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Chief Executive Officer (CEO) compensation and value creation in Brazilian companies listed on the IBRX 100

Remuneração do Chief Executive Officer (CEO) e criação de valor em empresas brasileiras listadas no IBRX 100

Remuneración del *Chief Executive Officer (CEO)* y creación de valor en empresas brasileñas que cotizan en el IBRX 100

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Abstract
This study aimed to analyze the relationship between CEO compensation and value creation in Brazilian companies listed on the IBRX 100. To this end, the concept of value creation was considered through the use of measures that incorporate the opportunity cost companies, namely: Economic Value Added (EVA) and Market Value Added (MVA). The period under analysis was from 2015 to 2019, with a sample of 75 companies. To test the hypotheses, we used multiple linear regression models, estimated by the System Generalized Method of Moments. The results indicate that EVA and MVA impact the decision to increase or decrease CEO compensation. Therefore, the findings of this research may indicate an alignment between the compensation policy of the companies analyzed and the value creation of organizations, alleviating the conflicts of interest between agent and principal.
Keywords: Compensation; Economic Value Added; Market Value Added; Opportunity cost

Resumo
Este estudo teve como objetivo analisar a relação entre a remuneração dos *CEOs* e a criação de valor em empresas brasileiras listadas no IBRX 100. Para tal, contemplou-se o conceito de criação de valor a partir da utilização de medidas que incorporam o custo de oportunidade das empresas, quais sejam: *Economic Value Added (EVA)* e *Market Value Added (MVA)*. O período em análise foi de 2015 a 2019, com uma amostra de 75 empresas. Para testar as hipóteses, utilizaram-se modelos de regressão linear múltipla, estimados pelo Método dos Momentos Generalizado Sistêmico. Os resultados indicam que o *EVA* e o *MVA* impactam na decisão de aumentar ou diminuir a remuneração dos *CEOs*. Portanto, os achados desta pesquisa podem indicar um alinhamento entre a política de remuneração das empresas analisadas e a criação de valor das organizações, amenizando os conflitos de interesse entre agente e principal.
Palavras-chave: Remuneração; *Economic Value Added*; *Market Value Added;* Custo de Oportunidade

Resumen
Este estudio tuvo como objetivo analizar la relación entre la compensación de los directores ejecutivos y la creación de valor en las empresas brasileñas que cotizan en el IBRX 100. Para ello, se consideró el concepto de creación de valor mediante el uso de medidas que incorporan el costo de oportunidad de las

empresas, a saber: *Economic Value Added (EVA)* y *Market Value Added (MVA)*. El período bajo análisis fue de 2015 a 2019, con una muestra de 75 empresas. Para probar las hipótesis, utilizamos modelos de regresión lineal múltiple, estimados por el Método de Momentos Generalizados Sistémicos. Los resultados indican que EVA y MVA afectan la decisión de aumentar o disminuir la compensación del CEO. Por tanto, los hallazgos de esta investigación pueden indicar un alineamiento entre la política retributiva de las empresas analizadas y la creación de valor de las organizaciones, aliviando los conflictos de interés entre agente y principal.
Palabras clave: Remuneración; *Economic Value Added*; *Market Value Added*; Costo de oportunidad

1 Introduction

The 2008 global financial crisis put executive compensation in the spotlight due to the detection of a weak link between compensation and performance (Bussin & Modau, 2015). Many criticisms were made to organizations and committees due to increases in executive compensation in the face of disappointing financial results (Lindqvist & Grunditz, 2004). In this regard, the academic literature on agency theory and executive compensation has argued that the compensation of Chief Executive Officers (CEO*)* must be aligned with business performance (Holmstrom, 1979, Grossman & Hart, 1983). Under the lens of agency theory, compensation contracts need to be designed to align the interests of managers (agents) with those of shareholders (principal). Additionally, a strong relationship between executive compensation and performance can result in the selection and retention of more productive managers (Raithatha & Komera, 2016).

In the academic scenario, several works analyzed executive compensation and its relationship with business performance. The literature on the subject focuses on Anglo-Saxon economies, thus, few research have been carried out in emerging markets (Raithatha & Komera, 2016). It was highlighted that CEOs received surprising salaries, despite major problems faced by companies, indicating the need to align compensation to performance (Colvin, 2008). However, CEOs are highly qualified executives, possess significant leadership skills, and are seen as a scarce resource, being encouraged through compensation structures to remain in the organization as long as they work to drive performance (Bussin & Modau, 2015).

Most studies that investigate the relationship between compensation and performance use traditional measures based on accounting data, such as: i) the return on assets (ROA); and ii) the return on equity (ROE) (Fatemi *et al.,* 2003). These measures, although widely used, have flaws, as they do not reflect the risk involved for a company, considering the cost of equity, in addition, they may be prone to manipulation (Wet, 2012).

From this perspective, research has suggested two additional measures to investigate the relationship between executive compensation and risk-adjusted organizational performance measures: the Economic Value Added (EVA) and Market Value Added (MVA) (Bussin, 2015; Wet, 2012). Studies by Stewart (1991) and Stern (1993) introduced the concept of EVA and MVA as superior measures for corporate performance. EVA is a risk-adjusted internal performance measure that incorporates the Weighted Average Cost of Capital (WACC) and produces a positive result when the company obtains operating returns after taxes, surplus to the cost of capital. On the other hand, the MVA is the difference between the company's market value and the capital invested in it (Santos & Watanabe, 2005). It is noteworthy that MVA is affected not only by the generation of EVA, but also by external factors capable of influencing stock prices, over which companies have no control (Wet, 2012).

Based on studies by Fatemi *et al.* (2003), Wet (2012), Kruger and Petri (2014), Lunardi et al. (2017) it is observed that EVA and MVA are adequate measures to measure the maximization of shareholder value. Therefore, it is relevant that researches seek to relate executive compensation to measures that align the interests of shareholders and managers. Based on these considerations, we raise the following question: what is the relationship between CEO compensation and value creation in Brazilian companies? The objective is to investigate the relationship between CEO compensation and value creation in Brazilian companies listed on the IBRX 100.

This research intends to contribute to expand the literature on the compensation of CEOs in Brazil in an empirical way. The results can provide insights into the existence of a relationship between CEO compensation and business performance. For businesses and society, the discussions provide insights into the importance of establishing compensation packages fairly and efficiently, assisting in the process of creating value for companies and mitigating agency conflicts. Since it is necessary to consciously integrate compensation with strategies to generate sustainable long-term value in companies (IBGC, 2018).

This study differs from national surveys in that it incorporates value creation measures, either: the EVA and the MVA. In addition, variables were incorporated to control factors that may interfere with the compensation of CEOs, whichever they are: observable characteristics of CEOs and the board of directors (age, gender, education), governance variables (duality of functions, size of the board of directors and supervisory board, audit by the Big Four), company size and economic variation (Ozkan, 2011; Bugeja et al.

2012; Vieito & Khan, 2012; Bussin & Modau, 2015; Lin *et al*., 2013; Cunha *et al*. 2016; Lopes *et al*. 2017; Smirnova & Zavertiaeva, 2017).

2 Theoretical Framework

2.1 Executive Compensation

In modern economies most companies are characterized by the separation between ownership and control. This separation results in a conflict of interest between managers and shareholders. Shareholders do not have sufficient elements to monitor the actions of managers, which generates a tendency on the part of managers to maximize their own well-being (Berle & Means, 1932). From this conflict, corporate governance emerges, with the purpose of mitigating agency problems by assisting in the preparation of compensation packages (Murphy, 2009). The board of directors is the body responsible for monitoring top management in a company and plays a key role in defining the CEO's compensation (Finkelstein & Hambrick, 1988; Lin & Lin, 2014). Thus, increasing board independence can improve corporate governance, preventing managers from receiving higher salaries without plausible justifications (Guthrie *et al.,* 2012).

The agency theory suggests that one of the ways to align the interests of managers with the interests of shareholders is through the linking of compensation contracts to business performance, that is, for directors to be able to direct their actions in favor of shareholders, it is necessary that their compensation is aligned with performance (Firth, *et al.,* 2006; Chhaochharia & Grinstein, 2009). Furthermore, two factors must be considered in the compensation of CEOs, they are: i) the market, managerial labor market, marginal products of CEOs, company size, business performance, and human capital; ii) the power and preferences of the board of directors and the CEO (Finkelstein & Hambrick, 1988).

The compensation policy is understood as a mechanism capable of aligning the interests between managers and shareholders. Therefore, compensation packages are seen as an important instrument for mitigating conflicts of interest. However, executive compensation is a complex and controversial issue. Some studies argue that high compensation packages are the result of managers with high power and autonomy to set their own pay. Another strand argues that high compensation comes from great hiring in a competitive environment with the presence of managerial talent (Frydman & Jenter, 2010; Ozkan, 2011).

Managerial power and market forces can be important factors in CEO compensation. In fact, it is important to understand how companies design compensation packages and if, in fact, there is a link between compensation and performance (Frydman & Jenter, 2010). Because the compensation system, when poorly designed, tends to be part of an agency problem, and it may be based on indicators that affect the principal's vision. Thus, the compensation design needs to be aligned with the objectives defined between the parties to the contract, to be well structured and have a relationship with the company's future performance indicators (Bebchuck & Spamann, 2010; Souza *et al.,* 2017).

2.2 Value Creation

In a dynamic and competitive environment that characterizes the business world, it is beneficial that companies have an adequate measure to assess their economic and financial performance and know the quality of business management. Thus, the assessment of business performance has become one of the topics widely studied in the field of finance and controllership. In traditional research, the emphasis is on performance measures such as: Return on Assets (ROA) and Return on Equity (ROE) (Santos & Watanabe, 2005).

However, given the difficulty in consolidating a measure capable of properly measuring business performance, the Economic Value Added (EVA) emerged, which consists of a technique capable of estimating the creation of economic value in a company. The measure was developed by Stern Stewart Co. consultants with the aim of providing incentives for its use, thus, some companies started to adopt it in the decision-making process, linking it to the compensation of managers (Tortella & Brusco, 2003).

EVA is calculated from operating profit after tax (NOPAT), subtracting the cost of capital. Despite all the positive rhetoric surrounding EVA and all the benefits emphasized by Stern Stewart and Co, and other authors, there are studies that question its effectiveness. The literature produced controversial results. Some studies have found that EVA increases shareholder value (Stewart, 1991; Stern, Stewart & Chew, 1998; Pettit, 2000; Tortella e Brusco (2003). On the other hand, studies have observed a positive and significant correlation between EVA and MVA (Walbert, 1994; Kruger, 2012).

EVA is defended as a value creation criterion, as it is a real measure of the degree of success of a company, whose administration is responsible for its maximization (Stewart, 1991). It can be considered a superior measure to accounting earnings and widely accepted by owners and managers, recognizing the weighted cost of capital and business risks. However, EVA has limitations, the main one is related to the use of the traditional accounting system that produces limited data, making it difficult to obtain the true EVA. While there are challenges, it is possible to implement EVA successfully (Shil, 2009).

The EVA concept helps to understand the value creation process. From its use, it is possible to perform the following actions: i) increase operating income from existing assets, reducing costs or increasing sales; ii) reduce the cost of capital by changing the financing mix; iii) reduce the amount of capital linked to existing projects without significantly affecting the operating result, reducing investment in working capital and selling unused assets. The ideal scenario would be to use EVA with other metrics, so decisions can be made assertively (Damodaran, 2002; Shil, 2009). In this work, we chose to use EVA together with MVA. This approach was the same used by Wet (2012), in addition, there is a theoretical basis that emphasizes the importance of EVA and MVA to measure the return on investments and the generation of shareholder value, serving as predictive indicators for business management (Kruger & Petri, 2014).

The Market Value Added (MVA) is a conceptual tool, also developed by Stern Stewart Co to measure how much management adds value to the capital invested in the company, that is, measures the difference that investors would be willing to pay in relation to the company's equity, based on a comparison between the market value (for how much the shareholder could sell its shares) to the equity value of the company (share capital). Whenever the market value is higher, the MVA will be positive, which means the creation of shareholder value by the management (Camargos, 2008).

The primary objective of companies is to maximize shareholder wealth. Maximization occurs from the difference between the market value and the amount invested in the company. Thus, MVA is the present value of all future EVAs (Stern, 1993). MVA is influenced by EVA and by external factors capable of influencing stock prices. However, it is believed that companies with consistently positive and growing EVAs will be able to maximize their MVA in the long term (Brigham & Gapenski, 1994; Ehrbar, 1998). Although the EVA and MVA are correlated with each other, they are different measures. EVA is an accounting-based measure and evaluates business performance over a given period. On the other hand, the MVA is generated from market data, incorporating expectations of future results (Ramana, 2005).

From the advent of measures capable of measuring the creation of shareholder value, it is possible that some companies choose to link executive compensation packages to value creation. Thus, the measures that most adequately capture business performance are EVA and MVA. EVA takes into account the weighted average cost of capital and MVA can be obtained from the market value of the shares. Furthermore, from a strategic point of view, there is no doubt that a forward-looking focus, based on the creation of shareholder value and the incorporation of risk, embodied in EVA and MVA, it is essential for a solid executive compensation policy (Wet, 2012).

2.3 Development of Hypotheses

Previous studies have addressed the relationship between executive compensation and business performance through the use of traditional and non-traditional measures. Additionally, some authors opted for the use of control variables related to individual CEO characteristics, company size and corporate governance mechanisms as factors that can influence compensation.

Fatemi *et al.* (2003) worked with a sample of domestic and global companies over the period 1992-1995. The authors identified that executive compensation is positively related to MVA and, to a lesser extent, to EVA. MVA was a determinant of executive compensation. In addition, EVA and MVA were considered the best predictors of transversal variation in senior executives' salaries, when compared to the traditional performance measure (ROA).

The study by Ozkan (2011) aimed to examine the link between CEO compensation and business performance. The authors employed a panel composed of 390 companies from 1999 to 2005. The proxy used to measure performance was Tobin's Q. Additionally, cash compensation (salary and bonus) and stock options were included (stock options and incentive plans). In addition, the authors chose to control variables for corporate governance. The findings indicated that Tobin's Q has no significant impact on CEO compensation.

Wet (2012) studied the relationship between the compensation of executives of listed companies in South Africa between 2006 and 2010. The measures used were: EVA, MVA, ROA and ROE. The results showed a significant relationship between executive compensation, EVA and MVA, but the correlation would be better when using ROA and ROE. The study found a stronger relationship between executive compensation and EVA, contradicting Fatemi et al. (2003).

Lin *et al*. (2013) empirically tested the determinants of executive compensation. The aim was to understand the "fat cat problem" phenomenon, that is, companies with low performance that have CEOs with high compensation. The authors used a sample consisting of 903 American companies from 2007 to 2010. The proxies used for performance were ROA and ROE. The results showed that: i) bigger companies pay their CEOs more; ii) Older CEOs have higher cash pay; iii) there is a general lack of link between pay and performance.

Bussin and Modau (2015) investigated the relationship between CEO compensation and the performance of organizations in South Africa from 2006 to 2012. 21 companies listed on the Johannesburg Stock Exchange were investigated. The authors used as measures the Market Capitalization (MC), Earnings per Share (EPS), ROE, EVA and MVA. The results indicate that executives have visibly distanced

themselves from the focus on short-term incentives. The distance occurred due to the removal of elements related to performance in compensation contracts, resulting in a disconnect between pay and performance.

Raithatha and Komera (2016) aimed to examine the relationship between executive compensation and company performance in India. The authors used as a performance measure the ROA, ROE (accounting-based measures), Tobin's Q and Annual Stock Return (market-based measures). For control, size, leverage and risk were used. Evidence suggests that companies determine executive compensation based on accounting performance measures.

Smirnova and Zavertiaeva (2017) investigate whether companies link CEO compensation to specific financial indicators and the effects of the level of business performance from accounting data. The metrics used to measure performance were the ROA and the Sharpe ratio (risk-adjusted return). The results show that companies link CEO pay (in particular) total pay and bonuses to accounting-based measures. The Sharpe ratio, as a market-based measure of performance, influences all types of pay, except benefits.

In Brazil, studies on compensation and performance are still controversial. Traditionally, the authors use ROA and ROE as a measure (Krauter, 2013; Machado and Rogers, 2016; Cunha et al., 2016; Souza, Cardoso and Vieira, 2017; Lopes, Gasparetto, Schnorrenberger and Lunkes, 2018; Beuren et al., 2020). Furthermore, despite the controversy in the literature, it is expected that there is a link between CEO compensation and business performance, through the use of value creation measures. Given the above, this study assumes the following research hypotheses:

- **H_1:** There is a positive and significant relationship between CEO compensation and Economic Value Added (EVA).

- **H_2:** There is a positive and significant relationship between CEO compensation and Market Value Added (MVA).

3 Methodology

3.1 Research Classification, Sampling and Data Collection

This research is characterized as descriptive, quantitative and documentary. The population consisted of Brazilian companies listed on B3 and belonging to the IBRX 100 index, it is an average performance indicator of the quotations of the 100 most negotiable and representative assets in the Brazilian stock market. This indicator is formed by heterogeneous companies, which belong to different sectors and classified in different corporate governance segments. It should be noted that BDRs and assets of companies undergoing judicial or extrajudicial reorganization, special regime for temporary administration are not included in this universe, intervention or that are traded in any other special listing situation (B3, 2021).

Based on data analysis, it was necessary to exclude 25 companies, with twenty-three (23) belonging to the financial sector and two (2) having missing data. The financial sector was excluded from the considerations of Vilela (2013), for the author, the MVA has a restriction of use in the case of banks, highlighting the impossibility of evaluating the business units at market prices and the systematic market volatility for the share price.

Therefore, the non-probabilistic sample consisted of 75 companies and 351 observations, forming an unbalanced panel. The analysis was carried out from 2015 to 2019 (six years). The sample limitation was necessary due to the effort made to collect data. Although the disclosure of executive compensation has improved in Brazil with the publication of the Normative Instruction CVM nº 480/09, the data is not yet available in electronic format. Therefore, most of the variables were collected manually. In addition, information on compensation was available until the 2019 fiscal year.

It is noteworthy that the time frame used in this research includes periods of stability and economic recession in Brazil. The periods marked by the recession were the years 2015 and 2016. For Jensen and Murphy (2010), in times of crisis, it makes sense to increase executive salaries as a form of retention. On the other hand, Anderson *et al.,* (2010) state that CEO salaries can be reduced in times of economic recession. Thus, the study sought to control the effects of economic variations on compensation.

Data of a secondary nature were obtained and/or calculated as follows: (i) the information for calculating EVA, MVA and company size were extracted from the database of Economática®; (ii) the information for calculating the Weighted Average Cost of Capital (WACC) was extracted from the Economática® database and data provided by Damodaran (2019). The calculation of WACC followed the guidelines proposed in the study by Neto et al., (2008), considering the following items: short term loans and financing, long-term loans and financing, short-term debentures, long-term debentures, equity; financial expenses; Rf (average 10 years American treasure); T-Bond 10 + country risk; Beta – 60 months; Market Risk Premium; (iii) information on CEO compensation, observable characteristics of CEOs and the board of directors, as well as the governance variables, were manually extracted from the Reference Form (RF), available on the website of B3; and (iv) the GDP variation value was extracted from the IBGE website.

3.2 Specification of the Econometric Model

The models used were operationalized through the statistical package Stata®. In order to verify the relationship between CEO compensation and value creation in Brazilian companies, we chose to use the multiple linear regression model, estimated by the System Generalized Method of Moments (System GMM). Previous researchers have pointed to the potential problem of endogeneity in executive compensation models (Ozkan, 2011). Thus, the models in this study were analyzed using the System GMM method, which is a more appropriate methodology to deal with econometric problems, especially the endogenous relationship between the variables (Blundell & Bond,1998). System GMM was also estimated with two stages and with Windmeijer correction, to increase robustness.

From the literature review, we proceeded with the estimation of equations (1) and (2) through a panel data regression.

$$CM_{it} = \beta_1 EVA_{it-1} + \beta_2 SIZE_{\ it} + \beta_3 AGE_{it} + \beta_4 \Delta GDP_{it} + \beta_5 SIZE_{BOARD_{it}} + \beta_6 TASEIZ_{it} + u_{it} \quad (1)$$

$$CM_{it} = \beta_1 MVA_{it-1} + \beta_2 SIZE_{\ it} + \beta_3 AGE_{it} + \beta_4 \Delta GDP_{it} + \beta_5 BOARD\_SIZE_{it} + \beta_6 SB\_SIZE_{it} + u_{it} \quad (2)$$

Where i = 1,..., N represents the companies in the sample and t = 1,..., T represent the years analyzed (2015-2019); β is the estimated slope coefficient for each independent variable; $u_{it} = \alpha_i + \varepsilon_{it}$ is the compound error term where α_i is the unobserved individual effect and ε_{it} is the random error term. The model variables are described in Figure 1.

Although the System GMM also does not assume that the variables have a normal distribution and the presence of heteroscedasticity does not preclude its application, for the results of the estimated models to be robust, some assumptions need to be met (Caixe, Matias and Oliveira, 2013).

Thus, in order to validate the model and obtain consistent results, the following tests were applied: (i) Unit Root test: the System GMM condition that the first differences of the instrumental variables are not correlated with the fixed effects will be satisfied if the process is stationary (Blundell & Bond, 1998), for this, we used the Phillips-Perron (PP) test whose null hypothesis is that all panels contain a unit root and the alternative hypothesis, is that at least one panel is stationary; (ii) Arellano Bond Autocorrelation test: the test is applied to verify the autocorrelation in the idiosyncratic error term, a negative and significant first order autocorrelation is expected, but second-order not significant; (iii) Sargan/Hansen test: for the validation of the GMM, the fundamental assumption is that the instruments are exogenous, in order to verify such an assumption, two tests can be used, the Sargan test and the Hansen test, with the Hansen test being considered superior; (iv) Hansen's Difference test: tests the validity of the subset of instruments, the null hypothesis of the test assumes that the instrument subsets are exogenous, when not rejected, indicates that the additional conditions for the use of System GMM are valid (Roodman, 2009).

It is noteworthy that although the System GMM provides robust estimates, even the models have several econometric problems, the models were also estimated by the Ordinary Least Squares (OLS) Method for grouped data (Pooled) in order to verify their assumptions, ensuring greater robustness to the results. In this sense, the following tests were applied: (i) the Variance Inflation Fator (VIF), to detect the presence of multicollinearity of the regressors; (ii) Breusch-Pagan test to check the homoscedasticity of the error term; (iii) the RESET test (regression specification error test) by Ramsey in order to examine the correct specification of the model; and (iv) o Doornik-Hansen test to verify the normality of residues.

3.3 Description of Variables

The dependent variable of the study is the total value of the compensation of the CEOs (CM) which comprises the fixed compensation and the variable compensation. We used the logarithm of the maximum individual compensation of the statutory board, available in item 13.11 of the Reference Form. Larcker and Tayan (2019) claim that, on average, in the United States, the CEO earns 1.8 times the salary of the second-largest executive, and the second largest earns 1.2 times more than the third. Thus, it can be inferred that the value of the highest compensation for the executive board is that of the Chief Executive Officer (CEO). As of 2009, with the publication of the Normative Instruction CVM nº 480/09, companies started to mandatorily disclose the minimum compensation, average compensation and maximum compensation of executives. Based on the literature, the study's independent variables were defined, as described in Figure 1.

The independent variables used to measure value creation were the Economic Value Added (EVA) and the Market Value Added (MVA). In the main models of this study, such measures were not used in a single model, in view of the highlights of the literature on the possibility of correlation between them (Wet, 2012), being used together in robustness tests.

Variable	Operationalization	Expected Sign	Source
Main variables of interest			
Economic Value Added [$EVA_{(t-1)}$]	Operating Profit - (Invested Capital* WACC) **WACC = (We * Ke) + (Wd * Kd*)** Variable lagged by one period	+	Bussin and Modau (2015); Wet (2012); Fatemi *et al.* (2003).
Market Value Added [$MVA_{(t-1)}$]	Market value of shares - (Book value of PL) Variable lagged by one period	+	Bussin and Modau (2015); Wet (2012); Fatemi *et al.* (2003).
Control variables			
Size (SIZE)	Ln of the company's total assets	+	Lin *et al.* (2013); Lin and Lin (2014); Ozkan (2011); Chalevas (2011); Cunha et al., (2016)
GDP variation (ΔGDP)	Change in GDP from one period to another, in order to verify fluctuations in the periods of the economy.	+	Bussin and Modau (2015); Kaplan (2012); Anderson *et al.* (2010); Jensen and Murphy (2010).
CEO age (AGE)	Years of life taken from the CEO's birth date.	+	Lin *et al.* (2013); Ozkan (2011).
Board Size (BOARD_SIZE)	Number of members on the board of directors at the end of each year	+	Ozkan (2011); Lin et al. (2013); Cunha et al., (2016)
Size of the Supervisory Board (SB_SIZE)	Number of members of the supervisory board at the end of each year		

Figure 1 - Summary of independent variables
Source: Authors' own elaboration.

In addition, they were weighted by total assets and used lagged, that is, the previous period was considered. As for the control variables, there is: the size of the company measured by the natural log of the asset, the variation in the annual gross domestic product (GDP), the age of the CEO, the size of the board of directors and the size of the supervisory board. Finally, it should be noted that the dummy variables were included in the robustness analyses: duality, gender of CEO and board, board formation and Big Four auditing; in addition, fixed and variable compensation were tested.

4 Analysis of Results

4.1 Descriptive Analysis

Table 1 contains descriptive data for the quantitative variables used in the regression models. The variable compensation of CEOs (CM) showed low variability, with a coefficient of variation of 7.33%. On average, the executives in the sample received an annual salary of BRL 8.00 million, the average compensation in logarithms was 15.89.

Table 1
Descriptive statistics of quantitative variables

	Nº of Obs.	Minimum	Maximum	Median	Mean	Standard Deviation	Coefficient of Variation
CM	348	11.43	18.24	15.445	15.3504	1.1245	7.33%
$EVA_{(t-1)}$	250	-0.17	0.15	0.02	0.0190	0.0441	232.80%
$MVA_{(t-1)}$	342	-0.64	4.18	0.315	0.5864	0.8535	145.56%
SIZE	351	13.15	20.65	16.53	16.5947	1.2657	7.63%
AGE	350	36	87	57	56.2857	9.4182	16.73%
BOARD_SIZE	351	2	30	9	9.7208	4.2764	43.99%
SB_SIZE	351	0	10	3	3.3675	2.5364	75.32%
ΔGDP	351	-3.55	1.32	1.14	-0.540	2.2795	-422.12%

Source: Authors' own elaboration.
Notes: CM: Total compensation of CEOs; EVA: Economic Value Added; MVA: Market Value Added; SIZE: Size; AGE: CEO age; ΔGDP: GDP variation; BOARD_SIZE: board size; SB_SIZE: size of the supervisory board.

When analyzing the compensation of CEOs by sector, in Table 2, based on the coefficients of variation, we note that, in general, there is no great variability in the compensation of CEOs in the sectors analyzed. The sector that presented, on average, the highest compensation was communications (16.50),

however, in the analyzed sample, there were only six companies belonging to this sector. On the other hand, the sector with the lowest average compensation was the public utility (14.48).

Table 2
Descriptive statistics of the total compensation of CEOs (CM) by sector (logarithmized)

CM by sector	Nº of Obs.	Minimum	Maximum	Median	Mean	Standard Deviation	Coefficient of Variation
Industrial goods	38	12.71	16.94	15.74	15.28	1.1421	7.48%
Communications	6	15.28	18.24	16.28	16.50	1.0661	6.46%
Cyclic consumption	96	13.36	17.45	15.54	15.49	1.0186	6.57%
Non-cyclical consumption	33	13.95	17.72	16.13	16.01	0.9023	5.63%
Basic materials	49	12.85	17.89	15.55	15.52	1.1503	7.41%
Oil, gas and biofuels	18	14.51	17.12	15.43	15.48	0.7870	5.09%
Health	24	14.70	17.57	16.00	16.05	0.6529	4.07%
Information Technology	11	14.04	16.72	15.07	15.05	0.7886	5.24%
Public utility	73	11.43	16.52	14.44	14.48	1.0242	7.07%

Source: Authors' own elaboration.

By analyzing the value creation measures shown in Table 2, we present the following considerations: the variables EVA and MVA showed a high variability in the data, the coefficient of variation is 232.80% for EVA and 145.56% for MVA, signaling great heterogeneity. From the minimum and maximum values, the existence of value creation and destruction in the studied companies can be seen. The median of EVA is 0.02 and that of MVA, 0.32, that is, more than half of the data point to the creation of value in companies.

These results are more promising when compared to studies by Wet (2012) in South African companies, whose averages for these indicators were negative, in the period from 2006 to 2010, indicating the destruction of wealth, in terms of an internal measure (EVA) and an external measure (MVA). It is noteworthy, however, that the sample used in this study is of companies listed on B3 and belonging to the IBRX 100 index.

As for the size (SIZE) of the company, given by the natural log of total assets, a low variability was identified, with a coefficient of variation of 7.63%, signaling that the companies analyzed have a uniform size, which may be related to the index to which they belong (IBRX 100). When analyzing the age of the CEOs, there is homogeneity in the data with a coefficient of variation of 16.73%. The oldest CEO is 87 years old and the youngest one is 36 years old. The average age is approximately 56 years old. This result is similar to that found by Ozkan (2011), about the UK CEOs, whose average age was 51 years, indicating that as the CEO occupies a very important position in the company, it is to be expected that he will be a person with more experience.

The variables that measure the size of the board of directors (BOARD_SIZE) and the supervisory board (SB_SIZE) showed greater variability 43.99% and 75.32%, respectively. The board of directors revealed a minimum number of two members and a maximum of 30, and in more than half of the observations there were more than 9 members on the boards. The supervisory board presented a minimum of 0, indicating that some companies do not have this board. It is noteworthy that in more than half of the observations there were more than three members on the supervisory board.

Finally, the variation in GDP (ΔGDP), which captured the oscillations in the Brazilian economic environment from year to year, showed great variability in the period analyzed with a coefficient of variation of -422.12%. It is emphasized that Brazil went through a period of recession in 2015 and 2016, with a variation in GDP of -3.55 and -3.28, respectively. In the years 2017, 2018 and 2019, however, there was an economic recovery, with a positive change in GDP. When analyzing the compensation of CEOs over the period, considering the median, it is observed that, in periods of economic recession (2015 and 2016), the compensation of CEOs was lower, with a sharp growth from 2017.

4.2 Econometric Analysis

Considering the endogenous relationship between the dependent variable, represented by the compensation of CEOs (CM) and the independent variables of value creation, as well as the longitudinal structure of the research, to analyze the relationship between CEO compensation and value creation in listed Brazilian companies that make up the IBRX 100, we used the panel data regression model estimated by the System GMM developed by Blundell and Bond (1998). However, the models were also estimated by the OLS (pooled) method to verify their assumptions. Furthermore, in all the econometric analyzes of this study, we considered a significance level of 5%.

In order to test the proposed hypotheses, two econometric models were estimated, considering the value creation variables EVA and MVA. The model was validated as suggested in the literature, and its results and estimation tests are described in Table 3.

Before estimating the System GMM, we checked the assumptions of the OLS method. In the estimations of the model with the MVA, we did not identify multicollinearity in the variables, with the VIF it was 1.26; the Breusch-Pagan test showed that heteroscedastic errors, being necessary to use robust standard errors for heteroscedasticity; the RESET test indicated the existence of omitted variables; and the Doornik-Hansen test demonstrated the non-normality of the residues. However, this assumption can be relaxed by the number of observations and the propositions of the central limit theorem. Thus, for the MVA model there was only a specification problem. Regarding the EVA model, all OLS method assumptions were met. As for the explanatory power of the models, it is noted that the model for the MVA had greater explanatory power (R^2 adjusted from 11.83%), in relation to the EVA model (adjusted R^2 was 8.4%) (Table 3).

The diagnostic analysis, considering the System GMM, indicated, firstly by the unit root test, the suitability of using the model, by showing the existence of panels with stationary series according to the Phillips–Perron (PP) test for all independent variables, with the exception of GDP variation. However, we emphasize that this stationary panel condition is sufficient, but not necessary for System GMM (Blundell & Bond, 1998; Barros *et al.,* 2010). When verifying the autocorrelation of the error term, negative and significant first-order autocorrelation and non-significant second-order autocorrelation were obtained for both models, meeting the requirements of the System GMM.

As for the exogeneity of the instruments, the Hansen test (more robust) was not significant in all models, according to the null hypothesis of the test that the instruments are valid. Furthermore, the Hansen difference tests (not significant) confirmed that the subsets of instruments are exogenous and that System GMM can be used (Table 3). Therefore, both models were validated for the System GMM.

After validation of the System GMM, proceed with the analysis and discussion of the results presented in Table 3. First, the explanatory variables, measures for value creation, EVA and MVA will be analyzed. Next, the control variables will be analyzed.

Table 3
Estimation results with the dependent variable Total Compensation

	Model with MVA (1)		**Model with EVA (2)**	
	Pooled	**GMM Sis**	***Pooled***	**GMM Sis**
$MVA_{(t-1)}$	0.3834***	**0.2921****		
	(0.0780)	(0.1371)		
$EVA_{(t-1)}$			7.4698***	**11.9576****
			(1.6690)	(4.6607)
SIZE	0.2072***	**0.1953****	0.0893	0.1705
	(0.0497)	(0.0870)	(0.0622)	(0.1162)
AGE	0.0019	0.0034	-0.0048	-0.0033
	(0.0059)	(0.0077)	(0.0074)	(0.0088)
ΔGDP	0.0193	0.0175	0.0626**	**0.0571****
	(0.0272)	(0.0183)	(0.0307)	(0.0284)
BOARD_SIZE	0.0091	0.0093	-0.0498**	-0.0505
	(0.0178)	(0.0260)	(0.0199)	(0.0315)
SB_SIZE	-0.0851***	**-0.0980****	-0.0324	-0.045
	(0.0291)	(0.0394)	(0.0339)	(0.0730)
Constant	11.8052***	12.0175***	14.4826***	13.0461***
	(0.8218)	(1.4386)	(1.0325)	(1.9112)
R^2 adjusted	0.1183		0.084	
VIF test	1.26		1.23	
Breusch-Pagan	5.43**		3.5273*	
RESET (F)	5.91***		0.6408	
Doornik-Hansen	19.6016***		5.8664*	
AR(1)		-1.9778**		-2.2853**
AR(2)		0.9953		-0.208
Sargan Test		1.0913		17.6029***
Hansen Test		2.1426		7.8557
Dif-Hansen Test		2.14		7.86
Wald Test		26423.86***		12697.67***
No. of observations	338	338	246	246
No. of groups		74		56
No. of Instruments		12		12

Source: Authors' own elaboration.
Notes: The variables MVA and EVA were used. We assume that the other regressors are exogenous. Standard errors are in parentheses, in the tests the value of the statistic is presented and the statistical significance is indicated by the symbols: *10%; **5%; ***1%. CM: CEOs' compensation; EVA: Economic Value Added; MVA: Market Value Added; SIZE: size; REC: Economic recession; AGE: Age of the CEO; ΔGDP: GDP variation; BOARD_SIZE: board size; SB_SIZE: size of the supervisory board.

Based on the results obtained with the estimation of the model, considering the analyzed sample, no evidence was found to reject the first research hypothesis: **H_1:** There is a positive and significant relationship between the compensation of CEOs and the Economic Value Added (EVA). Since the lagged EVA was statistically significant at 5%, the results indicate that an increase in EVA from the previous period influences a higher current compensation of executives, which confirms the arguments by Tortella and Brusco (2003) that some companies may provide incentives for the use of EVA in the decision-making process, supporting studies by Fatemi *et al*. (2003) and Wet (2012) for this variable.

Whereas some studies found a positive and significant correlation between EVA and MVA (Walbert, 1994), the second research hypothesis was elaborated, based on a measure of external value creation, being: **H_2:** There is a positive and significant relationship between CEO compensation and Market Value Added (MVA).

The findings of this study also allowed the non-rejection of second research hypothesis, demonstrating that CEO compensation is positively and significantly impacted by lagged MVA. It can be inferred that an increase in MVA from the previous period causes an increase in the total compensation of CEOs. This finding corroborates the studies by Fatemi *et al*. (2003) and Wet (2012) in American and South African companies. For authors, MVA is a significant determinant of executive compensation, which are offset by additions to MVA, which demonstrates a concern of companies with the creation of long-term value.

Thus, by using lagged value creation proxies (EVA and MVA) to capture the organization's past performance, it was possible to identify that the compensation of CEOs for the studied sample is linked to the organization's past wealth generation. This fact presupposes an attempt by the analyzed companies to mitigate possible agency problems with a compensation policy that aligns with value creation. Demonstrating that both value creation measures, one based on accounting (EVA) and the other on market information (MVA), showed a link with compensation.

This finding is in line with the finding by Kruger and Petri (2014), which suggests the importance of using EVA and MVA to measure the return on investments and the generation of shareholder value, serving as predictive indicators to analyze business performance, considering the opportunity cost of capital (EVA) and market perception in relation to capital management (MVA).

Additionally, this research tested control variables that may be related to the compensation of CEOs, which are: size, age of the CEO, GDP variation, size of the board of directors and size of the supervisory board.

The variable size (SIZE) was significant, at 5%, and positive in the MVA model, it is possible to infer that the size of the company is positively associated with the compensation of CEOs. The findings corroborate the studies by Ozkan (2011); Lin *et al.* (2013); Lin and Lin (2014) and Cunha *et al*., (2016). The authors claim that company size has a positive relationship with executive compensation, as larger companies pay better and have a greater capacity to hire qualified executives (Chavelas, 2011).

The variation in GDP sought to capture economic fluctuations during the years analyzed. This variable was positive and significant at 5% for the MVA model, suggesting that a positive variation in GDP is associated with an increase in CEO compensation. The findings highlight the effects of the country's economic situation on CEO salaries, in line with findings highlighting the influence of the external environment on CEO compensation, as well as the sensitivity of pay-performance, which tends to fluctuate with macroeconomic trends (Bussin, 2015).

Finally, the variable of size of the supervisory board was also significant at 5% and negative in the MVA model. This variable captures an important component of corporate governance and suggests that an increase in the number of members of the supervisory board, or even the presence of this board, is associated with lower compensation for CEOs. This result is in line with the characteristic of this body in Brazil, as it is an inspection mechanism that is independent of the administrators, to report to the partners, whose objective is to preserve the value of the organization (IBGC, 2015). Thus, the result suggests that the supervisory board is an element capable of inhibiting excessive compensation for CEOs. The variables of CEO age and size of the board of directors were not significant in both models.

4.3 Robustness Tests

In order to obtain greater robustness to the results, inferences were made with the inclusion of dummy variables for control, including EVA and MVA in a single model, and tested the CEO's fixed and variable compensation as dependent variables, separately. The dummy variables used in the robustness tests are presented in Figure 2.

Table 4 presents the descriptive statistics of the qualitative variables (classified as 0 and 1) used in the robustness analyses. The DUAL variable (duality of roles), which took on value 1 when the CEO accumulates roles and 0 otherwise, indicated that in 97.06% of the cases the CEOs of the companies analyzed were dedicated exclusively to their function, which contributes to reducing the influence on compensation decisions. This result is in line with the findings of Martins and Júnior (2020), who point out that in most of the companies studied, CEOs were dedicated to a single function.

Variable	Operationalization	Expected Sign	Fonte
Control dummies variables			
Duality of Function (DUAL)	Takes value 1: when there is duality of functions Takes value 0: otherwise	+	Chalevas (2011); Bethlem (2012); Bugeja et al. (2012); Cunha et al., (2016),
CEO Gender (GEN_CEO)	Takes value 1: When the CEO is male Takes value 0: otherwise	+	Bugeja et al. (2012); Vieito and Khan (2012)
Big Four Audit (BIG4)	Takes value 1: When the company is audited by a Big Four Takes value 0: otherwise	-	(Lopes et al., 2017)
Gender of the Chairman of the Board (GEN_BOARD)	Takes value 1: When the chairman of the board of directors is male. Takes value 0: otherwise		
Training of the Board (FORM_BOARD)	Takes value 1: When the training of the chairman of the board of directors is an accountant, or an economist or an administrator Takes value 0: otherwise		

Figure 2 - Summary of qualitative variables (dummies) used in the robustness analysis
Source: Authors' own elaboration.

As for the gender of the CEO and chairman of the board of directors, the sample was mostly composed of male members, with 96.58% and 97.65% respectively. In addition, about 92.59% of the companies in the sample were audited by a Big Four: Deloitte, Ernst & Young (EY), KPMG and PriceWaterhouseCoopers. With regard to the training of the chairman of the board of directors, 41.94% of the presidents have a degree in administration or accounting sciences or economics.

Table 4
Descriptive statistics of the qualitative variables used in the robustness analysis

DUMMY	DUAL	GEN_CEO	GEN_BOARD	BIG4	FORM_BOARD
0	97.06%	3.42%	2.35%	7.41%	58.06%
1	2.94%	96.58%	97.65%	92.59%	41.94%
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Authors' own elaboration.

Notes: DUAL: Duality of Function; GEN_CEO: CEO gender; GEN_BOARD: gender of the chairman of the board of directors; BIG4: audit by a Big Four; FORM_BOARD: training of the board of directors.

By including the dummy variables in the compensation models, as well as working together with EVA and MVA, three more regression models were obtained (Table 5). When checking the OLS assumptions, we found: the model with MVA (3) had 15.36% explanatory power, but continued with specification problems in the functional form and normality of the residues; the model with EVA (4) is able to explain 15.08% of the compensation and had no problem with the assumptions; and the model with EVA and MVA explained about 18.74% of the dependent variable and did not present normality of the residues.

The necessary assumptions for the validation of the estimations by system GMM, however, were all validated, the estimations of this method being used for the analyses. The detail in the robustness estimations is for the increase in the number of variables, which brings as a consequence the reduction of the degrees of freedom of the models.

A after the inclusion of the dummies, the lagged MVA remained positive and significant in model 3, as well as the lagged EVA in models 4 and 5, confirming the previous results (Table 3). The particularity was the non-significance of the MVA when it was included together with the EVA, which may be a consequence of the increased collinearity in the model. Furthermore, it is noteworthy that the EVA value creation proxy presented more consistent results in this sample, confirming the positive effect of EVA on the total compensation of CEOs.

As for the control variables, the estimates obtained in Table 5 confirmed the effects of company size, size of the supervisory board and GDP variation in the total compensation of CEOs. In addition, a significant and negative effect of board size on compensation was identified (model 4), suggesting that an increase in board size results in lower compensation for CEOs. It is noteworthy that the board of directors is an important governance instrument, helping to align the interests of shareholders. This result for the size of the board of directors goes against the findings by Ozkan (2011), Lin *et al.* (2013) and Cunha *et al.,* (2016), which suggest that a larger board may be less effective in monitoring CEO compensation.

Table 5
Robustness results of estimates with variable dependent on total compensation (CM)

	Model with MVA (3)		Model with EVA (4)		Model with EVA and MVA (5)	
	Pooled	**GMM Sis**	**Pooled**	**GMM Sis**	**Pooled**	**GMM Sis**
$MVA_{(t-1)}$	0.3515***	**0.2797****			0.2971***	0.1866
	(0.0745)	(0.1349)			(0.0885)	(0.2172)
$EVA_{(t-1)}$			7.5833***	**6.8914****	5.7039***	**5,8006****
			(1.6495)	(2.7032)	(1.7080)	(2.9444)
SIZE	0.1900***	**0.1856****	0.075	0.1134	0.1155*	0.1282
	(0.0534)	(0.0904)	(0.0613)	(0.0863)	(0.0611)	(0.1090)
AGE	-0.0036	-0.0006	-0.0102	-0.0035	-0.0102	-0.0036
	(0.0065)	(0.0086)	(0.0073)	(0.0084)	(0.0072)	(0.0102)
ΔGDP	0.0258	0.0188	0.0614**	0.0488***	0.0347	0.0364
	(0.0266)	(0.0199)	(0.0302)	(0.0187)	(0.0306)	(0.0378)
BOARD_SIZE	0.0065	0.009	-0.0457**	**-0.0382****	-0.0398**	-0.0291
	(0.0166)	(0.0260)	(0.0197)	(0.0193)	(0.0194)	(0.0214)
SB_SIZE	-0.0622**	**-0.0956****	-0.0105	-0.0566	-0.006	-0.059
	(0.0282)	(0.0391)	(0.0341)	(0.0437)	(0.0333)	(0.0572)
DUAL	0.1401	0.339	1.3229***	0.5445	1.3272***	0.4704
	(0.3531)	(0.3142)	(0.4871)	(0.3342)	(0.4765)	(0.5032)
BIG4	0.0293	0.0211	-0.1587	-0.126	-0.2918	-0.0098
	(0.2223)	(0.2137)	(0.2529)	(0.2752)	(0.2506)	(0.3819)
FORM_BOARD	0.3846***	0.1786	0.2743*	0.1498	0.2754*	0.1536
	(0.1181)	(0.1466)	(0.1451)	(0.1696)	(0.1419)	(0.1915)
GEN_CEO	1.1814***	**0.7767*****	1.3353***	**0.7362*****	1.2096**	**0.6741*****
	(0.4392)	(0.2151)	(0.4921)	(0.1844)	(0.4829)	(0.2379)
GEN_BOARD	-0.2353	-0.1921	-0.7791	**-0.4662****	-0.7072	**-0.4660****
	(0.3802)	(0.1426)	(0.5369)	(0.2176)	(0.5257)	(0.1876)
Constant	11.2451***	11.7295***	14.3670***	13.8180***	13.6417***	13.2689***
	(1.0388)	(1.6277)	(1.2996)	(1.6790)	(1.2896)	(2.0578)
R^2 adjusted	0.1536		0.1508		0.1874	
VIF test	1.2		1.17		1.21	
Breusch-Pagan	0.0552		2.511		0.8501	
RESET (F)	2.6923**		1.784		1.8573	
Doornik-Hansen	11.3694***		2.2553		6.2456**	
AR(1)		-2.0206**		-2.1241**		-1.9832**
AR(2)		1.1127		0.2336		0.4656
Sargan Test		2.0834		17.7831		58.2546
Hansen Test		3.3179		6.7728		26.5973
Dif-Hansen Test		0.71		4.18		10.09
Wald Test		71015.31***		32172.47***		81763.46***
No. of observations	329	329	240	240	240	240
No. of groups		72		55		55
No. of Instruments		17		25		39

Source: Authors' own elaboration.
Notes: The variables MVA and EVA were used. It is assumed that the other regressors are exogenous. Standard errors are in parentheses, in the tests the value of the statistic is presented and the statistical significance is indicated by the symbols: *10%; **5%; ***1%. CM: CEOs' compensation; EVA: Economic Value Added; MVA: Market Value Added; SIZE: size; REC: Economic recession; AGE: age of the CEO; ΔGDP: GDP variation; BOARD_SIZE: board size; SB_SIZE: size of the supervisory board; DUAL: Duality of Function; GEN_CEO: CEO gender; GEN_BOARD: gender of the chairman of the board of directors; BIG4: audit by a Big Four; FORM_BOARD: training of the board of directors.

With regard to the dummies that were included, some observable characteristics of CEOs and boards of directors became significant. First, it is highlighted that the gender of the CEO was significant and positive in the three models, demonstrating that the fact that the CEO belongs to the male gender, provides higher pay compared to female CEOs. The result corroborates the study by Vieito and Khan (2012), whose findings indicated that male executives, on average, earn more than female executives. Therefore, the results are consistent with the literature, indicating that there is still a gap on the effect of gender on executive compensation.

Another significant dummy variable was the gender of the chairman of the board of directors (models 4 and 5). The result indicates that when the chairman of the board of directors is male, there is a tendency for the CEO's remuneration to be lower. The other variables included in the model were not statistically significant.

Additionally, the fixed and variable remuneration of CEOs in the models with EVA and MVA were tested separately as dependent variables. The results from these estimates are not presented, as they were not statistically significant, and it is not possible to make inferences in this data sample.

5 Final Considerations

This study aimed to analyze the relationship between CEO compensation and value creation in Brazilian companies listed on the IBRX 100. When verifying the effect of value creation on CEO compensation, congruent results were obtained in the two value measures used: EVA and MVA.

Thus, the first hypothesis of the model was not rejected, that is, there is a significant and positive relationship between CEO compensation and EVA, suggesting that prior period EVA impacts the decision to increase or decrease CEO compensation. The EVA is a measure obtained from accounting data, which seeks to capture the company's economic profit, demonstrating in the studied sample that it is a relevant performance measure for the compensation of CEOs. In the same perspective, the second hypothesis of the model was not rejected, that is, there was a positive and significant relationship between the MVA and the compensation of CEOs. It is noteworthy that the MVA is a measure that reflects the market's view and incorporates future expectations. Therefore, the findings of this research may indicate an alignment between the remuneration policy of the companies analyzed and the value creation of organizations, alleviating the conflicts of interest between agent and principal.

We conclude that the companies studied may be linking executive compensation to value creation measures, as well as being influenced by accounting characteristics (from EVA) that capture historical performance and by market issues (with MVA) that relate to future performance. It is important that companies align their business strategy with the executive compensation policy, which will contribute to minimizing conflicts of interest and generating wealth.

In addition, the findings of the control variables are also noteworthy. Emphasizing the governance mechanisms, supervisory board and board of directors, which negatively affected the compensation of CEOs. As well as the issue of gender inequality in the remuneration of Brazilian executives and in the occupation of prominent positions, given that the studied sample had a low proportion of women occupying executive positions and suggested that male CEOs have a higher remuneration.

With regard to the contributions of the study, in practice, EVA and MVA may emerge as relevant metrics to help institutions design executive compensation packages in a balanced and sustainable manner. Theoretically, the study contributed to discussions on the alignment between the performance of organizations and the compensation of their executives, considering the context of a developing market like the Brazilian one and testing variables that consider the risks of the business, i.e., most effective measures to measure value creation.

This study presents, as a limitation, the analysis of only listed companies belonging to the IBRX 100 Index, and in a specific period of time, therefore, the results cannot be generalized. For future research, we believe that some points can be explored: i) introduce traditional performance measures within the same sample; ii) deepen the discussion on the negative impact of dual functions on CEO compensation; iii) expand the discussion on gender inequality in the remuneration of executive positions.

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