

# Tracing the links between executive compensation structure and firm performance: evidence from the Brazilian market

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## Abstract

**Purpose** – This study aims to investigate how different executive compensation structures were related to the performance of firms.

**Design/methodology/approach** – This study was based on a sample of companies with the highest standards of corporate governance listed on the Brazilian Stock Exchange. We adopted the multiple correspondence analysis followed by the hierarchical cluster analysis to propose a typology defined by fixed and variable components of the executive compensation and multiple firm performance indicators.

**Findings** – The analysis produced three clusters, which were submitted to robustness tests, highlighting that companies used the compensatory incentives in striking distinct ways as governance mechanisms. The study found a positive relationship between the performance of companies and the variable incentives of executive compensation, especially the long-term incentive, as well as a negative relationship between the performance of firms and the fixed component of the compensation structure.

**Research limitations/implications** – This research, whose sample was based on an emerging market, adds empirical evidence to the literature. However, future studies are invited to address the relationships between executive compensation structures and firm performance in other markets, as well as to examine these relationships in companies with distinct levels of governance.

**Practical implications** – This study provides insights on how the incentive structure can be adopted as an efficient governance mechanism, especially for companies in emerging markets.

**Originality/value** – The main novelty of this paper is that the methodological strategy used here enabled the authors to discriminate distinct executive compensation structures and establish a relationship between these compensation structures and different types of performance indicators.

**Keywords** Firm performance, Corporate governance, Executive compensation, Emerging markets

**Paper type** Research paper

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## 1. Introduction

Although executive compensation can be interpreted as the result of ideal hiring in a competitive market of managerial talents, it can also be affected by the managerial power (Frydman and Jenter, 2010). Compensation should be designed through critical incentives to increase the shareholder value and to discourage opportunistic behavior that can induce executives to act for their benefit. Therefore, compensation instruments are notably relevant in solving agency problems where ownership and control are considered different dimensions (Al Farooque *et al.*, 2019).

The relationship between total CEO compensation and organizational performance has been widely examined in the literature (Abdalkrim, 2019; Sheikh *et al.*, 2018; Carter

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*et al.*, 2016). However, the total chief executive officer (CEO) compensation is considered an unsatisfactory proxy in the investigation of its effects on the economic performance of the firm once companies may not have the same compensation structure, although they may report similar amounts in terms of their executives' compensation packages (Mehran, 1995). In this sense, Ozcan (2011) examined the link between firm performance and different components of executive compensation in the UK. Pereira and Esperança (2015) analyzed the determinants of variable compensation for Portuguese executives. Beavers (2018) investigated how the adoption of inside debts in executive compensation impacted the firm's debt structure. The evidence emphasizes that there are variations in the efficiency with which incentives of the compensation structure are used as governance instruments.

Even if these studies improve considerably our understanding of the compensation–performance relationship, the literature is still scarce in providing evidence on how the executive compensation structure is connected to the firm performance. Moreover, despite the evidence demonstrate a positive association between levels of governance, firm performance and executive compensation (Al Farooque *et al.*, 2019), there are still many unknowns regarding the compensation–performance relationship in companies with strong governance. This gap is an opportunity to examine differences regarding the compensatory contracts in companies oriented to the control and monitoring of their executives, as well as to comprehend how these differences are linked to the performance of these companies.

This study examines the association between distinct executive compensation structures and the performance of firms with high standards of corporate governance. More specifically, this study answers the following question: how do firms with high governance standards differ in terms of their executive compensation structures, and how these compensation structures are related to their performance? By addressing this research problem, we could assess how different components of the compensation structure – defined in fixed and variable components – were related to the performance of firms and examine how companies with high standards of corporate governance responded to agency conflicts through their executive compensation structures. The sample of the study consisted of 100 companies listed in the Brazilian Stock Exchange (Bovespa) from which data on different components of the statutory board's compensation were added to the performance data of firms. The Brazilian landscape is particularly interesting because the country represents an emerging economy that integrates one of the main international investment routes in Latin America; on the other hand, it has low rates of economic growth and social development. Different from developed markets, Brazil is characterized by a high concentration of voting capital of companies, and low levels of legal enforcement and property rights (Gallego and Larrain, 2012; Chong and López-de-Silanes, 2007). The central agency conflict in the Brazilian scenario occurs between majority and minority shareholders (Chong and López-de-Silanes, 2007). These idiosyncrasies affect resource allocation, public policies and the distribution of income and political influence in a particular way (Morck *et al.*, 2005).

We adopted the multiple correspondence analysis (MCA) followed by the hierarchical cluster analysis (HCA) to address the research problem. This strategy allowed us to add our contribution to the literature by characterizing distinct types of compensatory structures, relating them to multiple indicators of performance. The results demonstrated that companies brought forward variations regarding their compensation structures, even though sharing similar commitments with respect to the monitoring and surveillance of management acts. These compensatory structures were related to distinct levels of the companies' performance.

This paper is structured as follows. The literature background is presented in Section 2. The database and the empirical methodology are presented in Section 3. In Section 4, we present the typology that relates the executive compensation structures to the indicators of

firms' performance. Finally, we discuss the results and summarize the main conclusions in Section 5.

## 2. Literature background

### *2.1 Executive compensation structure as a mechanism for reducing agency conflicts*

The contractual theory of the firm points out that agency conflicts are derived from the separation between control and ownership (Jensen and Meckling, 1976). This theoretical framework assumes that managers (agents) are opportunistic and that their decisions may not maximize the wealth of the owners (principal). Thus, owners must adopt mechanisms to ensure that their wealth is not expropriated or directed to projects without economic attractiveness (Shleifer and Vishny, 1997). In this sense, one of the most important mechanisms to discourage the agents' opportunistic behavior refers to the executive compensation model (Fama and Jensen, 1983). According to Frydman and Jenter (2010), the literature on this subject assumes two perspectives. The first one is based on hypotheses of income extraction, which means that compensation is established based on incomplete contracts, which allows executives to capture income at the expense of shareholders' wealth. The second perspective is based on hypotheses of value maximization and assumes that the remuneration contracts are developed to attract the best talents and, still, establish the guidelines in a relatively complete way so that the executives can maximize the wealth of the owners.

Jensen and Murphy (1990) suggest that the most appropriate compensation structure is the one in which the managers' pay derives from their decisions and which are reflected in the firm's common stock prices, which means a long-term prospect of wealth maximizing. However, these long-term measures (stock market value) present restrictions in the measurement of the firm performance. These restrictions are because of exogenous shocks in the process of forming stock prices and over which managers have no direct control, such as financial crises and economic recessions. Also, the stock performance for a given firm must be assessed concerning the stock performance of peer companies, which will determine whether the manager has performed better in conducting business (Holmstrom, 1982).

On the other hand, compensation structures based on short-term measures as those related to accounting indicators can encourage managers to practice earnings management. However, these metrics reflect decisions over which managers have greater control as the levels of investments made by the firm, the financial risk assumed by the participation of onerous debts in its capital structure and the creation of profits and cash in the short term (Mehran, 1995). The empirical evidence indicates that firms with high growth rates tend to use market-based performance metrics more substantially in their compensation structure, whereas mature firms consider accounting indicators (De Angelis and Grinstein, 2015). For the authors, the choice concerning the type of performance metrics relies on the extent to which a certain metric expresses the main decisions of managers.

The compensation portions linked to the short or long term described so far can be considered as variable components of the compensation. However, firms generally have a fixed component in their compensation plan. The fixed pay tends to be more representative in firms inspected by regulatory bodies and whose voting capital is controlled by the governmental sphere (Cambini et al., 2015). The high level of concentration of voting capital is also a relevant factor for private firms to determine a high level of fixed compensation for their managers (Gallego and Larrain, 2012). The choice of a specific compensation structure, based on fixed and variable criteria, as well as the representativeness of the short- and long-term variable incentives, depends on the firm characteristics, including the

size (Murphy, 1985), the degree of financial leverage (Jensen, 1986; Harvey and Shrieves, 2001) and risk levels (Palepu and Healy, 2013). Firms with high volatility in cash flow generation, for example, tend to have a negative association with managers' short-term variable compensation (Brick *et al.*, 2002). Petra and Dorata (2008) found that a smaller board of directors increases the probability of CEOs' low pay for performance. Besides, characteristics of the managers, such as age and educational level; the independence of the board of directors; and the activism of the shareholders in supporting or contesting the decisions made by the managers are also determining factors both in the levels and in the compensation structure (Alves *et al.*, 2016).

## *2.2 Relationship between executive compensation and firm performance*

Despite the importance related to the extrinsic and intrinsic characteristics of the contracts which permeate executive compensation, another question that arises is whether there is an association between the firm performance and the absolute levels of executive compensation or the compensatory components. Abdalkrim (2019) found that CEO total compensation and CEO cash compensation were significantly positive across all performance components analyzed, including accounting- and market-based measures. Sheikh *et al.* (2018) found that accounting and market performances impacted CEO compensation distinctly. The current- and previous-year firm accounting performance positively impacted CEO compensation. However, the previous year's market performance negatively influenced CEO compensation; the current-year market performance did not influence CEO compensation. Carter *et al.* (2016) produced evidence that abnormally high CEO total pay predicted worse future firm performance, proxied by the return on assets (ROA). When disaggregating the total compensation, it was found that less performance-linked component of compensation corresponded to greater declines. That is, pay-for-performance incentives seem to foster better firm performance, although excessive levels of abnormal pay of any form indicate governance breakdown.

In this sense, literature has investigated the relationship between the short- and long-term variable incentives of compensation and the firm performance, with evidence showing dissimilarities in the executives' sensitivity according to the markets. Ozkan's (2011) evidence demonstrated that both the median share holdings and stock-based pay-performance sensitivity were lower for the UK CEOs compared to the US CEOs, emphasizing that performance-based compensation did not appear to be fully effective as an instrument of governance in the UK. Smirnova and Zavertiaeva (2017) produced evidence that indicated the link between the bonus payment and accounting-based measures in European firms. The Sharpe ratio, as a measure of market performance, influenced all compensation components except benefits. Pereira and Esperança (2015) found that the magnitude of the variable compensation of Portuguese executives was not associated with the performance of firms. Instead, firms with lower productivity levels were found to pay higher levels of variable compensation. Sakawa *et al.* (2012) found that firm profit of ROA and stock return were significant and positive related to the Japanese executives' short-term incentives. The authors also emphasized that foreign shareholders tended to adopt more long-term incentives rather than short-term incentives, indicating they were concerned with higher standards of corporate governance. According to Croci *et al.* (2012), institutional investors from Continental European firms demonstrate a preference for the executive compensation structure to be more intensely linked to market metrics, which tends to raise share prices. Beavers (2018) found that the use of inside debits in executive compensation reduced agency costs between shareholders and debt holders. Also, the compensatory structure based on inside debits impacted the firms' debt structure.

The compensation–performance relationship reaches very specific outlines in emerging countries, in which concentrated ownership prevails (Gallego and Larrain, 2012). Larkin *et al.* (2018) and Moshirian *et al.* (2017) emphasize that capital markets in less developed

countries tend to not be translated into efficient mechanisms for transmitting information between the various economic agents. Because of these specificities, market metrics may not be the most suitable indicator for managers' compensation. [Sheikh et al. \(2018\)](#) highlight that the volatility of the Pakistan stock market restricts the linking of market metrics to the executive compensatory contracts. The findings of [Raithatha and Komera \(2016\)](#) did not show a pay–performance relationship among Indian firms when their performance was proxied by market-based measures. In Brazil, on the other hand, [Aguiar and Pimentel \(2017\)](#) found a positive association between the variable incentives and market- and accounting-based performances. The authors emphasized the positive relationship between the stock-based compensation and the price-to-equity ratio, suggesting that the long-term incentive played its role in creating long-term value. [Abraham and Singh \(2016\)](#) found a robust positive association between executive remuneration and the growth in the rates of return of controlling shareholders. Despite the low information quality that permeates emerging markets, they are not devoid of corporate governance mechanisms, which are considered crucial to reducing agency conflicts in these types of environments ([Abudy et al., 2020](#)). Based on the evidence, we propose that companies differ in terms of their executive compensation contracts. As highlighted in the literature, we can expect that companies with distinct compensation structures report differences in their performance.

### 3. Methodological approach

#### 3.1 Data

This study was based on secondary data collected over the second half of 2019. Companies with assets traded on Bovespa are classified into five segments with differentiated corporate governance rules: New Market, Level 1, Level 2, Bovespa Mais and Bovespa Mais Level 2. Created in 2000, the New Market segment includes companies with the highest standard of corporate governance, voluntarily submitted to a set of corporate rules that expand the shareholders' rights and establish the disclosure of inspection and control policies and structures [1]. Companies listed in this segment must publish the compensation policies for their councils, committees and statutory executive officers, which justifies the adoption of these companies for composing the sample of our study. Although high levels of governance are associated with the reduction of agency costs and distortions in firms' performance indicators ([Sheikh et al., 2018](#)), the selected sample allowed us to assess the existence of different patterns of compensation–performance relationships in companies equally subject to demanding corporate governance requirements.

We obtained the list of companies belonging to the New Market segment on the Bovespa website. From this list, we collected data on different components of the statutory board's compensation through consultations in the Reference Forms, which started disclosing data on executive remuneration under Instruction Number 480/2009 of the Brazilian Securities Commission. We gathered data on the amounts paid as fixed compensation with salary, short-term variable compensation (bonus, profit sharing, compensation for participation in meetings and commissions), long-term variable compensation (stock-based compensation) and direct and indirect benefits. Data on the performance of firms were collected from the information systems provided by Economática and Thomson Reuters. Data collection covered the period between 2016 and 2018.

The New Market segment consisted of 139 companies when data were collected. After data collection, a database treatment was carried out so that all the analyzed companies reported the complete data in the analyzed period. Therefore, the reductions made in the sample were because of the lack of some information necessary to carry out the analysis. The main reasons for the exclusions were related to the non-availability of compensation data for companies in judicial reorganization and the data incompleteness for companies whose capital was opened after 2016. These procedures resulted in a final sample of 100 companies.

Similar to [Gallego and Larrain \(2012\)](#) and [Smirnova and Zavertiaeva \(2017\)](#), we adopted ROA as a measure of accounting performance, calculated for firm  $i$  and in the  $t$ -period as follows:

$$ROA_{it} = \frac{\text{Operating profit}_{it}}{\text{Average total assets}_{it}} \quad (1)$$

We adopted a metric related to the creation of economic value added (EVA), which aimed to identify a possible association between executive compensation and the creation of excess economic profit for the firms' shareholders. EVA can also demonstrate whether managers are maximizing the shareholder wealth from a medium- and long-term perspective, which should be the main focus to be pursued by decision-makers ([Jensen and Murphy, 1990](#)). We calculated the EVA for company  $i$  in the  $t$ -period as follows:

$$EVA_{it} = \frac{NE_{it} - (Ke_{it} * Equity_{it-1})}{\text{Total assets}_{it-1}} \quad (2)$$

where  $NE_{it}$  is the net profit of the firm  $i$  in the  $t$ -period;  $Ke_{it}$  is the cost of equity capital of the firm  $i$  in the  $t$ -period; and  $Equity_{it-1}$  refers to the net equity of company  $i$  for the period  $t - 1$ . We weighted the EVA by the variable  $\text{Total assets}_{it-1}$  (total assets of company  $i$  for the period  $t - 1$ ) to allow comparability between the companies analyzed.

An important indicator of firm performance is sales growth over time. [Huang and Chen \(2010\)](#) suggest that firms that sustain sales growth rates are more committed to long-term performance. The calculation of the sales growth rate for company  $i$  in the  $t$ -period was obtained as follows:

$$G_{Sales_{it}} = \ln\left(\frac{Sales_{it}}{Sales_{it-1}}\right) \quad (3)$$

wherein  $G_{Sales_{it}}$  represents the Neperian logarithm of the ratio between  $Sales_{it}$  and  $Sales_{it-1}$ , corresponding to sales of firm  $i$  for the periods  $t$  and  $t - 1$ , respectively.

We adopted the Sharpe ratio as a measure of market performance. This metric, based on [Smirnova and Zavertiaeva \(2017\)](#), was defined for firm  $i$  in the  $t$ -period as follows:

$$SR_{it} = \frac{R_{it} - Rf_t}{\sigma_{it}} \quad (4)$$

where  $R_{it}$  is the stock return of the firm  $i$  in the  $t$ -period;  $Rf_t$  is the risk-free rate in the  $t$ -period; and  $\sigma_{it}$  corresponds to the standard deviation of stock returns, calculated from weekly returns for each stock. We considered the interbank deposit certificate rate to represent the risk-free return in the Brazilian economy.

Finally, we developed a variable that related cash levels to the book-to-market ratio (ratio between shareholders' equity per stock and stock price). According to [Jensen \(1986\)](#), companies with high levels of cash but with low growth rates are those with the most intense agency conflicts between managers and shareholders. In this sense, we analyzed this indicator in distinct executive compensation structures. This variable is defined as follows:

$$Cash\_BooktMarket_{it} = \frac{Cash_{it}}{\text{Total assets}} \times \frac{Book_{it}}{Market_{it}} \quad (5)$$

wherein  $Cash\_BooktMarket_{it}$  represents the relationship between cash and cash equivalents and the book-to-market ratio for firm  $i$  in the  $t$ -period;  $Book_{it}$  refers to the shareholders' equity per stock for company  $i$  in the  $t$ -period; and  $Market_{it}$  refers to the stock price of company  $i$  in the  $t$ -period.



The descriptive statistics of the executives' compensation (in local currency) and the performance indicators of companies, obtained from the arithmetic averages for the 2016–2018 period, are presented in [Tables 1](#) and [2](#). The fixed pay and the short-term variable incentives are the most significant components of the compensatory contracts, with averages of nearly R\$5.8m and R\$4.9m per company, respectively. The average stock-based compensation is R\$3.6m, whereas benefits represent R\$528 thousand. The total compensation paid to the statutory board, equalized by the companies' total assets to allow the comparability of the companies' compensation package, is 3.96. The asymmetries between the minimum and maximum values denote that the compensation components and compensation packages were paid at substantially different levels among companies. Regarding the companies' performance indicators, the average ROA is 2.24 with significant data dispersion, whereas the EVA weighted by the firms' assets is zero. The sales growth, the Sharpe ratio and the indicator that relates the cash to the book-to-market ratio are 0.01, 0.77 and 0.10, respectively.

### 3.2 Empirical methodology

We adopted MCA combined with HCA to determine different types of executive compensatory structures and their relationship with the performance indicators of firms. MCA is an extension of correspondence analysis (AC) and allows to analyze the pattern of relationships of a set of categorical variables through the correspondence between rows and columns ([Abdi and Valentin, 2007](#)). Thus, the MCA is a simple AC, which uses a matrix of indicators, where the observations are represented as lines and the categories of variables as columns. This technique has the purpose to convert a matrix of non-negative data into a type of graphical representation, whose association between rows and columns is projected through points on a reduced-dimension map, known as a correspondence map ([Michailidis, 2007](#))[\[2\]](#).

After performing the MCA, we estimated the coordinates of each company on the selected dimensions, from which we conducted an HCA to identify the different groupings on the correspondence map. As suggested by [Rencher \(2002\)](#), we adopted the Euclidean distance between objects as a measure of dissimilarity and Ward's linkage optimization method. We used Stata to perform all statistical analyses.

**Table 1** Descriptive summary of the statutory board's compensation

<i>Components of executive compensation</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Fixed compensation (R\$)	5,783,121	4,356,633	748,665	25,861,934
Short-term variable compensation (R\$)	4,853,742	9,151,466	0	79,739,264
Long-term variable compensation (R\$)	3,602,679	6,657,700	0	53,873,580
Direct and indirect benefits (R\$)	527,988	861,333	0	6,565,820
Total compensation weighted by total assets of the firm	3.96	5.23	0.03	28.36

**Table 2** Descriptive summary of performance indicators of firms

<i>Performance indicators</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
ROA	2.24	11.47	−57.08	46.47
EVA	0	0.10	−0.39	0.61
G_Sales	0.01	0.19	−0.70	0.47
SR	0.77	0.99	−0.87	6.73
Cash_BooktMarket	0.10	0.20	−1.38	0.81

Table 3 presents the variables used in the analysis, whose categories were defined from their distributions. The low category was assigned to values equal to or below the 25 per centile, the medium category to values above the 25 per centile and below or equal to the 75 percentile and the high category to values above the 75 per centile of the distributions. The variables corresponding to executive compensation components were defined in proportional terms to the total compensation to allow the identification of different compensatory structures. We also adopted the total assets of the companies as a supplementary variable to examine the relationship between the compensation strategies and the size of the companies. Unlike the active variables used to determine the geometric space and the main axes on which the points are projected, the coordinates of supplementary variables are projected on the map of correspondence, but they do not influence the dimensions (Greenacre, 2007). The variables are expressed by their respective arithmetic average for the 2016–2018 period.

#### 4. Results

The results of MCA (Appendix Table A1) reported the coordinates used to project the categories of variables in the two dimensions selected to explain the differences between the points [3]. The first and second dimensions explain 58% of the data variability. The HCA, which was carried out on the first two dimensions of the MCA, indicated the existence

Table 3 Variables used in MCA			
Variables	Description	Categories	Codes
ROA	Accounting performance based on the return on assets	Low ( $ROA \leq -0.26$ ) Medium ( $-0.26 < ROA \leq 7.10$ ) High ( $ROA > 7.10$ )	A1 A2 A3
EVA	Firm performance based on the added economic value	Low ( $EVA \leq -0.04$ ) Medium ( $-0.04 < EVA \leq 0.04$ ) High ( $EVA > 0.04$ )	B1 B2 B3
G_Sales	Firm performance based on the sales growth rate	Low ( $G\_Revenues \leq -0.04$ ) Medium ( $-0.04 < G\_Revenues \leq 0.10$ ) High ( $G\_Revenues > 0.10$ )	C1 C2 C3
SR	Market performance based on the Sharpe ratio	Low ( $SI \leq 0.20$ ) Medium ( $0.20 < SI \leq 1.06$ ) High ( $SI > 1.06$ )	D1 D2 D3
Cash_BooktMarket	Firm performance based on the relationship between cash/cash equivalents and the book-to-market ratio	Low ( $Cash\_BooktMarket \leq 0.04$ ) Medium ( $0.04 < Cash\_BooktMarket \leq 0.13$ ) High ( $Cash\_BooktMarket > 0.13$ )	E1 E2 E3
Fixed	Relative share of the fixed component in the total compensation (%)	Low ( $Fixed \leq 35.14\%$ ) Medium ( $35.14\% < Fixed \leq 66.83\%$ ) High ( $Fixed > 66.83\%$ )	F1 F2 F3
Var_st	Relative share of the short-term variable component in the total compensation (%)	Low ( $Var\_st \leq 14.11\%$ ) Medium ( $14.11\% < Var\_st \leq 39.15\%$ ) High ( $Var\_st > 39.15\%$ )	G1 G2 G3
Var_lt	Relative share of the long-term variable component in the total compensation (%)	Low ( $Var\_lt \leq 0$ ) Medium ( $0 < Var\_lt \leq 28.46\%$ ) High ( $Var\_lt > 28.46\%$ )	H1 H2 H3
Benef	Relative share of the benefits in the total compensation (%)	Low ( $Benef \leq 1.57\%$ ) Medium ( $1.57\% < Benef \leq 5.37\%$ ) High ( $Benef > 5.37\%$ )	I1 I2 I3
Comp_wgh	Total compensation divided by the firm's total assets	Low ( $Comp\_wgh \leq R\$ 0.98$ ) Medium ( $R\$ 0.98 < Comp\_wgh \leq R\$ 4.26$ ) High ( $Comp\_wgh > R\$ 4.26$ )	J1 J2 J3
Assets	Total assets (in thousands of R\$)	Low ( $Assets \leq R\$ 1,508,246$ ) Medium ( $R\$ 1,508,246 < Assets \leq R\$ 13,100,000$ ) High ( $Assets > R\$ 13,100,000$ )	atv_1 atv_2 atv_3

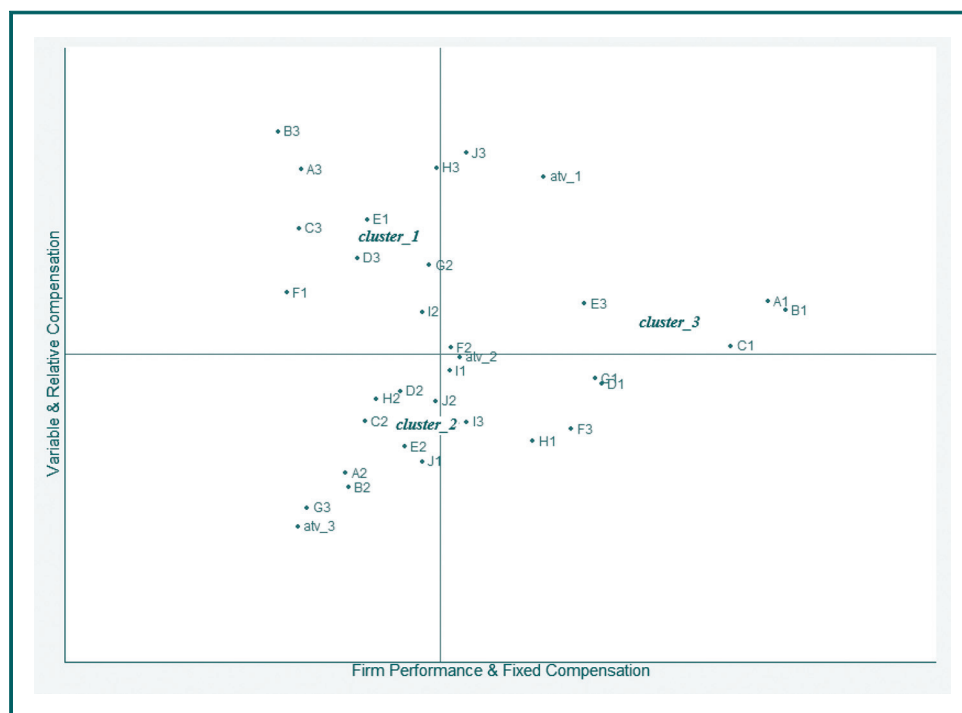


of three clusters projected on the correspondence map (Figure 1). The number of clusters was determined from the analysis of the pseudo-F (Calinski-Harabasz),  $Je(2)/Je(1)$  and pseudo-T-squared (Duda-Hart) indexes (Appendix Table A2). For the Pseudo-F and  $Je(2)/Je(1)$  indexes, larger values demonstrate a stronger grouping power, whereas lower values on the pseudo-T-squared indicate greater distinctive power (Statacorp, 2011).

The quality of the points in each dimension, which was examined based on the least-squares correlation statistics reported in the MCA, indicates that the first dimension is primarily related to the performance indicators of firms and to the fixed pay of executives. The second dimension has a strong association with the variable incentives and with the total compensation of executives equalized by the companies' assets. When interpreting the correspondence map, we have to bear in mind that the more two points are distant from each other, the more they are opposed to the distribution of their profiles (Greenacre and Hastie, 1987). In the first dimension, Cluster 1, and to a lesser extent Cluster 2, are frontally opposed to Cluster 3. This distinction is observed mainly because of the proximity of points A3, B3, C3, D3, E1 and F1 to Cluster 1. These codes correspond to the highest categories of the firms' performance, except for the variable that relates the cash to the book-to-market ratio, whose category is low. In this dimension, Cluster 1 is also associated with the low category of fixed compensation. On the other hand, Clusters 1 and 2 are distinguished in the second dimension. In this axis, the points related to the medium category of the short-term variable compensation (G2), the high category of the long-term variable compensation (H3) and the high category of the weighted total compensation (J3) are close to Cluster 1. Clusters 1 and 3 are also associated with the low category of total assets (atv\_1).

The differences between clusters are also outlined in Table 4, which presents the means of the variables per cluster. In general, the results demonstrated that applying the MCA/HCA methodology produced distinct clusters. This conclusion is supported by the MANOVA results (Appendix Table A3), from which we find that there are differences concerning the

**Figure 1** Correspondence map



vector means between the groups identified. From the Kruskal–Wallis tests (Table 4), we can reject the null hypothesis that the means of the variables in the clusters are equal, except for the variable representing the benefits.

Clusters 1 and 2 are conspicuous because of the superior performance of firms, with indicators above the sample means. However, Cluster 1 is associated with substantial and statistically high-performance indicators as evidenced by the coefficients underlying MANOVA (Table 5), except for the cash related to the book-to-market ratio. These clusters are primarily distinguished by their compensation structures, whose share of the fixed component is 43% and 53% in Clusters 1 and 2, whereas the long-term variable incentive represents 30% and 11%, respectively. These clusters also are distinguished by the total executive compensation equaled by the companies' assets, which is 6.05 in Cluster 1 and 2.42 in Cluster 2.

The most significant differentiating factor between Clusters 1/2 and 3 concerns the firms' performance, whose indicators are all below the sample means in Cluster 3. The only exception is for the cash related to the book-to-market ratio, whose coefficient underlying MANOVA in Cluster 3 is higher compared to the benchmark (Cluster 1) at the 5% significance level. The executive compensation structure in Cluster 3 differs from that one verified in Cluster 1 by presenting a strong predominance of the fixed pay (58%) and low representation of the long-term variable incentive (18%). It also opposes to that of Cluster 2 in terms of the representativeness of the short-term variable incentives, which is 37% lower. In summary, compared to Cluster 1, Clusters 2 and 3

**Table 4** Means of the variables by cluster

<i>Variables</i>	<i>Overall mean</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Kruskal–Wallis</i>
ROA	2.24	11.36	3.59	−11.75	0.0001
EVA	0	0.09	0.004	−0.12	0.0001
G_Sales	0.01	0.12	0.05	−0.20	0.0001
SR	0.77	1.07	0.81	0.32	0.0049
Cash_BooktMarket	0.10	0.08	0.11	0.09	0.0466
Fixed (%)	51.51	43.38	52.87	57.90	0.0466
Var_st (%)	26.71	23.84	31.11	19.68	0.0060
Var_lt (%)	17.57	29.62	11.28	18.20	0.0020
Benef (%)	4.21	3.16	4.74	4.23	0.9445
Comp_wgh	3.86	6.05	2.42	5.15	0.0001
Assets (in thousands of R\$)	27,579,595	8,962,362	28,040,094	4,471,889	0.0022
<i>N</i>	100	26	52	22	

**Table 5** Coefficients underlying MANOVA

<i>Variables</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Const.</i>
ROA	−0.577*** (0.105)	−1.608*** (0.127)	2.654*** (0.086)
EVA	−0.788*** (0.081)	−1.808*** (0.098)	2.808*** (0.066)
G_Sales	−0.385*** (0.139)	−1.189*** (0.168)	2.462*** (0.114)
SR	−0.308* (0.163)	−0.671*** (0.196)	2.308*** (0.133)
Cash_BooktMarket	0.308* (0.167)	0.497** (0.201)	1.731*** (0.136)
Fixed	0.308* (0.167)	0.497** (0.201)	1.731*** (0.136)
Var_st	0.365** (0.163)	−0.164 (0.197)	1.846*** (0.133)
Var_lt	−0.635*** (0.170)	−0.521*** (0.205)	2.385*** (0.139)
Benef	0.058 (0.172)	0.038 (0.208)	1.962*** (0.141)
Comp_wgh	−0.635*** (0.156)	−0.073 (0.188)	2.346*** (0.127)
Assets	0.288* (0.161)	−0.332* (0.195)	1.923*** (0.132)

Notes: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

are associated with a higher prevalence of the fixed compensatory component and a lower predominance of the stock-based compensation, with indicators of firm performance stating the prominence of Cluster 1.

The main characteristics of the typology we propose are outlined as follows.

#### ***4.1 Cluster 1: companies with aggressive executive compensation focused on the long-term variable incentive, with abnormally high performance***

This cluster, composed of 26 companies, is associated with a ROA of 11.36, performing more than five times above the sample mean. Except for the variable that relates the cash to the book-to-market ratio, whose mean (0.08) is lower than the means of the other clusters, all other performance indicators are above the sample means, with EVA, sales growth and Sharpe ratio equal to 0.09, 0.12 and 1.07, respectively. In terms of the compensatory structure of its statutory board, the long-term variable incentive is remarkable (29.62%), performing 69% above the sample mean. Combined with the short-term variable pay, the total variable compensation represents 53% of the executives' total compensation. On the other hand, the fixed pay represents only 43.38% of the compensation package, the lowest fixed component reported among all clusters. The benefits are equivalent to 3.16% of total compensation. These companies are associated with average total assets of R\$8.96bn. Compared to the sample mean, the total executive compensation weighted by the companies' assets is 57% higher, which makes this cluster the one with the most aggressive compensation policy. Lojas Renner, Via Varejo, Raia Drogasil, Cielo and CVC are some examples of companies belonging to this cluster.

#### ***4.2 Cluster 2: companies with timid executive compensation focused on the short-term variable incentive, with normal performance***

Consisting of 52 companies, this cluster is characterized by presenting positive performance indicators, but only slightly higher than the sample means, with ROA, EVA, sales growth, Sharpe ratio and cash related to the book-to-market ratio equal to 0.004, 0.05, 0.81 and 0.11, respectively. In this cluster, the executive compensation structure is concentrated in the fixed pay (52.87%), and in the short-term variable incentives (31.11%), the latter performing 16% above the sample mean. In contrast, the long-term variable incentive performs 36% below the sample mean, constituting only 11.28% of the compensation package. The benefits represent 4.74% of total compensation. This cluster gathers large business groups with total assets of R\$28bn, on average. The total executive compensation weighted by the firms' assets (2.42) is 37% lower than the sample mean, which indicates a less aggressive executive compensation policy concerning the other clusters. This cluster gathers MRV, JBS, Kroton, Light and several public companies.

#### ***4.3 Cluster 3: companies with executive compensation structure focused on the fixed pay, with abnormally low performance***

In this cluster, composed of 22 companies, all performance indicators are below the sample means. The indicators reported for ROA, EVA, sales growth, Sharpe ratio and cash related to the book-to-market ratio are -11.75, -0.12, -0.20, 0.32 and 0.09, respectively. The remarkable characteristic of the executive compensation structure is the predominance of the fixed pay (57.90%), which is 12% higher than the sample mean. The short- and long-term variable incentives represent 19.68% and 18.20% of the compensation package, respectively. The benefits are equivalent to 4.23% of total compensation. In this cluster, companies reported assets equal to R\$4.5bn, on average, which are six times less than the sample mean. Although these companies are smaller than those in the other clusters, their executive compensation equalized by the firms' assets (5.15) is above the sample mean. The representativeness of companies in the Construction and Engineering sector (54.55%)

is a predominant characteristic of this cluster, with examples including the following companies: Direcional, Gafisa, Tecnisa and Viver, among others.

## 5. Discussion and conclusion

In this study, we proposed a typology that allowed us to discriminate executive compensation structures in distinct types. We were also able to examine, in the context of a developing economy, the relationships between these compensation structures and multiple performance indicators in companies with high standards of corporate governance.

Our results show that even when submitted to strict governance standards, the compensation–performance relationship is heterogeneous, evidencing that companies respond differently to agency conflicts. In the proposed typology, we found that the long-term variable incentive (stock-based compensation) stood out in Cluster 1, in which performance indicators were abnormally high. On the other hand, Cluster 3 had the largest share of the fixed pay in the total executive compensation and it was associated with the lowest performance metrics. Cluster 2, characterized by linking more intensively the executive compensation to the short-term variable incentives (such as bonus and profit sharing), was associated with favorable, but timid performance indicators.

Our evidence shows that firm performance is significantly and positively related to the long-term variable incentive, that is, Brazilian market executives seem to be more sensitive to performance-based compensation than Ozkan (2011) and Pereira and Esperança (2015) found in developed markets. Although submitted to the idiosyncrasies of emerging markets, the Brazilian market also seems to respond more favorably to this governance instrument than other emerging markets such as those examined by Sheikh *et al.* (2018) and Raithatha and Komera (2016). Thus, in addition to Larkin *et al.* (2018) and Moshirian *et al.* (2017) evidence, we can expect some level of heterogeneity regarding the role of emerging capital markets in the decision-making of economic agents.

As highlighted by Frydman and Jenter (2010), we also demonstrated that companies' compensatory contracts could be distinguished between those which supported the perspective of maximizing the value and of those that extracted income from the owners. This distinction can be explained by the representativeness of each component in the executive compensation structure, with stock-based compensation corroborating the relevance of long-term incentives in mitigating agency conflicts (Jensen and Murphy, 1990). This evidence is also supported by the coefficients underlying MANOVA of the indicator that relates cash and cash equivalents to the book-to-market ratio, corroborating Jensen (1986) by exposing an inverse relationship in the potential for agency conflicts between Clusters 1 and 3.

The empirical results of this study contribute to a more accurate assessment of the performance–compensation relationship and shed light on the implications concerning the incentive system as a governance mechanism. Although our analysis proved to be robust, it was not free of limitations. The most relevant restriction concerned the endogeneity of the variables, which means that our model did not ensure the orthogonality between the proxies for executive compensation and firm performance. Furthermore, future studies should use larger samples to examine other markets and firms with different governance levels, which could clarify other questions that this study raised. However, it is our hope that this study whets the appetite of the scientific community in this area to continue this line of research.

## Notes

1. Available at: [www.b3.com.br/pt\\_br/produtos-e-servicos/solucoes-para-emissores/segmentos-de-listagem/novo-mercado/](http://www.b3.com.br/pt_br/produtos-e-servicos/solucoes-para-emissores/segmentos-de-listagem/novo-mercado/) (accessed 1 April 2020).
2. The distances between points in the  $n$ -dimension space summarize all the information about the differences between the points of rows and columns in the table.

3. Greenacre (2007) recommends the adoption of dimensions whose inertia is greater than  $1/Q$ , where  $Q$  is the number of variables used in the model. Based on this rule, we neglected the dimensions with inertia of less than 11.11%.

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## Appendix A

**Table A1** MCA results

<i>Categories</i>	<i>Mass</i>	<i>Overall Quality</i>	<i>%inert</i>	<i>coord</i>	<i>dimension_1 sqcorr</i>	<i>contrib</i>	<i>coord</i>	<i>dimension_2 sqcorr</i>	<i>contrib</i>
<i>ROA</i>									
A1	0.025	0.736	0.101	2.700	0.724	0.182	0.535	0.013	0.007
A2	0.050	0.629	0.040	-0.777	0.302	0.030	-1.201	0.327	0.072
A3	0.025	0.522	0.055	-1.147	0.237	0.033	1.867	0.285	0.087
<i>EVA</i>									
B1	0.025	0.733	0.111	2.841	0.725	0.202	0.442	0.008	0.005
B2	0.050	0.628	0.044	-0.753	0.256	0.028	-1.347	0.371	0.091
B3	0.025	0.603	0.067	-1.334	0.264	0.045	2.252	0.34	0.127
<i>G_Sales</i>									
C1	0.025	0.841	0.068	2.394	0.841	0.143	0.081	0	0.000
C2	0.050	0.554	0.021	-0.617	0.358	0.019	-0.678	0.196	0.023
C3	0.025	0.558	0.037	-1.160	0.36	0.034	1.275	0.197	0.041
<i>SR</i>									
D1	0.025	0.743	0.024	1.330	0.726	0.044	-0.299	0.017	0.002
D2	0.050	0.412	0.008	-0.328	0.259	0.005	-0.374	0.153	0.007
D3	0.025	0.489	0.019	-0.675	0.234	0.011	1.048	0.255	0.027
<i>Cash_BooktMarket</i>									
E1	0.025	0.729	0.016	-0.601	0.22	0.009	1.361	0.51	0.046
E2	0.050	0.639	0.015	-0.294	0.114	0.004	-0.937	0.524	0.044
E3	0.025	0.539	0.028	1.190	0.497	0.035	0.513	0.042	0.007
<i>Fixed</i>									
F1	0.025	0.411	0.043	-1.261	0.37	0.040	0.622	0.041	0.010
F2	0.050	0.020	0.010	0.090	0.016	0.000	0.068	0.004	0.000
F3	0.025	0.357	0.040	1.081	0.292	0.029	-0.758	0.065	0.014
<i>Var_st</i>									
G1	0.025	0.544	0.030	1.272	0.535	0.040	-0.246	0.009	0.002
G2	0.050	0.473	0.016	-0.089	0.01	0.000	0.899	0.463	0.040
G3	0.025	0.540	0.042	-1.094	0.282	0.030	-1.552	0.257	0.060
<i>Var_lt</i>									
H1	0.031	0.516	0.022	0.764	0.323	0.018	-0.878	0.193	0.024
H2	0.044	0.509	0.013	-0.522	0.38	0.012	-0.453	0.129	0.009
H3	0.025	0.378	0.043	-0.028	0	0.000	1.886	0.378	0.089
<i>Benef</i>									
I1	0.025	0.010	0.019	0.077	0.003	0.000	-0.167	0.007	0.001
I2	0.050	0.197	0.011	-0.148	0.041	0.001	0.427	0.156	0.009
I3	0.025	0.170	0.015	0.219	0.031	0.001	-0.687	0.139	0.012
<i>Comp_wgh</i>									
J1	0.025	0.487	0.011	-0.148	0.019	0.001	-1.083	0.468	0.029
J2	0.050	0.365	0.006	-0.035	0.004	0.000	-0.476	0.36	0.011
J3	0.025	0.851	0.023	0.218	0.021	0.001	2.035	0.83	0.104
<i>Assets</i>									
atv_1	0.250	0.583	0.375	0.853	0.194		1.797	0.389	
atv_2	0.500	0.015	0.358	0.160	0.014		-0.028	0.000	
atv_3	0.250	0.653	0.421	-1.174	0.327		-1.742	0.326	

**Table A2** Index results for validating the number of clusters

<i>No. of clusters</i>	<i>Calinsk/Harabasz pseudo-F</i>	<i>Je(2)/Je(1)</i>	<i>Duda/Hart</i>	<i>Pseudo-T squared</i>
1	–	0.6137		61.67
2	61.67	0.4190		105.39
3	119.49	0.6417		27.92
4	104.69	0.3233		50.24
5	109.22	0.4060		40.96

**Table A3** MANOVA results

<i>Source</i>	<i>Statistic</i>	<i>Df</i>	<i>F(df1,</i>	<i>df2) =</i>	<i>F</i>	<i>Prob &gt; F</i>
Cluster	W 0.1003	2	22.0	174.0	17.07	0.0000 e
	P 1.2196		22.0	176.0	12.50	0.0000 a
	L 5.7836		22.0	172.0	22.61	0.0000 a
	R 5.1661		11.0	88.0	41.33	0.0000 u
Residual		97		Number of obs = 100		
Total		99				

**Notes:** W = Wilk's lambda, P = Pillai's trace, L = Lwaley–Hotelling trace, R = Roy's largest root; e = exact, a = approximate, u = upper bound on F

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