PAY-PERFORMANCE SENSITIVITY AND OWNERSHIP CONCENTRATION IN BRAZILIAN COMPANIES

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▪ Received: 05/22/2020 ▪▪ Approved: 04/07/2021 ▪▪▪ Second Approved Version: 05/08/2021

ABSTRACT

We examine whether the firm's performance influences executive compensation and how the ownership concentration moderates this pay-performance relationship. Our sample comprises 205 Brazilian companies listed on Brasil, Bolsa, Balcão (B3) with available data between 2010 and 2018. We employ the Generalized Method of Moments with Instrumental Variables (IV-GMM) regressions to control the simultaneity effect of firm performance and executive compensation. Our main results indicate that although the positive influence of firm performance proxies (return on equity and return on assets) on executive compensation, the ownership concentration decrease the pay-performance sensitivity. Thus, our study contributes to the literature by showing that the high level of ownership concentration reduces the propensity of aligning the interests of managers for higher levels of compensation with the interests of shareholders for better firm profitability, not reflecting the recommended practices of corporate governance.

Keywords: Pay-Performance Sensitivity. Executive Compensation. Firm Performance. Ownership Concentration.

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SENSIBILIDADE DA REMUNERAÇÃO À PERFORMANCE E A CONCENTRAÇÃO ACIONÁRIA EM COMPANHIAS BRASILEIRAS

RESUMO

Nós examinamos se a performance da firma influencia a remuneração dos executivos e como a concentração acionária modera essa relação de *pay-performance*. Nossa amostra é composta por 205 companhias brasileiras listadas na Brasil, Bolsa, Balcão (B3) com dados disponíveis entre 2010 e 2018. Para controlar a simultaneidade entre a performance da companhia e a remuneração de executivos, utilizamos regressões de Método dos Momentos Generalizado com Variáveis Instrumentais (IV-GMM). Nossos principais resultados indicam que, embora a influência positiva das *proxies* de performance da firma (retorno sobre o patrimônio líquido e retorno sobre ativos) na remuneração de executivos, a concentração acionária reduz a sensibilidade da remuneração à performance. Assim, este estudo contribui para a literatura ao evidenciar que o alto nível de concentração acionária reduz a propensão de alinhamento dos interesses dos gestores por níveis mais altos de remuneração com os interesses dos acionistas por maiores níveis de rentabilidade, não refletindo as práticas recomendadas de governança corporativa.

Palavras-chave: Sensibilidade da Remuneração à Performance. Remuneração de Executivos. Performance da Firma. Concentração Acionária.

1 INTRODUCTION

Grounded on the conflict of interests that arises from the separation of ownership and control (Berle & Means, 1932), executive compensation can be viewed as one of the corporate governance mechanisms that disciplines, monitors, and motivates the managers. It provides incentives for the agents making choices that will maximize the shareholder's wealth due to the existence of imperfect monitoring (Jensen & Meckling, 1976).

The optimal contracting view posits that if executive compensation is closely related to the company performance (pay-performance sensitivity), this compensation may align the interests of managers for higher levels of compensation with the interests of shareholders for better firm performance (Yang, Cullinan, & Liu, 2018). However, in a competing way, the managerial power view considers that managers may design compensation contracts not aligned with the shareholders' best interests due to their bargaining power over the board (Ataay, 2018).

Based on these two competing views, several scholars confirm the inexistence of a consistent and robust relationship between executive compensation and firm performance both in developed (Aguinis, Gomez-Mejia, Martin, & Joo, 2018; Dai, Jin, & Zhang, 2014; Iyengar, Williams, & Zampelli, 2005; Shin & Seo, 2011; Tosi, Werner, Katz, & Gomez-Mejia, 2000; Van Essen, Otten, & Carberry, 2015) and in emerging markets (Alves & Krauter, 2014; Beuren, Silva, & Mazzioni, 2014; Dani, Panucci, Michels, Gonçalves, & Zonatto, 2017; Fernandes & Mazzioni, 2015; Vasconcelos & Monte, 2013). Due to this lack of consensus, we consider relevant to scrutinize this relationship by investigating the influence of moderating factors that may play a role in the design of executive compensation plans, such

as the level of ownership concentration.

This moderating effect may occur since, with the help of large controlling shareholders, entrenched managers may be prone to maximize personal monetary benefits by using compensation schemes that have little relationship with firm performance. Thus, managers from companies with high ownership concentration degrees will tend to adopt less pay for performance packages, not reflecting the recommended practices of corporate governance (Jiang, Habib, & Smallman, 2009).

The Brazilian context provides an interesting setting to examine this moderating effect of ownership concentration empirically. Unlike the Anglo-Saxon countries, Brazil is characterized by higher levels of ownership concentration (Silva, Lana, & Marcon, 2018) and classified as a country with poor governance and weak legal protection for investors (Crisóstomo, Brandão, & López-Iturriaga, 2020; Martins, Schiell, & Terra, 2017). In this sense, we examine whether the firm performance influences Brazilian companies' executive compensation and how the ownership concentration moderates this pay-performance relationship.

Despite the possible influence of firm performance on executive compensation, the compensation may also act as a mechanism of motivation, stimulating managers to obtain a superior performance (Aguiar & Pimentel, 2017). In this way, we control this possible simultaneity problem between firm performance and executive compensation, in a sample of 205 non-financial Brazilian companies in the period 2010-2018, using instrumental variables in a Generalized Method of Moments IV (IV-GMM) regression.

Our main results reveal that although the positive influence of firm performance on executive compensation, the ownership concentration may decrease the pay-performance sensitivity. However, it is important to highlight that our results are not consistent across all estimations, being susceptible to the different proxies of executive compensation and ownership concentration.

Based on these findings, our study contributes to the literature by showing that the high level of ownership concentration tends to reduce pay-performance sensitivity, not reflecting the recommended practices of corporate governance. If executive compensation is tied to the firm performance, it may align the interests of managers for higher levels of compensation with the interests of shareholders for better firm profitability.

In this sense, our study fills the gap regarding the moderating effect of ownership concentration on the pay for performance relationship in the Brazilian context since, to the best of our knowledge, it is the first to consider that ownership concentration plays a role in pay-performance sensitivity. Moreover, contributes due to the lack of convergence of previous studies that examine the pay-performance sensitivity, especially in the Brazilian context (Aguiar & Pimentel, 2017; Alves & Krauter, 2014; Beuren et al., 2014; Dani et al., 2017; Fernandes & Mazzioni, 2015; Pinto & Leal, 2013; Vasconcelos & Monte, 2013), which is characterized by companies with higher levels of ownership concentration.

We also expand the discussion about the low positive pay-performance sensitivity (or non-significant) documented by prior literature (Aguinis et al., 2018; Buck, Liu, & Skovoroda, 2008; Dai et al., 2014; Firth, Fung, & Rui, 2006; Jensen & Murphy, 1990; Ozkan, 2011; Tosi et al., 2000; Van Essen et al., 2015), suggesting that

this might be partially due to moderating effects which play a role in the design of executive compensation.

As a practical implication, our study contributes to shareholders and potential investors by showing that ownership concentration reduces the propensity of aligning the interests of managers for higher levels of compensation with their interests for better firm performance. Thus, they may expect more agency conflicts when investing in firms with concentrated ownership structures.

The rest of the paper is organized as follows: In the second section, we expose the hypotheses development. In the third section, we describe our sample selection procedure and outline our research design. Finally, in the last two sections, we present the empirical results and the conclusions, respectively.

2 HYPOTHESES DEVELOPMENT

Agency theory assumes that individuals are rational, risk-averse, and inclined to take actions that maximize their personal wealth (Gomez-Mejia & Wiseman, 1997; Jensen & Meckling, 1976). In this sense, managers may be driven by self-interest and motivated by financial incentives, which may induce opportunistic actions that not necessarily include the same objectives as those of the shareholders (Lubatkin, Durand, & Ling, 2007; Michiels, Voordeckers, Lybaert, & Steijvers 2012).

According to the agency theory, executive compensation is one of the mechanisms to motivate managers to act in the best interest of the shareholders, which should (partly) depend on firm performance (Murphy, 1986). This incentive mechanism would be unnecessary whether the managerial activities were observable, and thus, shareholders could monitor them. However, given that this not occur, an optimal pay-for-performance contract will provide incentives for managers to take appropriate actions, tying its expected utility to the shareholder's wealth (Jensen & Murphy, 1990; Ross, 1973).

In line with the optimal contracting view, previous studies show a significant positive association between firm performance proxies (e.g., return on assets, return on equity and Tobin's Q) and executive compensation both in developed (Ke, Petroni, & Safieddine, 1999; Michiels et al., 2012), and emerging countries (Ataay, 2018, Cao, Pan, & Tian, 2011; Kohli, 2018; Yang et al., 2018). These results suggest that executive compensation mechanisms, when tied to firm performance, may mitigate or eliminate potential agency conflicts.

However, several results show that this positive association is not consistent across all models, being sensitive to the firm performance proxies. Shin and Seo (2011) findings show that although the return on assets and shareholder return are positively and significantly associated with cash compensation in U.S firms, the return on assets is not associated with total compensation, while the shareholder return is negatively and significantly associated with total compensation.

Further studies reported similar inconclusive results in the U.S. context. Daily, Johnson, Ellstrand, and Dalton (1998) showed that return on equity is not associated with the cash compensation and total compensation. Iyengar et al. (2005) found that return on equity is not associated with cash compensation in the full sample with all-equity and high-levered firms. Leone, Wu, & Zimmerman (2006)

reported that changes in return on assets are not associated significantly with changes in equity compensation. Dai et al. (2014) showed that changes in shareholder return do not significantly influence changes in cash and equity compensation.

This also occurs in emerging markets. Firth et al. (2006) showed that the return on sales and the shareholder's return are not associated with CEO total compensation in Chinese firms, in line with Chang, Chen and Shu (2017) findings of a non-significant association between firm performance, measured by return on equity and return on sales, and total executive compensation in the same country.

In the Brazilian context, the relationship between firm performance and executive compensation also seems inconclusive (Fernandes & Mazzioni, 2015). While some evidences show that there is a positive (negative) influence of firm performance on executive compensation (Dani et al., 2017; Vasconcelos & Monte, 2013), depending on the firm performance proxy, other evidences show that there is no significant association between firm performance and executive compensation (Alves & Krauter, 2014; Beuren et al., 2014; Konrath, Lunkes, Gasparetto, & Schnorrenberger, 2018).

However, we expect that Brazilian firms are tying executive compensation to the firm performance due to the following reasons. First, firms are improving its executive compensation disclosure practices following the Brazilian Securities Exchange Commission normative instruction #480, which led to the mandatory disclosure of managerial compensation plans in 2010, also requiring that firms disclose the main performance measures that are being used to compensate managers.

Second, the performance-based compensation (e.g. bonuses and other variable compensation components) have been comprising a significant portion of executive compensation plans, being widely used by Brazilian firms (Konrath et al., 2018). Previous research supports this view, by documenting that the adoption of stock-based compensation plans is increasing in the Brazilian context over the years (Ermel & Medeiros, 2020). Both practices create incentives for managers in increasing firm performance, and, consequently, increasing its compensation levels.

Third, Brazilian firms are improving the quality of corporate governance practices over the years, adopting complementary corporate governance mechanisms that are designed to protect shareholders (Azevedo, Bomfim, & Nakao, 2021; Leal, Carvalhal, & Iervolino, 2015). In this vein, under the complementary or substitutive corporate governance mechanisms views, firms may strategically strengthen managerial compensation to firm performance in order to provide benefits to shareholders (Oh, Chang, & Kim, 2018).

Based on the above discussion, and following the optimal contracting view that executive compensation may align managers' and shareholders' interests, our first hypothesis is stated as follows:

H_1: Firm performance has a positive influence on executive compensation in Brazilian companies.

Nevertheless, the relationship between firm performance and executive compensation may vary significantly depending on the institutional and organizational aspects, such as the structure of ownership (Ataay, 2018; Devers, Cannella, Reilly, & Yoder, 2007). This occurs due to the influence of managerial power on the compensation design arrangements, in which the ownership concentration level may play a significant role on the pay-performance sensitivity since the controlling shareholders are often in charge of setting managerial compensations (Cao et al., 2011).

In line with managerial power view, executive compensation may be viewed not only a potential mechanism for addressing the agency problem but also as part of the agency problem itself (Bebchuk & Fried, 2003). It may occur since controlling shareholders may extract private benefits by setting executive compensation schemes unrelated to the wealth of minority shareholders (Cao et al., 2011; Michiels et al., 2012).

Under this view, previous studies show that higher levels of ownership concentration tend to reduce the pay-performance sensitivity, suggesting that the performance sensitivity of compensation is weaker when executives have more control over decisions, especially those related to their compensation (Ataay, 2018; Jiang et al., 2009). Based on this effect, one possible explanation for the mixed results on the pay-performance relationship in Brazilian context (Alves & Krauter, 2014; Beuren et al., 2014; Dani et al., 2017; Fernandes & Mazzioni, 2015; Vasconcelos & Monte, 2013) is the fact that these studies do not consider the effect of ownership concentration.

We believe that this is particularly important because, despite the reduction in the degree of ownership concentration by Brazilian companies in recent years, the degree of ownership concentration still high (Aguiar & Pimentel, 2017; Pinto & Leal, 2013). Thus, considering that higher levels of ownership concentration tend to reduce the pay-performance sensitivity, our second hypothesis is stated as follows:

H_2: Ownership concentration has a negative influence on the pay-performance relationship in Brazilian companies.

3 SAMPLE SELECTION AND RESEARCH DESIGN

3.1 Sample Selection

To test our hypotheses, we use a sample of Brazilian companies listed on B3 with available data between 2010 and 2018. We consider this period for two reasons. First, due to the data availability, since the Brazilian Securities Exchange Commission normative instruction #480 led to the mandatory disclosure of executive compensation data in 2010. Second, due to the mandatory adoption of the International Financial Reporting Standard in Brazil began in 2010, which led to an increase in the accounting information quality (Pelucio-Grecco, Geron, Grecco, & Lima, 2014; Sousa, Sousa, & Demonier, 2016).

In line with previous studies (Ataay, 2018; Cao et al., 2011; Jiang et al., 2009; Kohli, 2018), we exclude financial firms due to their specific financial and operating structures, which provide misleading results regarding the calculation of performance variables. In addition, following Fama and French (1995), we exclude firms with negative equity.

Finally, we exclude firms with no available data in three years' time window to avoid observations that do not capture the time effect (average of observations per group is 6.9). After excluding firms that are missing necessary data, the final sample consists of 1,416 observations of 205 firms in the 2010-2018 period, as shown in Table 1 of the sample selection procedure.

Table 1
Sample selection

	Firms	Observations
Total of Brazilian companies listed on B3	463	4,167
(−) Financial industry firms	(216)	(1,944)
(−) Missing data from executive compensation	(7)	(337)
(−) Missing data from ownership concentration	(12)	(283)
(−) Firms with negative equity	(3)	(158)
(−) Firms with no data in three years' time window	(20)	(29)
(=) Final sample	205	1,416

Source: Elaborated by the authors

We do not require company data in all years in order to avoid survival bias. Thus, our analyses are based on unbalanced data. We require financial data from Thomson Reuters Eikon© and Economatica© databases and executive compensation data from the Brazilian Securities Exchange Commission website. Hence, we obtain the executive compensation data from the Total Remuneration of the Board of Directors section of Reference Form (#13). After data collection, we applied data winsorization at 1% and 99% levels to mitigate the outliers identified through boxplots.

3.2 Research Design

Prior literature posits simultaneous relations between firm performance and executive compensation. On the one hand, the positive influence of firm performance on executive compensation may reduce potential agency conflicts (Ataay, 2018; Cao et al., 2011; Kohli, 2018; Yang et al., 2018). However, on the other hand, executive compensation may act as a mechanism of motivation, stimulating managers to obtain a superior performance (Aguiar & Pimentel, 2017).

To control the simultaneity effect of firm performance and executive compensation, we run the following model using a Generalized Method of Moments IV (IV-GMM) regression:

$$TotComp_{i,t} = \beta_0 + \beta_1 Perf_{i,t} + \beta_2 Owner_{i,t} + \beta_3 Perf\ x\ Owner_{i,t} + \sum_{j=4}^{12} \phi\ Controls_{i,t} + \mu_{i,t}$$

Following Ataay (2018), Kohli (2018) and Michiels et al. (2012), we use Total Compensation (*TotComp*) as a measure for executive compensation. This measure comprises the sum of the logarithms of fixed compensation (salary, benefits, participation and other fixed compensations), variable compensation (bonus, results participation, meetings participation, commissions' participation and other variable compensations), and stock options exercised.

Regarding the firm performance variables (*Perf*), we adopted accounting-

based indicators used by prior studies (Ataay, 2018; Cao et al., 2011; Jiang et al., 2009; Ke et al., 1999; Kohli, 2018; Michiels et al., 2012; Yang et al., 2018). The Return on Equity (*ROE*) is measured by the ratio of net income to total equity, and Return on Assets (*ROA*) is measured by the ratio of net income to total assets.

The reasons to use accounting-based rather than market-based measures of firm performance are twofold. First, accounting-based measures reflect current (and recent past) firm performance, whereas market-based measures reflect investors' perceptions of future firm value (Devers et al., 2007). Second, accounting-based measures are less noisy than market-based measures, being more directly attributable to CEOs as criteria for determining its compensation (Capezio, Shields, & O'Donnell, 2011; Sloan, 1993).

To identify whether controlling shareholders, who often manage the firms that they control, expropriate minority shareholders by increasing the level of their own compensation (Cheung, Stouraitis, & Wong, 2005), we use three different proxies. In line with prior studies, we capture ownership concentration by the percentage of total voting shares of the largest shareholder (*Owner1*), of the three largest shareholders (*Owner3*), and of the five largest shareholders (*Owner5*) (Al-Jaifi, 2017; Earle, Kucsera, & Telegdy, 2005; Shehzad, Haan, & Scholtens, 2010; Yen & André, 2007).

Considering that the ownership concentration may be categorized into three categories: (i) dispersed – equal or lower to 20%, (ii) dominated - above 20% and equal or lower to 50% and, (iii) concentrated - above 50% (Anjos, Tavares, Monte, & Lustosa, 2015), we use a dummy variable to capture ownership concentration levels above 50% of total voting shares. Furthermore, the interaction between performance variables and the three ownership concentration proxies (*Perf x Owner*) aims to examine the moderating effect of ownership concentration on the pay-performance relationship.

In line with Banghøj, Gabrielsen, Petersen and Plenborg (2010) and Michiels et al. (2012), we use leverage (*Lev*) and sales growth (*ΔSales*) as instrumental variables to control the simultaneity between accounting-based performance indicators and executive compensation. The argument supporting the influence of leverage on accounting-based performance indicators considers that an increase in debt will negatively influence on the company's performance due to the income reduction from debt expenses. The inclusion of sales growth is considering that increases in sales should improve profits, whereas this growth generally distributes fixed costs on higher levels of revenues, which results in higher profitability (Brush, Bromiley, & Hendrickx, 2000).

We highlight that our instrumental variables are not correlated with the residuals of the regressions and with the dependent variable (*TotComp*), in line with prior evidence that leverage (Ataay, 2018; Kohli, 2018) and sales growth (Borisova, Salas, & Zagorchev, 2018; Coughlan & Schmidt, 1985) are not statistically associated with executive compensation. Furthermore, we confirm that the instrumental variables are valid and that the structural models are specified correctly through Hansen's J test for overidentifying restrictions.

Regarding the control variables (see Appendix 1 for variable definitions), we control for *BoardSize*, defined as the number of total board members, considering that prior studies show a positive association between board size and executive compensation (Banghøj et al., 2010; Maltocsy, Shan, & Seethamraju, 2012). This

positive influence may be due that larger boards are less effective in controlling management (Maltocsy et al., 2012) since the monitoring capacity is weakened and the actions become more dispersed on larger boards.

We control *FirmSize*, defined as the logarithm of net sales revenue, insofar as larger firms have better conditions to pay higher levels of executive compensation due to the larger volume of business, which results in higher revenues and profits (Sridhar & Kumar, 2015). Finally, in line with prior studies (Cao et al., 2011; Kohli, 2018; Yang et al., 2018), we also include year dummies to control the possible time fixed effect.

Based on the research design and variables presented above, Figure 1 shows our conceptual framework.

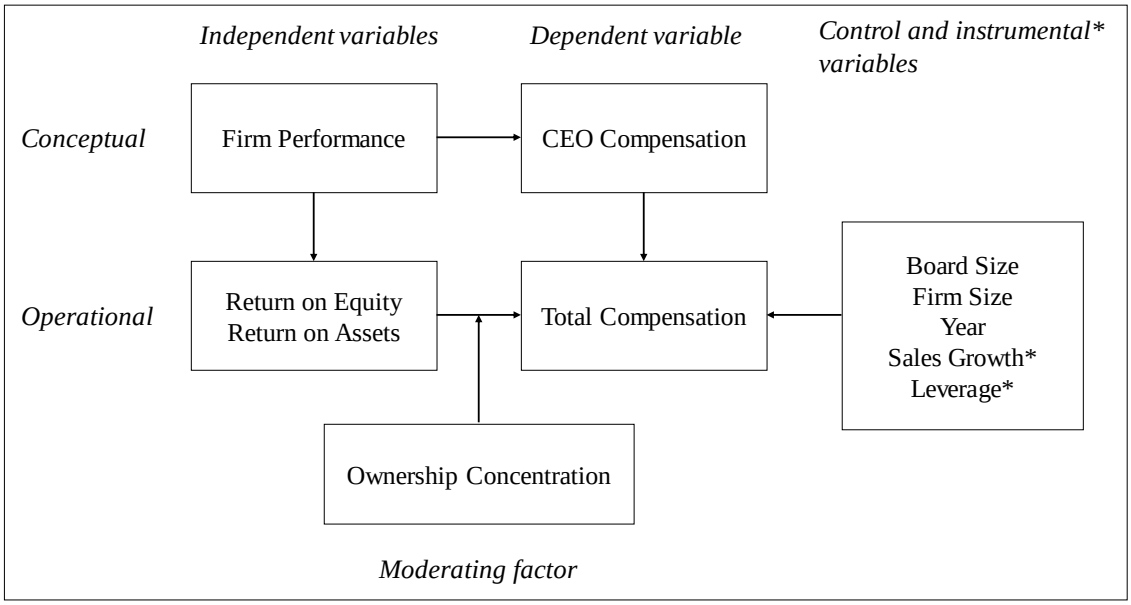

Figure 1. Conceptual Framework
Source: Based on Libby, Bloomfield and Nelson (2002).

The relationship presented above considers that the Firm Performance positively affects the Executive Compensation (which is the pay-performance sensitivity), while the moderating effect of Ownership Concentration negatively affects the pay-performance relationship.

4 RESULTS AND DISCUSSION

4.1 Descriptive Analysis

Table 2 presents a statistical summary of the data. The mean (median) of total compensation is 15.071 (16.061), with a 0.453 standard error. The firm included in our sample with the higher executive compensation level is Ambev, which compensates its executives with fixed and variable compensation, including stock options. The summary statistic also reports that, in an overall way, Brazilian firms are presenting low levels of firm performance since the mean (median) of return on equity (*ROE*) is -0.043 (0.071), whereas the mean (median) of return on assets (*ROA*)

is 0.024 (0.031). This finding could be attributed to the Brazilian economic crisis during 2012-2018, as evidenced by Lopes, Costa, Carvalho and Castro (2016) and Barbosa (2017).

Regarding the ownership concentration, Table 2 shows that the percentage of the largest controlling shareholder (*Owner1*) is 47.4%. However, this percentage increases significantly when we consider the sum of the three (*Owner3*) and five (*Owner5*) largest shareholders, reaching 76.3% and 83.3%, respectively. This ownership concentration level suggests that, although the ownership patterns have been diluted, indicating the first stage of dispersed ownership (Gorga, 2009), the Brazilian scenario still similar to other countries in Latin America, being characterized by a highly concentrated structure with shareholders who hold a predominant role as a manager too. Consequently, they could engage in accounting decisions that reflect personal reasons (Saona & Muro, 2018), such as the misaligning between pay-performance relationship.

Table 2
Descriptive statistics

Variable	Obs.	Mean	Median	Std. Dev.	Min.	Max.
TotComp	1,415	15.908	16.061	1.276	11.097	18.291
ROE	1,415	-0.043	0.071	0.624	-4.276	0.735
ROA	1,415	0.024	0.031	0.086	-0.369	0.222
Owner1	1,415	0.474	0.	0.499	0	1
Owner3	1,415	0.763	1	0.425	0	1
Owner5	1,415	0.833	1	0.372	0	1
ΔSales	1,415	0.094	0.079	0.339	-0.731	2.163
Lev	1,415	0.551	0.573	0.245	-0.362	0.976
FirmSize	1,415	21.959	22.024	1.709	17.713	26.309
BoardSize	1,415	14.803	15	5.453	3	27

Source: Elaborated by the authors. Notes: *TotComp* is measured as the sum of the logarithms of fixed compensation, variable compensation and stock options exercised. *ROE* is the ratio of net income to total equity. *ROA* is the ratio of net income to total assets. *Owner1* is an indicator variable that equals one if the firm has its largest shareholder with more than 50% of voting shares, and zero otherwise. *Owner3* is an indicator variable that equals one if the firm has its three largest shareholders with more than 50% of voting shares, and zero otherwise. *Owner5* is an indicator variable that equals one if the firm has its five largest shareholders with more than 50% of voting shares, and zero otherwise. *ΔSales* is measured as changes in revenues. *Lev* is the ratio of debt to assets. *FirmSize* is the logarithm of total assets. *BoardSize* is the total number of board members.

Table 2 also shows that firms have, on average, low sales increase (*ΔSales*) and moderate leverage levels (*Lev*). However, we cannot infer that the mean (median) average of 0.551 (0.573) is desirable or not considering the importance of analyzing debt quality aspects, such as debt maturity, interest rates, and currency risks, as well as verifying the mean debt ratios of the sectors in which companies are inserted as a comparison parameter (Martins, Miranda, & Diniz (2018). Finally, the *BoardSize* revels that, on average, the firms have 14 members, having the Energy Company of Minas Gerais the largest board size.

4.2 Regression Results

Before equation (1) estimation, which examines the firm performance influence on the executive compensation and the moderating effect of ownership concentration in this relationship, we perform specification tests for multicollinearity, heteroskedasticity, overidentifying restrictions, and presence of endogeneity.

We first perform the Variance Inflation Factor (VIF) test in a Pooled Ordinary Least Square (POLS) model, which suggests that there are no multicollinearity problems across all estimations (all mean VIFs are below 5). Considering the possible endogeneity between firm performance and executive compensation, we perform a Two-Stage Least Squares (IV-2SLS) model, using sales leverage (*Lev*) and sales growth (*ΔSales*) as instrumental variables for *ROE* and *ROA*, following Banghøj et al. (2010) and Michiels et al. (2012).

The Pagan-Hall test for heteroskedasticity in IV-2SLS models leads to rejecting the null hypothesis of homoscedastic residuals across the specifications. We use the Generalized Method of Moments (IV-GMM) regression due to the presence of heteroskedasticity (statistic results are in Table 3 and 4).

Hansen's J test for overidentifying restriction indicates that the structural models were specified correctly and that the instruments are valid, leading not to reject the null hypothesis across all models. However, regarding the test of endogeneity (orthogonality conditions), we do not reject the null hypothesis that *ROA* is exogenous in the models 5 and 6, as shown by the statistic results of endogeneity tests reported in Table 4.

Table 3
Second stage IV-GMM estimations of return on equity models

	TotComp (1)	*TotComp* (2)	*TotComp* (3)
ROE	0.630*** (2.57)	1.229* (1.80)	1.427* (1.74)
Owner1	-0.596*** (-11.33)		
Owner3		-0.787*** (-13.38)	
Owner5			-0.901*** (-13.11)
ROE x Owner1	-0.842** (-2.42)		
ROE x Owner3		-1.291* (-1.74)	
ROE x Owner5			-1.461* (-1.66)
FirmSize	0.316*** (14.64)	0.312*** (14.03)	0.309*** (13.85)
BoardSize	0.055*** (8.03)	0.051*** (7.31)	0.051*** (7.27)
Constant	8.187*** (19.64)	8.642*** (20.08)	8.875*** (20.16)
Year	Included	Included	Included
R2	0.402	0.379	0.368
Wald chi2	956.464***	1126.62***	1150.89***
Mean VIF	1.76	2.16	2.36
Pagan-Hall test	59.223***	24.777***	26.686***
Hansen's J test	0.267	0.228	0.204
Test of endogeneity	3.583**	4.699**	4.349**

Source: Elaborated by the authors. Notes: *TotComp* is measured as the sum of the logarithms of fixed compensation, variable compensation and stock options exercised. *ROE* is the ratio of net income to total equity. *Owner1* is an indicator variable that equals one if the firm has its largest shareholder with more than 50% of voting shares, and zero otherwise. *Owner3* is an indicator variable that equals one if the firm has its three largest shareholders with more than 50% of voting shares, and zero otherwise. *Owner5* is an indicator variable that equals one if the firm has its five largest shareholders with more than 50% of voting shares, and zero otherwise. *FirmSize* is the logarithm of total assets. *BoardSize* is the total board members. Z statistic is reported in parentheses. ***,**,* indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 3 reports the influence of return on equity estimates, instrumented by sales growth and leverage, on executive compensation (*ROE*). In this sense, all three models support the expected positive influence of *ROE* on *TotComp*. However, we find that the statistical significance of this association is susceptible to the control variables included in the model. When we use *Owner1* as a proxy for ownership concentration (model 1), *ROE* is statistically significant at 5%, different from models 2 and 3, in which it is statistically significant at 10%.

This result suggests that executives tend to have higher compensation levels in firms that perform well in terms of profitability. It supports the optimal contracting view that predicts that firm performance has a positive and significant impact on executive compensation, aligning the interests of managers for higher levels of

compensation with the interests of shareholders for better firm performance (Yang et al., 2018).

Our findings contrast with the negative influence of return on equity on executive compensation in the Brazilian context reported by Dani et al. (2017), which investigates 71 firms over the period 2012-2014. Besides that, our results do not converge with the non-significant association reported by Alves and Krauter (2014) and Fernandes and Mazzioni (2015), which examine only 3 and 41 Brazilian firms, respectively.

Nevertheless, we highlight that our results, based on a representative sample for Brazilian public companies (205), are in line with international findings both from emerging (Ataay, 2018; Cao et al., 2011; Kohli, 2018; Yang et al., 2018) and developed capital markets (Ke et al., 1999; Michiels et al., 2012). It shows that executive compensation mechanisms are associated positively with firm performance, reducing potential agency conflicts.

Contrary to the view that controlling shareholders, who often manage the firms that they control, can expropriate minority shareholders by increasing the level of their own compensation (Cheung et al., 2005), our results show negative and significant associations at 1% level between ownership concentration proxies and executive compensation. In addition, our results demonstrate that concentred ownership structures have a negative and significant impact on the pay-performance relationship in Brazilian companies. However, this association is susceptible to the proxies since the statistical significance varies between 5% (model 1) and 10% (models 2 and 3) among the models.

In this sense, our results reveal that the ownership concentration reduces the propensity of tying executive compensation to firm performance since they negatively influence on the pay-performance relationship. This finding is consistent with the view that controlling shareholders may obtain private benefits by setting executive compensation schemes unrelated to the wealth of minority shareholders (Cao et al., 2011; Michiels et al., 2012).

Considering that controlling shareholders often manage the firms they control, they may prefer compensation plans that are not tied to the firm's financial performance to grant higher compensation levels, even when the firm is not profitable in a given period. This fact may also explain that the fixed part of Brazilians executive compensation tends to be larger than the variable part.

Our results corroborate Ataay (2018) and Jiang et al. (2009) findings that the performance sensitivity of compensation is weaker when executives have more control over decisions, especially those related to their compensation.

Table 4 reports robustness tests, using return on assets estimates, instrumented by sales growth and leverage, as a proxy for firm performance (*ROA*). Overall results are consistent with those presented in Table 3, supporting the expected positive influence of *ROA* on *TotComp*, although that *ROA* is statistically significant at 10% on models 5 and 6.

Table 4
Second stage IV-GMM estimations of return on assets models

	TotComp (4)	*TotComp* (5)	*TotComp* (6)
ROA	4.473*** (2.67)	7.672* (1.93)	9.348* (1.69)
Owner1	-0.465*** (-6.28)		
Owner3		-0.558*** (-4.20)	
Owner5			-0.605*** (-3.50)
ROA x Owner1	-4.712** (-2.39)		
ROA x Owner3		-7.327* (-1.77)	
ROA x Owner5			-8.878 (-1.55)
FirmSize	0.318*** (14.87)	0.318*** (14.7)	0.311*** (13.98)
BoardSize	0.055*** (8.00)	0.050*** (7.28)	0.052*** (7.40)
Constant	8.001*** (19.80)	8.283*** (19.90)	8.512*** (0.433)
Year	Included	Included	Included
R2	0.419	0.408	0.389
Wald chi2	997.40***	1155.70***	1160.38***
Mean VIF	1.76	2.08	2.24
Pagan-Hall test	57.731***	36.239***	32.765***
Hansen's J test	0.267	0.136	0.216
Test of endogeneity	3.583**	2.714*	2.438

Source: Elaborated by the authors. Notes: *TotComp* is measured as the sum of the logarithms of fixed compensation, variable compensation and stock options exercised. *ROA* is the ratio of net income to total assets. *Owner1* is an indicator variable that equals one if the firm has its largest shareholder with more than 50% of voting shares, and zero otherwise. *Owner3* is an indicator variable that equals one if the firm has its three largest shareholders with more than 50% of voting shares, and zero otherwise. *Owner5* is an indicator variable that equals one if the firm has its five largest shareholders with more than 50% of voting shares, and zero otherwise. *FirmSize* is the logarithm of total assets. *BoardSize* is the total board members. Z statistic is reported in parentheses. ***,**,* indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

The negative and significant association at a 5% level between the *ROA x Owner1* and the *TotComp*, supports the view that ownership concentration has a negative and significant impact on the pay-performance relationship in Brazilian companies. However, *ROA* does not present the endogeneity problem on models 5 and 6 presented on Table 4. The p-values of the endogeneity test lead to not reject the null hypothesis of exogeneity (statistically significant only at 10% and non-significant, respectively).

Considering that the estimated coefficients may be inefficient when there is no evidence of endogeneity, we perform Ordinary Least Square (OLS) regressions as robustness tests for models 5 and 6, as shown in Table 5.

Regarding the control variables, we find similar results for all models on Tables 4, 5 and 6. The positive influence of *BoardSize* on *TotComp* confirm our predictions that the monitoring capacity is weakened and the actions become dispersed on larger boards, allowing executives to exercise greater influence over their remuneration.

This result corroborates international findings (Banghøj et al., 2010; Maltocsy et al., 2012) but do not converge with prior findings in Brazilian context (Anjos et al., 2015; Cunha, Vogt, & Degenhart, 2016), since they did not find a positive association between board size and executive compensation. However, we highlight that this not convergence may be due that we analyze a larger number of companies, as well as a longer period of time in comparison to those related studies.

Our results also show that *FirmSize* has a positive and significant influence on executive compensation across all estimations, supporting the view that larger firms have better conditions to pay higher levels of executive compensation (Sridhar & Kumar, 2015).

4.3 Additional Tests

To avoid inefficient estimators in models (5) and (6), we perform the specification tests to verify the assumptions of OLS models. Considering that the results of Chow, Breusch-Pagan, and Hausman indicate that the panel model with fixed effects is an adequated model (statistic results are reported in Table 5), we test the presence of heteroskedasticity through the Wald test, which rejects the null hypothesis of homoscedasticity, indicating that robust standard errors are necessary. Aiming to capture the time effect in the fixed effects models (Gujarati & Porter, 2011), we realize the test Parm, which indicates the inclusion of time dummies (two-way model).

Table 5
Ordinary least squares estimations of return on assets models

	TotComp (7)	*TotComp* (8)
ROA	0.295 (0.74)	0.079 (0.16)
Owner3	-0.048 (-0.70)	
Owner5		-.0184* (-1.93)
ROA x Owner3	-0.129 (-0.26)	
ROA x Owner5		0.192 (0.32)
FirmSize	0.405*** (8.12)	0.398*** (4.59)
BoardSize	0.059*** (11.51)	0.059*** (5.04)
Constant	5.998*** (1.077)	6.275*** (3.34)
Year	Included	Included
R2 Overall	0.391	0.404
Prob > F	32.44***	12.81***
Mean VIF	2.08	2.24
Chow test	19.55***	20.11***
Breusch-Pagan test	1903.14***	1986.02***
Hausman test	46.99***	22.92**
Wald test	1.805***	2.905***
Test parm	6.04***	3.03***

Source: Elaborated by the authors. Notes: *TotComp* is measured as the sum of the logarithms of fixed compensation, variable compensation and stock options exercised. *ROA* is the ratio of net income to total assets. *Owner3* is an indicator variable that equals one if the firm has its three largest shareholders with more than 50% of voting shares, and zero otherwise. *Owner5* is an indicator variable that equals one if the firm has its five largest shareholders with more than 50% of voting shares, and zero otherwise. *FirmSize* is the logarithm of total assets. *BoardSize* is the total board members. T-statistic (z statistic) is reported in parentheses. ***,**,* indicate significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Our OLS estimations do not converge with IV-GMM estimations, indicating that there is no significant association between return on assets and executive compensation in models (7) and (8). Due to the non-consistency of statistically significant association between firm performance proxies (*ROE* and *ROA*) and executive compensation (*TotComp*) across all the econometric models (1 to 8), our results not support our first hypothesis (H1), which predicts that firm performance has a positive and significant impact on executive compensation in Brazilian companies.

We also find inconclusive results regarding the moderating effect of ownership concentration on pay-performance sensitivity since the variables *ROA x Owner3* and *ROA x Owner5* are non-significant on models 7 and 8. Based on this evidence, we also reject our second hypothesis (H2) that ownership concentration

has a negative and significant impact on the pay-performance relationship in Brazilian companies.

This non-convergence between OLS and IV-GMM results could be explained through differences between both models, such as the capture of firms' fixed effects. We face a tradeoff in estimating our results through OLS panel data since, although controlling for firms' fixed effects, we do not account for the theoretical simultaneity between executive compensation (*TotComp*) and performance (*ROA*), as discussed by prior literature (Aguiar & Pimentel, 2017). On the other hand, in addition to the dummies that capture year's fixed effects, we do not include firm level dummies to control firms' fixed effects in the IV-GMM models since the inclusion of several dummies could lead to noisy results.

Finally, the coefficients of *FirmSize* and *BoardSize* corroborate previous estimations presented in Tables 3 and 4. They indicate that larger boards allow executives to exercise higher influence over their remuneration (Banghøj et al., 2010; Maltocsy et al., 2012) and that larger firms have better conditions to pay higher levels of executive compensation (Sridhar & Kumar, 2015).

5 CONCLUSIONS

We examine whether the firm performance influences the executive compensation of 205 Brazilian companies listed on B3 and how the ownership concentration moderates this pay-performance relationship. Our main results reveal that Brazilian firms, on average, tie executive compensation to firm performance since the return on equity influence positively and significantly on executive compensation across all the models. However, when we consider the return on assets as a proxy for firm performance, we find inconclusive results, which lead us to reject our first hypothesis that firm performance has a positive and significant impact on executive compensation in Brazilian companies.

Regarding the moderating factor of the ownership concentration in the pay-performance relationship, our results varied among the estimated models. When we use the return on equity as a proxy for the firm's performance, we find that ownership concentration reduces the pay-performance relationship. However, this result is not consistent when we consider the return on assets as a proxy for firm performance, not supporting that ownership concentration has a negative and significant impact on the pay-performance relationship in Brazilian companies across all estimations.

Nevertheless, our overall findings indicate that ownership concentration is weakening the pay-performance sensitivity under certain circumstances. Thus, signaling for current and potential shareholders that they may expect more agency conflicts when investing in firms with high ownership concentration since the executive compensation plans seem to be designed in these companies to increase manager's personal monetary benefits, as predicted by the managerial power view.

This finding highlights the importance of boards in monitoring the design of executive compensation plans that are not reflecting the best practices of corporate governance. In this sense, boards may try to curb practices of misalignment between executives' compensation and firm performance in order to enhance investors' perception towards agency problems, and thus, attracting

new investors or maintaining the current ones.

We consider that the development of the Brazilian capital market may reduce this negative effect of ownership concentration on pay-performance sensitivity. It may occur because, in scenarios with a predominance of firms with dispersed ownership structures, minority shareholders have greater power over compensation design arrangements.

By showing that the ownership concentration structure is an underlying factor that weakens the alignment between executive compensation and firm performance in Brazilian firms, we contribute to the corporate governance literature in the Brazilian context since, to the best of our knowledge, this is the first study to consider that ownership concentration plays a role in pay-performance sensitivity. However, although the contributions made, our paper also has its limitations.

For instance, the non-inclusion of market-based performance measures, such as Tobin's Q and Stock Return. In this sense, we encourage future researches to examine the influence of these variables on executive compensation in Brazilian context, as well as examine alternative proxies of accounting-based performance measures, either based on Generally Accepted Accounting Principles (GAAP) or based on Non-GAAP measures, such as Return on Sales and Earnings Before Interest, Taxes, Depreciation, and Amortization, respectively.

Further studies can also examine other corporate governance (behavioral) moderating factors that may influence the pay-performance sensitivity in Brazilian companies, such as board independence, board interlocking, institutional investors, and CEO duality (CEO overconfidence and CEO personality traits).

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APPENDIX

Appendix A
Variables Definition

Variable	Definition	Source
TotComp	Measure of executive compensation, computed as the sum of the logarithm of fixed compensation, variable compensation and stock options exercised. Fixed compensation is the sum of salary, fixed benefits, fixed participation and other fixed compensations. Variable compensation is the sum of bonus, results participation, meetings participation, commissions participation and other variable compensations.	Hand-collected
ROE	Measure of return on equity, computed as the ratio of net income to total equity.	Thomson Reuters©
ROA	Measure of return on assets, computed as the ratio of net income to total assets.	Thomson Reuters©
Owner1	Measure of ownership concentration, computed as a dummy variable that takes value of 1 if the cumulative percentage of voting shares from the largest shareholder is higher than 50% and zero, otherwise.	Economatica©
Owner3	Measure of ownership concentration, computed as a dummy variable that takes value of 1 if the cumulative percentage of voting shares from the top three shareholders is higher than 50% and zero, otherwise.	Economatica©
Owner5	Measure of ownership concentration, computed as a dummy variable that takes value of 1 if the cumulative percentage of voting shares from the top five shareholders is higher than 50% and zero, otherwise.	Economatica©
ΔSales	Measure of sales growth, computed as the change in net sales scaled by net sales in *t-1*	Thomson Reuters©
Lev	Measured as the ratio of total debt scaled by total assets.	Thomson Reuters©
BoardSize	Measured as the sum of board members.	Hand-collected
FirmSize	Measured as the logarithm of total assets.	Thomson Reuters©

Source: Elaborated by the authors

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1. Idealization and conception of the research subject and theme	✓		
2. Definition of the research problem	✓	✓	
3. Development of Theoretical Platform	✓	✓	
4. Design of the research methodological approach	✓	✓	✓
5. Data collection		✓	
6. Analyses and interpretations of collected data	✓	✓	
7. Research conclusions	✓	✓	✓
8. Critical review of the manuscript	✓	✓	✓
9. Final writing of the manuscript, according to the rules established by the Journal.		✓	
10. Research supervision			✓