after the mandatory change.

Data on each company's foundation date, the names of the occupants of the CEO and COB positions, its special listing segment, CEO age, as well as data about the economic group to which the company belongs were extracted from CVM's reference formulary, available at B3 S.A.'s website. Financial data such as total assets, revenue, return on assets (ROA), leverage, EBITDA, market value and economic sector were obtained from the Economática database. Data regarding the company's ownership were obtained by identifying the largest holder of common shares of the company. Table 3 shows the complete listing of variables used, their description, measures and data sources of each information.

In our paper, the null hypothesis is that there are no relevant predictors for the determination of a firm's leadership structure. In the alternative hypothesis, ROA, total assets, revenue, EBITDA (complexity of the organization), company's age, leverage, growth, sectors (information asymmetry), CEO age (imminence of succession process), being listed in special segments, and regulatory mechanisms are influential variables in a company's choice of a given leadership structure.

Table 3. Variables description, measures, and source.

Variables	Description	Measures	Source
DUAL	CEO Duality	1 = CEO duality; 0 = CEO non-duality	CVM's Reference Formulary
TA	Total Assets	Total Assets	Economática
REV	Revenue	Net Revenue	Economática
MV	Market Value	Market Value	Economática
EBITDA	Earnings before interest, taxes, depreciation and amortization	EBITDA	Economática
LEVERAGE	Financial Leverage	Total Liabilities on Total Assets	CVM's Reference Formulary
ROA	Return on Assets	ROA	Economática
GROWTH	Average Growth	Average change in revenue over the last five years	Economática
PS	Private Shareholding	1 = control by private shareholding; 0 = not controlled by private shareholding	Classification of the authors based on shareholding data taken from Economática, CVM Reference Formulary and "Guia Grandes Grupos 200 Maiores" from Valor Econômico magazine
SS	State Shareholding	1 = control by state shareholding; 0 = not controlled by state shareholding	
FS	Foreign Shareholding	1 = control by foreign shareholding; = not controlled by foreign shareholding	
BOARD_SIZE	Board Size	Number of effective members of the Board of Directors	CVM's Reference Formulary

FIRM_AGE	Firm Age	Age of the company since its foundation	CVM's Reference Formulary
CEO_AGE	CEO age	CEO age	CVM's Reference Formulary
REG_SECTOR	Regulated Sector	1 = belongs to regulated sectors (Energy, Gas and Oil, Telecommunications, Transportation and Services); 0 = does not belong to regulated sectors	Classification of the authors based on Economatica sectors
ESP_LIST	Special Listing Segment	1 = belongs to B3 S.A.'s special listing segments; 0 = does not belong to B3 S.A.'s special listing segments	B3 S.A.
SECTOR1	Agriculture, Livestock, and Forestry	1 = belongs to sector 1; 0 = does not belong to sector 1	Classification of the authors based on CNAE's classification for the 17 Economatica sectors
SECTOR2	Manufacturing Industries	1 = belongs to sector 2; 0 = does not belong to sector 2	
SECTOR3	Commerce, Repair of Motor Vehicles, and Personal and Household Objects	1 = belongs to sector 3; 0 = does not belong to sector 3	
SECTOR4	Construction	1 = belongs to sector 4; 0 = does not belong to sector 4	
SECTOR5	Production and Distribution of Electricity, Gas and Water	1 = belongs to sector 5; 0 = does not belong to sector 5	
SECTOR6	Financial Intermediation	1 = belongs to sector 6; 0 = does not belong to sector 6	
SECTOR7	Extractive Industries	1 = belongs to sector 7; 0 = does not belong to sector 7	
SECTOR8	Others	1 = belongs to sector 8; 0 = does not belong to sector 8	
SECTOR9	Transport, Storage and Communications	1 = belongs to sector 9; 0 = does not belong to sector 9	
LARGE	Large Companies	1 = company size is large; 0 = company size is not large	Companies belonging to the first quartile in descending order of revenue
SMALL	Small Companies	1 = company size is small; 0 = company size is not small	Companies belonging to the last quartile in descending order of revenue

Source: Elaborated by the authors.

Following Elsayed's (2010) methodology, CEO duality was used as the dependent variable. Logit regression models were used to relate the dependent variable to the various independent variables involved. In our study, "0" means that the company adopts the separation of roles, while "1" means that the company adopts CEO duality.

We started our model including all the variables shown in table 3 (equation 1). Then, following the procedure used by Elsayed (2010), we maintained only the variables that were significant at 10% (equation 2). Finally, we developed a

reduced model, containing only the regressor that added greater explanatory power to the model (equation 3), removing the sector-related variables and keeping only the variable REG_SECTOR, which accounts for greater differentiation within companies for the purpose of our study.

Equation 1 (below) is an exploratory model aiming to investigate contextual aspects of the firm associated with a given board leadership structure. The dependent variable is CEO duality, the explanatory variables are: total assets; revenue; market value; earnings before interest, taxes, depreciation and amortization; financial leverage; return on assets; average growth; type of shareholding; board size; firm age; CEO age; belonging to a regulated sector; and belonging to an especial listing segment.

$$\begin{aligned}
 Pr(DUAL_{it}) = \text{logit} & (\beta_0 + \beta_1 TA_{it} + \beta_2 MV_{it} + \beta_3 EBITDA_{it} + \beta_4 LEVERAGE_{it} + \beta_5 ROA_{it} \\
 & + \beta_6 GROWTH_{it} + \beta_7 PS_{it} + \beta_8 SS_{it} + \beta_9 FS_{it} + \beta_{10} BOARD_SIZE_{it} \\
 & + \beta_{11} FIRM_AGE_{it} + \beta_{12} CEO_AGE_{it} + \beta_{13} REG_SECTOR_{it} \\
 & + \beta_{14} ESP_LIST_{it} + \beta_{15} SECTOR1_{it} + \beta_{16} SECTOR2_{it} + \beta_{17} SECTOR3_{it} \\
 & + \beta_{18} SECTOR4_{it} + \beta_{19} SECTOR5_{it} + \beta_{20} SECTOR6_{it} + \beta_{21} SECTOR7_{it} \\
 & + \beta_{22} SECTOR8_{it} + \beta_{23} SECTOR9_{it} + \beta_{24} LARGE_{it} + \beta_{25} SMALL_{it})
 \end{aligned}
 \tag{1}$$

Equation 2 was obtained after removing the variables in which there was no convergence with the parameters of the model (GROWTH; SS; SECTOR1; SECTOR6; SECTOR7; SECTOR8) and running the Logit regression model of equation 1. Following Elsayed (2010) methodology, the most significant variables (up to 10% significance) were selected to compose the regression of equation 2. The variable FIRM_AGE, despite reaching the significance threshold level in equation 1, did not remain significant in equation 2, and then was withdrawn.

$$\begin{aligned}
 Pr(DUAL_{it}) = \text{logit} & (\beta_0 + \beta_1 CEO_AGE_{it} + \beta_2 ESP_LIST_{it} + \beta_3 REG_SECTOR + \beta_4 FS_{it} \\
 & + \beta_5 BOARD_SIZE_{it} + \beta_6 EBITDA_{it} + \beta_7 MV_{it} + \beta_8 SECTOR4_{it} \\
 & + \beta_9 SECTOR9_{it})
 \end{aligned}
 \tag{2}$$

Equation 3 was obtained after another round of variables removal. The variables SECTOR 4 and SECTOR 9 were removed due to their lack of relevance in our final analysis. Equation 3 was then the final model to test the hypothesis of this study.

$$\begin{aligned}
 Pr(DUAL_{it}) = \text{logit} & (\beta_0 + \beta_1 CEO_AGE_{it} + \beta_2 ESP_LIST_{it} + \beta_3 REG_SECTOR + \beta_4 FS_{it} \\
 & + \beta_5 BOARD_SIZE_{it} + \beta_6 EBITDA_{it} + \beta_7 MV_{it})
 \end{aligned}
 \tag{3}$$

3.1 Endogeneity

A very common characteristic of empirical work in corporate finance is the possible occurrence of endogenous regressors in the models. Therefore, in equations (1) to (3) above, one may have to deal with one or more endogenous regressors. In such circumstances, it is necessary to use econometric techniques that handle endogeneity, so as to estimate consistent and unbiased estimators. To do this, we used three different econometric techniques. In the first place, we used a difference and difference regression, including a control variable, called TREATMENT in the three equations above.

This variable is related to companies that were impacted by the regulation introduced in 2011 that established that companies listed in Brazil's major stock exchange, B3 S.A, could only achieve (or keep) the corporate governance special listing seal if they adopted CEO non-duality. The value "1" represents firms that were listed in special segments (thus subject to the new regulations) and maintained themselves listed in special segments from 2011 to the end of our sample period, while the value "0" represents firms that didn't belong to governance segments or decided to leave

the special segment listing from 2011 to the end of our sample period, thus were not subjected to the imposition.

Second, we treated endogeneity through the use of two-stage least squares panel method with cross-section random effects in which the instruments were lags of regressors of the three equations above.

Finally, we used a difference and difference regression once more with data structured in a panel format and estimated equation (1) to (3) using Panel Logit with the inclusion of the variable TREATMENT as a control variable.

4. RESULTS

4.1. Descriptive statistics

Table 4 shows the data collected, organized according to the type of board leadership structure, type of control, sector, and belonging to regulated sectors and special listing segments.

Table 4. Data Description.

Leadership Structure	2010	2011	2012	2013	2014	2015	2016
CEO non-duality	122	123	130	135	138	141	141
CEO duality	34	33	26	21	18	15	15
Total	156						
Special Listing Segments	2010	2011	2012	2013	2014	2015	2016
Does not belong to any special listing segment	48	46	47	46	47	47	45
Belongs to a special listing segment	108	110	109	110	109	109	111
Total	156						
Shareholding control	2010	2011	2012	2013	2014	2015	2016
Foreign	18	18	15	21	25	25	23
Government	10	10	11	11	11	11	11
PF	18	18	25	22	20	18	21
PJ	110	110	105	102	100	102	101
Total	156						
Regulated Sector	2010	2011	2012	2013	2014	2015	2016
Does not belong to a regulated sector	122	122	122	122	122	122	122
Belongs to a regulated sector	34	34	34	34	34	34	34
Total	156						
Economic Sectors	2010	2011	2012	2013	2014	2015	2016
Agriculture, Livestock, and Forestry	1	1	1	1	1	1	1
Manufacturing Industries	41	41	41	41	41	41	41
Commerce, Repair of Motor Vehicles, and Personal and Household Objects	21	21	21	21	21	21	21
Construction	14	14	14	14	14	14	14

Production and Distribution of Electricity, Gas and Water	22	22	22	22	22	22	22
Financial Intermediation	1	1	1	1	1	1	1
Extractive Industries	6	6	6	6	6	6	6
Others	38	38	38	38	38	38	38
Transport, Storage and Communications	12	12	12	12	12	12	12
Total	156						

Source: Elaborated by the authors.

4.2. Models of Equations 1, 2 e 3

Through equation 1, we obtained significant positive relationships among the variables CEO_AGE, FIRM_AGE, EBITDA, SECTOR4, SECTOR9 and the dependent variable. In addition, significant negative relationships were found among the variables ESP_LIST, REG_SECTOR, FS, BOARD_SIZE, MV and the dependent variable.

In equation 2, the relationships remained the same, but the variable FIRM_AGE was no longer statistically significant and therefore was removed from the model.

In equation 3, we removed the economic sector variables since they did not have a significant explanatory power to predict the dependent variable. The relationships and the significance of the remaining variables were the same as in equation 2. The results of the three above-mentioned models are shown in table 5.

Table 5. Probability of CEO duality.

	Duality		
	Eq (1)	Eq (2)	Eq (3)
Intercept	-3,537794	-2,988851	-2,942094
CEO_AGE	0,05609***	0,055244***	0,054957***
ESP_LIST	-2,043124***	-2,214439***	-1,513775***
REG_SECTOR	-1,941143***	-1,969367***	-1,355941***
FS	-1,248123*	-1,316485**	-1,675038**
BOARD_SIZE	-0,091739*	-0,085779*	-0,09571*
EBITDA	0,00000124**	0,00000121**	0,000000798*
MV	-0,000000287**	-0,000000333**	-
SECTOR4	1,816623***	1,662349***	-
SECTOR9	2,455711***	2,455412***	-
FIRM_AGE	0,014207***	-	-
TA	-2,64E-09	-	-
LEVERAGE	-0,000868	-	-
LARGE	0,090173	-	-
PF	-0,273908	-	-
VER	-1,13E-09	-	-
ROA	0,001788	-	-
SMALL	-0,000784	-	-
SECTOR3	-0,626948	-	-
SECTOR2	-0,386779	-	-
SECTOR5	-0,544131	-	-
McFadden R-squared	0,308326	0,294503	0,251059
LR statistic	282,4154	269,7537	229,9612

Prob (LR statistic)	0	0	0
Total number of observations	1089	1089	1089
Obs with Dep=0	927	927	927
Obs with Dep=1	162	162	162
Sample Period	2010 to 2016	2010 to 2016	2010 to 2016

*p<0,10; **p<0,05 e ***p<0,01

Source: Elaborated by the authors.

4.2 Robustness Tests

Table 6 shows the results of the estimation of a difference and difference regression in a pool of cross section using Logit and the TREATMENT as a control variable. We used Huber-White to correct for heteroscedasticity. It should be noted that the variable ESP_LIST was no longer significant in any of the three equations. With this method, we obtained an improvement in the probability of the coefficients in the three models, as well as an improvement in the McFadden R-squared of the first two equations.

Table 6. Probability of CEO duality – First robustness test

	Dual_{it}		
	Eq (1)	Eq (2)	Eq (3)
Intercept	-3,358715	-2,863239	-2,851998
TREATMENT	-1,971723***	-1,912613***	-1,702494***
CEO_AGE	0,054841***	0,053329***	0,053549***
ESP_LIST	-0,337425	-0,499713	-0,000152
REG_SECTOR	-2,076104***	-2,0207***	-1,414112***
FS	-1,256126*	-1,327772**	-1,681677***
BOARD_SIZE	-0,067818	-0,065917	-0,075524
EBITDA	0,000000108**	0,000000104**	0,0000000648*
MV	-0,0000000261**	-0,0000000293**	-0,0000000192*
SECTOR4	1,828539***	1,706406***	-
SECTOR9	2,419926***	2,433048***	-
FIRM_AGE	0,013643	-	-
TA	-4,38E-09	-	-
LEVERAGE	-0,000352	-	-
LARGE	0,111589	-	-
PF	-0,370462	-	-
REV	4,47E-09	-	-
ROA	0,002912	-	-
SMALL	0,046613	-	-
SECTOR3	-0,621018	-	-
SECTOR2	-0,532428	-	-
SECTOR5	-0,615481	-	-
McFadden R-squared	0,321583	0,307546	0,251059
LR statistic	294,5585	281,7014	229,9612
Prob(LR statistic)	0	0	0
Total number of observations	1089	1089	1089
Obs with Dep=0	927	927	927
Obs with Dep=1	162	162	162
Sample Period	2010 to 2016	2010 to 2016	2010 to 2016

*p<0,10; **p<0,05 e ***p<0,01

Source: Elaborated by the authors.

Table 7 presents the results of the estimation of Two-Stage Least Squares in a panel data with cross-section random effects for our three estimated models. We considered that CEO_AGE, BOARD_SIZE, EBITDA and MV were possible endogenous variables. Thus, we used lags of these regressors as instruments. The other regressors were considered exogenous. As seen, the results are, in general, not different from the ones obtained without treating for endogeneity.

Table 7. Probability of CEO duality - Second robustness test

	Dual_{it}
	Eq (3)
INTECEPT	-0.162073
CEO_AGE	0.008483***
BOARD_SIZE	0.000862
EBITDA	4.10E-09
ESP_LIST	-0.155742***
REG_SECTOR	-0.141491**
MV	-1.54E-09
FS	-0.100895**
R-squared	-8,277262
F-statistic	10,639838
Prob (F-statistic)	0,000006
Total Number of Observations	1089
Obs with Dep=0	927
Obs with Dep=1	162
Sample Period	2010 to 2016

*p<0,10; **p<0,05 e ***p<0,01

Source: Elaborated by the authors.

A third test was performed to correct for possible endogeneity: the Logit panel test with the inclusion of the TREATMENT variable. Table 8 presents the results. Only CEO_AGE, REG_SECTOR and FS were statistically significant².

Table 8. Likelihood of CEO duality - Third robustness test.

² It is important to highlight that the panel estimations have an advantage over the pool of cross-section estimation if one wants to study behavior over time. That is, in the panel it is possible to specify individual characteristics not observed as well as non-observed time effects. This makes panel models very interesting, since they allow a better understanding of the relationship between the dependent variable and the regressors.

	Dual _{it}
	Eq (3)
INTERCEPT	-6,9526334***
TRATAMENTO	-3,72991**
CEO_AGE	0,11966902***
ESP_LIST	-1,7510923
REG_SECTOR	-4,8631829**
FS	-4,3034616**
BOARD_SIZE	-0,06370155
EBITDA	9,314E-08
MV	-5,786E-08
	0
chi2	76,208846
N	1089
Total Number of Firms	1089
Obs with Dep=0	927
Obs with Dep=1	162
Sample Period	2010 to 2016

*p<0,10; **p<0,05 e ***p<0,01

Source: Elaborated by the authors.

Thus, considering the three robustness exercises we did to correct for endogeneity, only the CEO_AGE has been found as a common influence on the dependent variable in the three tests conducted.

5. DISCUSSION

CEO age (CEO_AGE) has a significant positive relationship with CEO duality. In fact, the association between CEO age and CEO duality was the most resilient relationship in our study. We argue that it validates the "passing the baton" theory (as seen in Dey, Engel & Liu, 2011; Linck, Netter & Yang, 2008; Faleye, 2007). The positive relationship between CEO duality and financial performance and CEO age can indicate that CEO duality may be associated with a rewarding mechanism of the CEO for good performance, in line with the passing the "passing the baton" theory proposed by Vancil (1987), in which the leadership structure functions as an incentive and reward mechanism in the succession planning of the organization's command.

Belonging to regulated sectors (REG_SECTOR) and to special listing segments of the stock market (ESP_LIST) has a strong negative relationship with CEO duality. This result is not surprising given the existence of the

external pressures toward the adoption of a separation of roles leadership structure. These results also corroborate the theoretical underpinnings found in Dey, Engel & Liu (2011), and Yang & Zhao (2014). The negative relationship between CEO duality and belonging to regulated sectors, special listing segments and foreign ownership can be explained through the influence of regulatory mechanisms that push companies toward the option of a structure of separation of roles. That is in line with the idea that regulatory mechanisms tend to require greater monitoring, and that the separation of roles would propitiate such oversight.

A higher EBITDA is significantly associated with CEO duality. This result is consistent with Amaral-Baptista, Klotzle & Melo's (2011) study, even though they used ROE instead of EBITDA as a measure of firm performance. As Rediker & Seth (1995, p. 87) posed, firm performance is dependent on the effectiveness of the whole set of mechanisms that involve the monitoring of agents and their incentive alignment (the corporate governance "bundle"). Zajac & Westphal (1994) contend that firms find their own efficient bundle based on the cost-benefit analysis of what can be optimally regarding their contextual factors. Thus, our results indicate that CEO duality may have indeed enhanced firm value in the context studied, which is in line with Sundaramurthy & Lewis's (2003) argument that CEO duality favors the decision-making environment of the company in a collaborative approach with the board of directors.

Foreign capital ownership (FS) also has a significant negative relationship with CEO duality. This result is in line with the findings of Elsayed (2010), who also found a negative relationship between foreign capital ownership and CEO duality in Egyptian companies. Since the principals are more distant (physically and psychically) from the agents, it is expected that the former will press for the adoption of a leadership structure that is more associated with the close monitoring of the agents. That is, constraining self-serving and opportunistic behaviors that may arise from the great level of information asymmetry among the parties becomes a priority in the governance bundle of firms of foreign capital ownership.

Board size (BOARD_SIZE) has a significant negative relationship with CEO duality. That is, CEO duality was associated with smaller board sizes, which points to an entrenchment of the CEO's power in such cases, since a larger board of directors could function as an alternative mechanism of governance control (Silveira, Barros & Famá, 2003; Brickley, Coles & Jarrell, 1997).

Firm's market value (MV) — representing the size of the firm — have a significant negative relationship with CEO duality. That is, CEO duality was associated with smaller companies (see Faleye, 2007). The lower financial costs and the greater clarity of the command unit associated with CEO duality may be particularly beneficial to companies of small size, in opposite to big companies who tend to benefit from more structured checks and balances mechanisms. This result is consistent with the hypothesis that small firms benefit more from the clarity and decisiveness of decision-making under a single executive, while large firms benefit more from the checks and balances of having two different executives in the CEO and COB positions (Palmon & Wald, 2002).

6. CONCLUSION

This article aimed to examine the factors that can influence the adoption of CEO duality in Brazil. The analysis was performed based on a sample taken from B3 S.A., containing 160 companies, with data from 2010 to 2016.

We departed from the null hypothesis that there are no relevant predictors that influence the adoption of a firm's board leadership structure. This hypothesis was rejected in our study. In the Brazilian companies analyzed, there was indeed a significant relationship between a company's leadership structure and contextual variables. CEO duality was positively associated with higher CEO age and superior financial performance. Conversely, CEO duality was negatively associated with firm size, belonging to special listing segments, belonging to regulated sectors, board size and foreign capital ownership.

The results indicate a significant relationship between elements regarding the organization context and the adoption of CEO duality. They are consonant with the proposition that a company will tend to adopt a board leadership structure that maximizes its potential value. Thus, although there are good

reasons to press for better governance practices, policy makers should take heed of how each measure can potentially affect companies' choices. When influential institutions in the capital markets and corporate governance activism groups determine, through regulations, that a single type of board leadership structure should be applied to all firms, it may end up destroying the value of some firms, which would receive more benefits from a different type of structure. Something that has been cautioned by authors such as Brickley, Coles, and Jarrell (1997) or Faleye (2007) for many years, and which seems to have been overlooked.

For future studies, it is suggested the use of new methodological procedures, the study of the relationship between governance mechanisms and the life cycle of organizations, about other governance intended policies and their impact on firms value, the conduction of event studies related to the change of a leadership structure, and the conduction of case studies, which can offer a detailed look on the relationship between a company's leadership structure and its influential predictive factors or even about the company succession transition.

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Received: 12/09/2018

Approved: 26/03/2019