Executive Variable Compensation, Earnings Management, and Analysts' Coverage: Empirical Evidence in an Emerging Market

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Abstract

This study analyzes the association between executive variable compensation and earnings management, and what role analysts' coverage plays in such association. We based our empirical analysis in a setting of firms from an emerging economy, providing a critical theoretical discussion about the theme in weak institutional environments. Moreover, we disentangle the executive variable compensation in two different incentives (i.e., short-term and long-term incentives), hence complementing previous literature on both earnings quality and executive compensation. Based on hand-collected data of executive variable compensation of Brazilian public firms, we find empirical evidence that short-term (long-term) executive variable compensation is positively associated (not associated) with earnings management levels. However, such association is dampened in firms with high levels of analyst coverage. Our findings contribute to discussions by major international agencies and governments about the worrying levels of earnings management by firms in emerging markets and the role of analysts in these less developed economies as an important moderating factor for such potential opportunistic practices.

Keywords: analyst coverage, executive compensation, earnings management, emerging markets.

1. Introduction

The Agency Theory argues that different agents related to the firm have divergent interests, causing agency conflicts (Jensen & Meckling, 1976). Therefore, there is a need to adopt corporate governance mechanisms to minimize these problems and align interests. Among these instruments, executive variable compensation stands out (Beuren et al., 2020), since, according to Goergen and Renneboog (2011), executive compensation linked to firm performance is one of the main alternatives to mitigate agent conflicts. However, and although variable compensation is a relevant instrument of corporate governance, when linked to accounting-based performance, variable compensation can have an opposite effect: encourage managers to adopt opportunistic practices to manipulate earnings in order to achieve established goals and obtain personal gains (Assense-Okofo et al., 2021; Buchholz et al., 2020), by using earnings management strategies.

The set of accounting information measurement and disclosure criteria enables managers to adopt certain practices to manage accounting information (Dechow et al., 2010), especially in more fragile institutional environments. Thus, variable compensation incentives can affect the behavior of managers (Gouldman & Victoravich, 2020), given that executives can adopt accounting choices that allow them to obtain more advantages (Moardi et al., 2019), because of the impacts reflected in their remuneration (Feng & Jia, 2021).

In this context, in which internal control mechanisms (such as executive compensation incentives) are not sufficient to contain managerial opportunism and protect the rights of shareholders, Walsh and Seward (1990) alert to the need to incorporate external mechanisms of governance. Among these, there is the monitoring of financial analysts which is a mechanism with characteristics that are different from the usual governance instruments (Degeorge et al., 2013). Analysts have privileged access to the firm's management, which allows them to be effective monitors of the managers' performance, as well as seek to ensure more accurate forecasts of the earnings reported to investors (Chen et al., 2015; Li et al., 2021; Thesing & Velte, 2021). From this perspective, therefore, analysts' coverage may dampen the incentives for managers to engage in earnings management.

Taking those arguments into account, and considering that executive variable compensation linked to accounting-based performance can encourage top management to engage in earnings manipulation to achieve their interests (Assenso-Okofo et al., 2021; Buchholz et al., 2020); and that the monitoring of analysts can mitigate managerial opportunism regarding earnings management practices (Degeorge et al., 2013), this study aims to analyze the moderating effect of analyst coverage on the relationship between executive variable compensation and earnings management.

We base our analysis on a sample of 340 firm-year observations of Brazilian listed firms between 2010 and 2019. We consider the absolute amount of discretionary accruals as a proxy for earnings management. Analyst coverage is measured by the number of analysts who follow the firm, while the executive variable compensation is estimated by the percentage of remuneration for both profit-sharing and share-based compensation. Controlling for a bunch of firm-level characteristics, we find that variable compensation incentives for profit-sharing can induce managers to adopt higher levels of earnings management. Moreover, our results also reveal that the coverage of financial analysts moderates this relationship, mitigating the effect of profit-sharing variable compensation on earnings management in Brazilian firms. However, we do not find any statistical significant association between share-based compensation and earnings manipulation.

This research contributes to the literature in the following ways. First, the study enriches the literature on earnings management determinants in emerging markets, such as Brazil, where

managers have strong incentives to engage in earnings manipulation, due to economic instabilities that affect organizations (Santana *et al.*, 2019) and weak institutional environment (Moura *et al.*, 2020). The application of regulations in countries with less developed economies may not be enough to guarantee investor protection (Ke & Zhang, 2020) and contain managers' propensity to manipulate earnings. In this scenario, other mechanisms, such as the monitoring of analysts, may even be more effective, minimizing the level of earnings management (Okyere et al., 2021) and contributing to the dissemination of better information quality (Shiah-Hou, 2016). Our study contributes to such debate, contributing to the discussion related to the assumptions of the Agency Theory, as it identifies how different mechanisms of corporate governance can impact the level of earnings management, thus influencing agency costs related to monitoring managers.

Second, by disentangling the executive variable compensation in two different incentives (i.e., short-term and long-term incentives), we complement previous literature on both earnings quality and executive compensation by offering a larger picture on the association between the two constructs. Finally, we also contribute specifically to executive compensation literature in emerging markets. The relationship between executive compensation and earnings management has been addressed in several perspectives in the literature (i.e., Assensso-Okofo *et al.*, 2021; Harris *et al.*, 2019; Park, 2019; Thesing & Velte, 2021). In emerging markets, compensation works as one of the main incentives for earnings management (Habbash & Alghamdi, 2015). However, Alhebri *et al.* (2021) state that, in the case of family businesses, this effect can be the opposite. The remuneration of managers can work as a mechanism capable of reducing the level of manipulation of earnings. Moreover, according to Abdelaziz *et al.* (2020), depending on the firm's corporate governance quality, executive compensation can also limit the manipulation of accounting amounts. Thus, studies that address the relationship between executive compensation and earnings management bring inconclusive results. For this reason, we contribute to the literature by identifying the specific effect of executive variable compensation on earnings management and investigating the moderating effect of monitoring analysts on this relationship.

2. Background and Hypotheses

Business relationships can be marked by agency conflicts, as the interests of managers and shareholders or majority and minority shareholders may diverge (Jensen & Meckling, 1976). It is at this core that Jensen and Meckling (1976) model the presuppositions of agency theory, which, according to Eisenhardt (1989), aims to solve the agency problem that arises when the objectives of the principal and the agent come into conflict, implying possible opportunistic actions by the managers.

In this process, information asymmetries can occur (Eisenhardt, 1989), and managers can be encouraged to engage in earnings management strategies in order to produce financial reports that provide a positive description of the business activities and financial position of the firm in order to maximize their own utility (Harris et al., 2019). The practice is intensified in situations where executive variable compensation is calculated based on reported earnings (Gutiérrez et al., 2020).

To solve this agency problem, the literature points out the importance of governance mechanisms, which can reduce the divergence of interests between managers and shareholders and, therefore, limit the manipulation of accounting amounts, improving the quality of financial reports (Mardnly et al., 2021). An important mechanism in such discussion is the board of directors, as it is responsible for protecting the rights of shareholders by overseeing financial disclosures and improving corporate performance (Almutairi & Quttainah, 2020), thus reducing

the risk of earnings management. It is in this context that Saona et al. (2020), for instance, examine how board characteristics determine the opportunistic managerial behavior exemplified in earnings management and provide evidence that larger boards supervise managers more efficiently, thus restricting their ability to manage earnings.

On the other hand, executive directors may be more encouraged to manipulate earnings. The executive board has attributes that ensure an important influence on the firms' decisions (Pucheta-Martínez & Gallego-Álvarez, 2021) – among them, the preparation and disclosure of accounting information. Therefore, managers can adopt accounting choices to obtain more advantages (Moardi et al., 2019), such as increasing personal wealth (Park, 2019) when salary incentives are linked to achieving earnings goals. Thus, due to the agency issue that involves remuneration and alignment, executives can manipulate the reported earnings to achieve the goal established by the shareholders (Kontesa et al., 2021). For this reason, executive compensation is identified as one of the main motivations for earnings management, especially in less developed economies (Habbash & Alghamdi, 2015).

From the above, the literature argues that, in a scenario of high incentives, the board tends to undertake a greater level of earnings management activities (Harris et al., 2019), in which managers can use firm resources and engage in activities to extract benefits at the expense of shareholders (Tosun, 2020). In this way, directors choose to manipulate financial reports to report better earnings performance (Feng & Jia, 2021). Thus, the relationship between executive compensation and earnings management is being increasingly explored, arousing the interest of academia and various stakeholders related to organizations (Dikolli et al., 2021).

Following this perspective, Park (2019) analyzes firms included in the ExecuComp database from 1997 to 2014 to investigate whether executives' compensation from similar firms affects earnings management. The author shows that executive compensation is positively associated with earnings management. Similarly, Harris et al. (2019) empirically demonstrate that directors exhibit very similar earnings management behaviors regardless of gender at higher levels of share-based compensation. Bao et al. (2021) reinforce this problem when they find that directors with higher levels of compensation may be influencing the quality of financial reports to their own benefit. Feng and Jia (2021) investigate the factors that encourage directors to prioritize good managerial information in financial reports and hence using data related to executive compensation, empirically find that executive with high salary performance incentives tends to adopt more earnings management practices. However, even though they show positive associations between executive variable compensation and earnings manipulation, studies show that the characteristics of the board of directors can mitigate these effects (Alhebri et al., 2021) to improve the manager-shareholder alignment and reduce the problem of information asymmetry (Assenso-Okofo et al., 2021). From the above, and considering that the remuneration levels of the board may be associated with earnings management practices, the following research hypothesis emerges:

H1: The executive variable compensation is positively associated with earnings management.

Analysts have an important role in the corporate governance of organizations, as they reduce agency costs arising from monitoring managers (Jensen & Meckling, 1976). Degeorge *et al*. (2013) explain that analysts have characteristics that make it possible to be effective external monitors, such as knowledge to interpret accounting numbers and privileged access to firm management. In addition to contributing to the detection of corporate fraud (Yu, 2008) and acting to reduce information asymmetry between insiders and outsiders (Sun & Liu, 2016).

The literature suggests that analysts significantly influence corporate decisions (Allen *et al*., 2016), including earnings management practices (Cang *et al*., 2014; Degeorge *et al*., 2013; Yu, 2008). According to Rodriguez-Pérez e Hemmen (2010), managers can take advantage of the opacity of accounting information disclosed in financial statements to manipulate accounting information. However, the active participation of financial analysts in the information disclosure process can influence the decision of managers regarding the manipulation (or not) of accounting information (Yu, 2008).

Yu (2008) explains that as analysts regularly monitor the financial statements and interact directly with management on financial reporting, managers would be less motivated to adopt profit manipulation practices, as these information intermediaries help detect misbehavior of managers (Healy & Palepu, 2001). On the other hand, analyst coverage can create excessive pressure on managers to meet earnings forecasts (Cang *et al*., 2014), in view of the reflections on share prices (Graham *et al*., 2005; Yu, 2008), in order to encourage managers to manipulate profits to meet or exceed analysts' forecasts. Thus, Cang *et al*. (2014) assert that, in general, analyst coverage can restrict or encourage earnings management, but that this effect depends on accounting standards, detection of earnings management practices, and the institutional context itself. Therefore, several studies have investigated the relationship between analyst monitoring and accounting earnings management.

Yu (2008) examines the relationship between financial analysts and earnings management strategies. The sample consisted of firms with information available in the I/B/E/S and Compustat databases over 1998-2002. The results show that companies followed by more analysts are less engaged in earnings management. Chen *et al*. (2015) find that managers are involved in more earnings management strategies after companies experience an exogenous loss in analyst coverage. Based on a sample formed by firms from 21 countries over 1994-2002, Degeorge et al. (2013) investigate the relationship between analyst coverage, earnings management, and financial development. The authors found that in countries with high economic growth, the increase in the number of analysts results in a lower level of earnings management. However, in countries with low financial development, this relationship does not occur. Analyzing companies listed on the London Stock Exchange in 2006-2010, Paiva *et al.* (2019) investigate the relationship between the level of earnings management in family and non-family businesses and whether analyst monitoring influences this relationship. The results show that family businesses have higher levels of earnings management, but this effect is more negligible when a significant number of analysts follow them.

Irani and Oesch (2016) examine how financial analysts influence managers' use of different types of earnings management. The authors identify that the reduction in analyst coverage decreases earnings management by operational decisions and increases manipulation by accruals, suggesting that managers use real activities to improve short-term performance in response to pressure exerted by financial analysts.

In less developed information environments, characterized by low investor protection, such as Brazil (Moura *et al*., 2020; Santa & Rezende, 2016), external mechanisms of corporate governance, such as the coverage of analysts, can play a relevant role in monitoring the actions of managers, due to the fragility of the institutional and legal environment in the country (Claessens & Yurtoglu, 2013). Thus, we expect that analyst coverage can inhibit managers' incentives to manipulate profits for personal gains, such as increased compensation linked to accounting results. Accordingly, and based on the theoretical foundation presented, the second research hypothesis is formulated:

H2: *The positive relationship between the executive variable compensation and earnings management is lower in firms with high analysts' coverage.*

Based on the literature presented, Figure 1 presents the theoretical model proposed in this study.

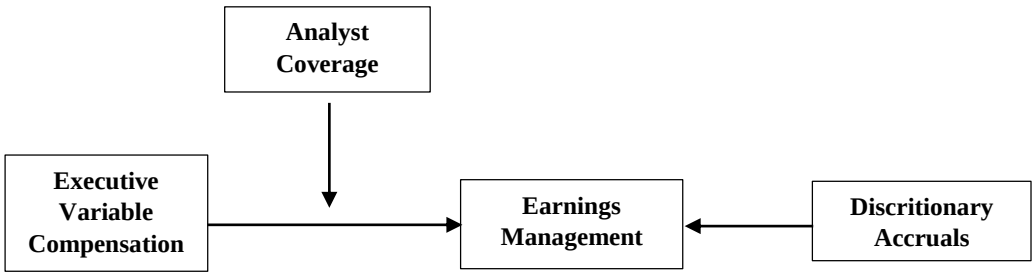

Figure 1 – Theoretical model

3. Research Design

3.1. Sample

The study sample is based on Brazilian listed firms that have shares traded on the IBrX 100. The IBrX 100 is formed by the 100 most tradable and representative stocks in the Brazilian stock market (B3, 2021). The analysis period covers the years between 2010 and 2019, using as data source the reference forms of the firms analyzed, as well as the Compustat database. Financial companies (Standard Industrial Classification [SIC] from 6000 to 6999) and from the public utility sector (SIC from 4400 to 4999) are excluded from the analysis, as widely recommended by the earnings management literature (eg, Kothari et al., 2005; Larson et al., 2018). Finally, after excluding observations without sufficient data to calculate the investigated variables, the final sample is composed of 340 firm-year observations.

3.2. Variables

We consider as a dependent variable the level of earnings management (*Acc EM*) measured by the amount of discretionary accruals, based on the modified Jones model (Dechow *et al*., 1995). The return on assets is inserted as an additional regressor (*ROA*), as well as the percentage of net revenue growth of firms (*Growth*), as suggested by previous accruals-based earnings management literature (e.g., Kothari *et al*., 2005; Larson *et al*., 2018; Lara *et al*., 2020). Thus, we calculate abnormal accruals by estimating Equation (1) in cross-section for industry-year with a minimum of 8 observations. Considering our cross-country design, we also control for country-level variation by including lagged gross domestic product (*GDP*) growth (e.g., Trimble, 2018; Chaney *et al.*, 2011). The absolute values of the estimated residuals from Equation (1) are our discretionary accruals measure, which represents the level of earnings management by each firm-year observation.

$$TA_{it} = \alpha_0 + \beta_1 \frac{1}{Ats_{it-1}} + \beta_2 \frac{(\Delta Sales_{it} - \Delta REC_{it})}{Ats_{it-1}} + \beta_3 \frac{GPPE_{it}}{Ats_{it-1}} + \beta_4 ROA_{it} + \beta_4 Growth_{it} + \varepsilon_{it} \quad (1)$$

where,

$$TA_{it} = \frac{(\Delta CA_{it} - \Delta CL_{it} - \Delta CASH_{it} + \Delta STDEBT_{it} - DEP_{it})}{Ats_{it-1}} \quad (2)$$

where, for each firm *i* in year *t*, *TA* is the total accruals. Δ*CA* is the change in current assets for each firm i from year *t*-1 to year *t*. Δ*CL* is the change in current liabilities. Δ*CASH* is the change in total cash reserve. Δ*STDEBT* is the change in the short-term debt. *DEP* is the amount of depreciation expenses. *Ats* is the total assets. Δ*Sales* is the change in the revenues. Δ*Rec* is the change in the accounts receivable. *GPPE* is the gross amount of property, plant, and equipment. *ROA* is the net income before extraordinary items scaled to total assets. *GROWTH* is the change in the annual revenues scaled by previous year's revenues.

As independent variables, we consider the percentage of executive variable compensation (*Comp_Variable*). In this sense, two variables are considered in the analysis of variable compensation: the percentage of compensation of profit-sharing (*Profit-Sharing Compensation*), as well as the percentage of share-based compensation related to the total compensation of the directors (*Share-Based Compensation*). Thus, we expect to increase the proposed discussion by inferring both a shorter-term variable remuneration (i.e., profit-sharing) and a long-term (i.e., share-based) compensation. We hand-collect data on variable compensation in the Reference Form[1] of the firms. Finally, the number of analysts (*Analysts*) who monitor firms are also considered as an independent variable, been such information obtained from the I/B/E/S database.

3.3. Models

In order to investigate whether there is a positive association between variable remuneration and earnings management by accruals (H1), Equation 3 is estimated:

$$ACC\ EM_{it} = \alpha_0 + \beta_1 Comp\_Variable_{it} + \gamma \sum Controls + \varepsilon \quad (3)$$

where, for each firm *i* in the year *t*, *ACC EM* is the earnings management based on discretionary accruals. *Com_Variable* is the executive variable compensation represented both by the percentage of compensation of profit-sharing (*Profit-Sharing Compensation*), as well as the percentage of share-based compensation concerning the total compensation of the directors (*Share-Based Compensation*).

Based on the theoretical argument presented, it is expected that the coefficient of the variable *Comp_Variable* – either captured by the percentage of compensation of profit-sharing (*Profit-Sharing Compensation*), as well as the percentage of share-based compensation concerning the total compensation of the directors (*Share-Based Compensation*) – to be significantly positive, suggesting a positive association between variable compensation and earnings management by accruals. In addition to the variables mentioned, based on previous earnings management literature (e.g. Black *et al*., 2017; Gray *et al*., 2015; Lara *et al.*, 2020; Osma, 2020; Trimble, 2018), we additionally consider a vector of control variables in our estimations (*Controls*). Table 1 presents the control variables and their definitions.

[1] Reference Form is an electronic document, of periodic referral, regulated by the Brazilian Securities Commission, containing important information about firms such as operational activities, risk factors, managers, capital structure, financial data, issued securities, among others.

Furthermore, in order to investigate whether the positive association between variable compensation and earnings management by accruals is lower in firms with higher coverage of analysts (H2), Equation 4 are estimated as follow:

$$ACC\ EM_{it} = \alpha_0 + \beta_1 Comp\_Variable_{it} + \beta_2 Comp\_Variable_{it}\ x\ Analysts_{it} + \gamma \sum Controls + \varepsilon \quad (4)$$

where, for each company *i* in year *t*, *Analysts* is the number of analysts who follow the companies. All other variables as previous mentioned.

Table 1. Variable's definition

Acc EM	is the accruals-based earnings management.
Analysts	is the number of analysts.
Profit-Sharing Compensation (*Share-Based Compensation*)	is the percentage of total executive variable compensation related to profit-sharing (share-based).
Size	is the natural logarithm of total assets.
Profitability	is the ratio between net income and total assets.
Debt	is the total debt scaled by total assets.
Growth	is the percentage of sales growth from period t-1 to t.
Dissue	is the percentage of total liability growth from period t-1 to t.
Eissue	is the percentage of growth in equity from period t-1 to t.
Big Four	is a dummy variable which assumes the value 1 for firms audited by the Big 4 auditors (i.e., PwC, KPMG, E&Y and Deloitte), and zero otherwise.
Litigation	is a dummy variable which assumes the value 1 for firms from industries with a high probability of litigation (i.e., SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370), and zero otherwise.
Loss	is a dummy variable which assume the value 1 for firms with negative net income, and zero otherwise.

In Equation 4, based on the theory presented, we expect that the variable *Comp_Variable* to be significantly positive, and that the interaction term *Comp_Variable* x *Analysts* to be significantly negative, suggesting that greater coverage of analysts dampen the positive association between variable remuneration and earnings management by accruals.

Equations 3 and 4 are estimated using the method of ordinary least squares (MQO), by considering both industry- and year-fixed effects. To adjust for possible cross-sectional and serial correlations, standard errors are adjusted by clusters at the firm-level (Petersen, 2009). All continuous variables are winsorized between 1% and 99%. Finally, we also follow Chen *et al.* (2018) instructions regarding potential problems of biased coefficients and standard errors that can lead to incorrect inferences, both with Type I and Type II errors, in the traditional accrual estimation process. Specifically, all independent variables from Equation 1 are included as a control variable in both Equations (3) and (4). However, the results are robust without this adjustment.

4. Results

4.1. Descriptive analysis

Table 2 presents the descriptive analysis of the dependent and independent variables. The results demonstrate that the level of discretionary accruals (*Acc EM*) is, on average, 0.0010, indicating that Brazilian firms have been using earnings management strategies to increase earnings, converging with the findings of Santana *et al*. (2019). Moreover, on average, the number of analysts who follow the firms in the sample is around 9, value lower than found by Novaes *et al*. (2018) (11,70). Fan *et al.* (2021) explain that the high coverage of analysts helps in the effective monitoring carried out by the board of directors to minimize the initiatives of manipulation of earnings, thus functioning as an important external mechanism of corporate governance.

We also note that the variable compensation for profit-sharing (*Profit-Sharing Compensation*) (linked to a more short-term view) and share-based remuneration (*Share-Based Compensation*) (linked to a more tong-term view) represent, on average, respectively, 13.67% and 18.29% of the total executive compensation of the board. To Beuren *et al.* (2020), short-term variable compensation can have a greater effect on corporate performance and on the investment policy of the firm, and, therefore, requires special attention, as there is evidence that high levels of variable compensation can induce managers to get involved in earnings management strategies (Dikolli *et al.*, 2020). Finally, we also find 94% of firms in the sample, on average, are audited by the Big Four auditor (*Big Four*), 31.76% operate in industries with high probability of litigation and only 21.47% presented negative profits in the period of analysis.

Table 2. Descriptive statistics

Variables	N	Mean	p25	p50	p75	SD
Acc EM	340	0.0010	-0.0351	0.0024	0.0344	0.0582
Analysts	340	9.5235	7.0000	10.0000	13.0000	4.5625
Profit-Sharing Compensation	340	0.1367	0.0000	0.0000	0.2660	0.1721
Share-Based Compensation	340	0.1829	0.0000	0.1360	0.2807	0.1944
Size	340	9.4761	8.2992	9.4639	10.4645	1.4907
Profitability	340	0.0384	0.0034	0.0298	0.0731	0.0576
Debt	340	0.2569	0.1108	0.2460	0.3770	0.1691
Growth	340	0.1296	0.0216	0.1077	0.1889	0.2354
Dissue	340	0.1895	-0.0333	0.1106	0.3148	0.4316
Eissue	340	0.1865	-0.0078	0.0725	0.1679	0.5611
Big Four	340	0.9294	—	—	—	—
Litigation	340	0.3176	—	—	—	—
Loss	340	0.2147	—	—	—	—

Acc EM is the accruals-based earnings management. *Analysts* is the number of analysts. *Profit-Sharing Compensation* (*Share-Based Compensation*) is the percentage of total executive variable compensation related to profit-sharing (share-based). *Size* is the natural logarithm of total assets. *Profitability* is the ratio between net income and total assets. *Debt* is the total debt scaled by total assets. *Growth* is the percentage of sales growth from period *t*-1 to *t*. *Issue* is the percentage of total liability growth from period *t*-1 to *t*. *Eissue* is the percentage of growth in equity from period *t*-1 to *t*. *Big Four* is a dummy variable which assumes the value 1 for firms audited by the Big 4 auditors (i.e., PwC, KPMG, E&Y and Deloitte), and zero otherwise. *Litigation* is a dummy variable which assumes the value 1 for firms from industries with a high probability of litigation (i.e., SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370), and zero otherwise. *Loss* is a dummy variable which assume the value 1 for firms with negative net income, and zero otherwise.

Table 3 shows the correlation analysis of the variables adopted in the study. We find that earnings management level is positively and significantly correlated with profitability and *Eissue* (growth of equity). In addition, it is noted that remuneration for profit sharing and remuneration based on shares are positively correlated with the profitability of companies. It is

also observed that the highest correlation between the research variables is approximately 47% (profitability and debt), which mitigates possible problems of multicollinearity in the analyzes performed.

Table 3. Correlation matrix

		1.	***2.***	***3.***	***4.***	***5.***	***6.***
1.	*Acc EM*	—					
2.	*Analysts*	0.0322	—				
3.	*Profit-Sharing Compensation*	0.0641	0.0145	—			
4.	*Share-Based Compensation*	-0.0146	0.148**	-0.195***	—		
5.	*Size*	-0.0079	0.142**	0.0866	-0.0486	—	
6.	*Profitability*	0.142**	0.0111	0.131*	0.162**	-0.296***	—
7.	*Debt*	-0.0863	0.121*	0.0143	-0.246***	0.315***	-0.474***
8.	*Growth*	0.0376	-0.123*	0.0900	0.0346	-0.121*	0.0993
9.	*Dissue*	-0.0209	-0.0995	-0.0440	0.0719	-0.0933	-0.0194
10.	*Eissue*	0.198***	-0.0615	0.0497	0.109*	-0.120*	0.1010
11.	*Big Four*	0.0345	-0.0213	-0.0689	0.207***	-0.108*	0.184***
12.	*Litigation*	0.0083	0.0700	0.0151	0.118*	-0.264***	-0.0592
13.	*Loss*	-0.165**	0.0673	-0.167**	-0.0046	0.169**	-0.642***
		7.	***8.***	***9.***	***10.***	***11.***	***12.***
7.	*Debt*	—					
8.	*Growth*	-0.0007	—				
9.	*Dissue*	-0.0833	0.322***	—			
10.	*Eissue*	-0.0886	0.312***	0.309***	—		
11.	*Big Four*	-0.300***	-0.0611	-0.0531	0.0720	—	
12.	*Litigation*	-0.257***	-0.0050	-0.0192	0.124*	0.188***	—
13.	*Loss*	0.265***	-0.183***	-0.0367	-0.152**	-0.136*	-0.0183

Acc EM is the accruals-based earnings management. *Analysts* is the number of analysts. *Profit-Sharing Compensation* (*Share-Based Compensation*) is the percentage of total executive variable compensation related to profit-sharing (share-based). *Size* is the natural logarithm of total assets. *Profitability* is the ratio between net income and total assets. *Debt* is the total debt scaled by total assets. *Growth* is the percentage of sales growth from period *t*-1 to *t*. *Issue* is the percentage of total liability growth from period *t*-1 to *t. Eissue* is the percentage of growth in equity from period *t*-1 to *t. Big Four* is a dummy variable which assumes the value 1 for firms audited by the Big 4 auditors (i.e., PwC, KPMG, E&Y and Deloitte), and zero otherwise. *Litigation* is a dummy variable which assumes the value 1 for firms from industries with a high probability of litigation (i.e., SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370), and zero otherwise. *Loss* is a dummy variable which assume the value 1 for firms with negative net income, and zero otherwise. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

4.2. Regression analysis

Table 4 presents the estimates of Equations (3) and (4) in order to test the association between the executive variable compensation and earnings management, as well as the moderating effect of analyst coverage on this relationship, respectively. The results of the estimates consistently indicate a positive and significant coefficient between variable compensation based on the percentage of compensation of profit-sharing (*Profit-Sharing Compensation*) and earnings management by accruals. This result suggests that short-term variable compensation incentives (i.e., profit-sharing) can possibly lead executives to engage in income-increasing accruals-based earnings management in order to achieve performance goals and then personal gains. Those findings are aligned to Park (2019) e Bao *et al*. (2021).

However, no significant relationship is identified between long-term variable compensation (*Share-Based Compensation*) and earnings management. Wang and Xiao (2011) explain that in environments with a high concentration of ownership and that the fundamental agency problem is type II (external investors and controlling shareholders), as in the Brazilian

corporate environment, business performance may not be decisive for the payment of share-based compensation; which, in a way, would not induce managers to adopt earnings manipulation practices to obtain this type of remuneration.

Table 4. Executive variable compensation, earnings management, and analysts' coverage

	Profit-Sharing Compensation			**Share-Based Compensation**		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.029	0.035	-0.021	0.032	0.041	-0.016
	(0.63)	(0.72)	(-0.46)	(0.75)	(0.92)	(-0.35)
Profit-Sharing Compensation	0.080**	0.094***	0.062*	—	—	—
	(2.30)	(2.86)	(1.65)			
Profit-Sharing Compensation x Analysts	-0.006*	-0.007**	-0.003	—	—	—
	(-1.88)	(-2.17)	(-0.84)			
Share-Based Compensation	—	—	—	0.003	-0.009	-0.019
				(0.08)	(-0.25)	(-0.54)
Share-Based Compensation x Analysts	—	—	—	-0.002	-0.001	-0.001
				(-0.60)	(-0.34)	(-0.29)
Analysts	0.001	0.001	0.002**	0.001	0.001	0.001
	(0.78)	(1.42)	(2.36)	(0.82)	(1.63)	(1.31)
Size	—	0.001	0.001	—	0.000	0.000
		(0.19)	(0.15)		(0.10)	(0.12)
Profitability	—	0.714***	0.743**	—	0.715**	0.713**
		(4.97)	(5.04)		(5.05)	(5.02)
Debt	—	0.025	0.029	—	0.018	0.017
		(0.96)	(1.13)		(0.71)	(0.66)
Growth	—	0.259***	0.252**	—	0.260**	0.260**
		(4.12)	(4.27)		(4.09)	(4.06)
Dissue	—	-0.013	-0.013	—	-0.013	-0.014
		(-1.20)	(-1.18)		(-1.15)	(-1.14)
Eissue	—	0.032***	0.033**	—	0.033**	0.033**
		(3.93)	(4.19)		(3.84)	(3.84)
Big Four	—	-0.019	-0.023*	—	-0.021	-0.021
		(-1.56)	(-1.74)		(-1.63)	(-1.65)
Litigation	—	-0.006	-0.003	—	-0.004	-0.005
		(-0.42)	(-0.25)		(-0.32)	(-0.37)
Loss	—	-0.004	-0.004	—	-0.004	-0.004
		(-0.47)	(-0.42)		(-0.45)	(-0.47)
Year Fixed-Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry Fixed-Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Chen's *et al*. (2018) correction	*No*	*Yes*	*Yes*	*No*	*Sim*	*Yes*
Observations	340	340	340	340	340	340
R-squared	0.0136	0.2614	0.2679	0.0079	0.2577	0.2580

Acc EM is the accruals-based earnings management. *Analysts* is the number of analysts. *Profit-Sharing Compensation* (*Share-Based Compensation*) is the percentage of total executive variable compensation related to profit-sharing (share-based). *Size* is the natural logarithm of total assets. *Profitability* is the ratio between net income and total assets. *Debt* is the total debt scaled by total assets. *Growth* is the percentage of sales growth from period *t*-1 to *t*. *Issue* is the percentage of total liability growth from period *t*-1 to *t*. *Eissue* is the percentage of growth in equity from period *t*-1 to *t*. *Big Four* is a dummy variable which assumes the value 1 for firms audited by the Big 4 auditors (i.e., PwC, KPMG, E&Y and Deloitte), and zero otherwise. *Litigation* is a dummy variable which assumes the value 1 for firms from industries with a high probability of litigation (i.e., SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370), and zero otherwise. *Loss* is a dummy variable which assume the value 1 for firms with negative net income, and zero otherwise. The *t*-statistics are in parentheses and are calculated using robust standard errors. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

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We also find that the interaction term between the variable compensation for profit-sharing and the coverage of analysts (*Profit-Sharing Compensation x Analysts*) presents a negative and significant coefficient, suggesting that the monitoring of analysts moderates the relationship between short-term remuneration incentives and earnings management by accruals.

Moreover, we also identify that the coefficient of the interaction term between share-based compensation and the coverage of analysts (*Shared-Based Compensation x Analysts*) is not significant at conventional levels, suggesting that the monitoring of analysts does not moderate the relationship between long-term remuneration incentives and earnings management by accruals.

We suspect, therefore, that when firms are monitored by financial analysts, in other words, when there is greater external monitoring of senior management actions, managers are less motivated to adopt earnings manipulation strategies to increase their variable compensation. Thus, analyst coverage seems to inhibit managerial opportunism resulting from earnings management practices, with the objective of obtaining private gains (i.e., Yu, 2008; Paiva *et al*., 2019; Sun, 2018). However, this moderating role of analysts seems to be important only concerning to short-term remuneration incentives.

Finally, regarding control variables, we also find empirical evidence that managers from more profitable (*Profitability*), highly growth (*Growth*), and firms that high changes in equity (*Eissue*) seem to be associated with more executive variable compensations, both profit-sharing and share-based one.

In order to complement our main empirical results, we additionally investigate the marginal effects of profit-sharing compensation on earnings management. Figure 2 plots the marginal effect of *Profit-Sharing Compensation* on *Acc EM*. The shaded area around the lines indicates the 95% confidence interval. We observe that as the percentage of profit-sharing compensation grows, their effect on earnings management also increases. In the current case, a change in profit-sharing from 0 to 100%, for instance, makes the marginal effects at the means on earnings management goes from -0.0028 zero to 0.0249 – an increment of around 2.78%. These results indicate the economic significance of the harmful effects of compensation as a trigger for managers to engage in earnings management practices in Brazilian firms.

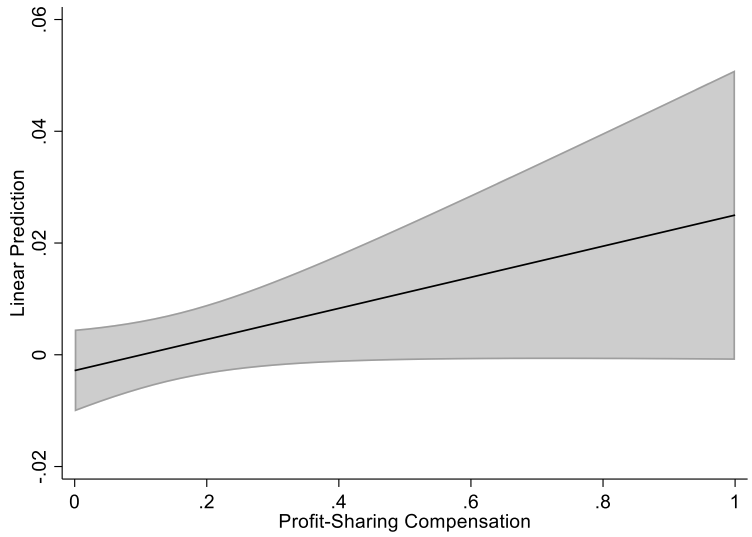

Figure 2 – Marginal effect: Profit-sharing compensation and earnings management

From the same perspective, we also create a dummy variable which assumes 1 for firm-year observations with a high number of analysts, based on the median of analysts throughout the whole sample (i.e. *HighAnalysts*), and zero, otherwise. Then, we plot the marginal effects of profit-sharing compensation on earnings management, by each of those two groups of firms (i.e. high-analysts' coverage *versus* low-analysts coverage). Figure 3 plots the marginal effect

of both *Profit-Sharing Compensation* on *Acc EM*, by considering the group of firms with high (i.e. *HighAnalysts* = 1), and low analysts coverage (i.e. *HighAnalysts* = 0). The shaded area around the lines indicates the 95% confidence interval. On the one hand, in the case of firms with high-analysts' coverage (i.e. *HighAnalysts* = 1), a change in profit-sharing from 0 to 100%, makes the marginal effects at the means on earnings management goes from 0.0040 zero to 0.0026 – an tiny reduction of around 0.01%. On the other hand, in the case of firms with low-analysts' coverage (i.e. *HighAnalysts* = 0), a change in profit-sharing from 0 to 100%, makes the marginal effects at the means on earnings management goes from -0.0089 zero to 0.0472 – an increment of around 5.61%. These results suggest a small economic significance of analysts' coverage to dampen the harmful effects of executive variable compensation on earnings management practices in Brazilian public firms.

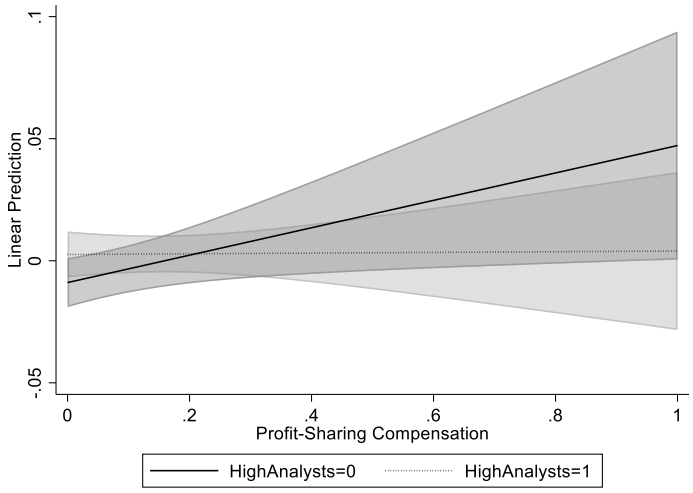

Figure 3 – Marginal effect: Profit-sharing compensation, earnings management and analysts' coverage

Based on such analyses, therefore, our empirical findings confirm the research hypotheses, since a positive association is identified between variable compensation and earnings management (H1 is not rejected) – even though regarding only profit-sharing compensation – and that this relationship is lower with the coverage of financial analysts (H2 is not rejected). In emerging markets like Brazil, where there are institutional weaknesses (Moura *et al*., 2020) and low investor protection (Santa & Rezende, 2016), weak external monitoring can be seen by managers as a favorable environment for opportunistic actions. However, the coverage of financial analysts can play a relevant role in this scenario, in order to inhibit managerial opportunism, such as earnings manipulation practices, which, therefore, would reduce agency costs arising from monitoring the actions of managers (Jensen & Meckling, 1976; Sun, 2018).

In order to check the robustness of our findings, sensitivity tests are performed using three alternative models for estimating discretionary accruals. More specifically, discretionary accruals are estimated based on the modified Jones model (Dechow *et al*., 1995), without any additional control variables (*GR_a1*); taking into account the modified Jones model (Dechow *et al*., 1995) and additionally including the firm's performance (i.e., ROA), based on Kothari *et al*. (2005) (*GR_a2*); and taking into account the modified Jones model (Dechow *et al*., 1995) and additionally including lagged accruals (Dechow *et al*., 2012) (*GR_a3*). Table 5 presents the results of the robustness tests.

Table 5. Robusteness tests

	Profit-Sharing Compensation			Share-Based Compensation		
	(1)	(2)	(3)	(1)	(2)	(3)
	EM_a1	*EM_a2*	*EM_a3*	*EM_a1*	*EM_a2*	*EM_a3*
Intercept	0.029	0.035	-0.021	0.032	0.041	-0.016
	(0.63)	(0.72)	(-0.46)	(0.75)	(0.92)	(-0.35)
Profit-Sharing Compensation	0.080**	0.094***	0.062*	—	—	—
	(2.30)	(2.86)	(1.65)			
Profit-Sharing Compensation x Analysts	-0.006*	-0.007**	-0.003	—	—	—
	(-1.88)	(-2.17)	(-0.84)			
Share-Based Compensation	—	—	—	0.003	-0.009	-0.019
				(0.08)	(-0.25)	(-0.54)
Share-Based Compensation x Analysts	—	—	—	-0.002	-0.001	-0.001
				(-0.60)	(-0.34)	(-0.29)
Control Variables	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year Fixed-Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Industry Fixed-Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Chen's *et al*. (2018) correction	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	340	340	298	340	340	298
R-squared	0.2688	0.2657	0.2735	0.2621	0.2557	0.2721

Acc EM is the accruals-based earnings management. *Analysts* is the number of analysts. *Profit-Sharing Compensation* (*Share-Based Compensation*) is the percentage of total executive variable compensation related to profit-sharing (share-based). Control variables as defined in Table 1. The *t*-statistics are in parentheses and are calculated using robust standard errors. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

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The results confirm the findings of our principal analysis (see Table 4), considering that the coefficient of the variable *Profit-Sharing Compensation* is positive and significant in the three models; and no significant relationship is identified between share-based compensation and the level of discretionary accruals. In addition, we also confirm that the analyst's coverage moderates, in a negative and statistically significant way, the relationship between variable compensation for profit-sharing (short-term compensation view) and earnings management.

Taking those results together, our findings overall demonstrate that different corporate governance mechanisms can affect earnings management tactics. While short-term variable remuneration is perceived as a stimulus to managers to manipulate earnings, the coverage of financial analysts can act to reduce such opportunistic practices. Thus, aspects of agency theory are reinforced in our analysis, considering that firms with more aggravating agency problems may be more exposed to opportunistic management practices, requiring the adoption of strong monitoring mechanisms to minimize these effects, such as the coverage of financial analysts, as effective in mitigating earnings manipulation practices, especially in weaker institutional environments, typically associated to emerging economies, such as in Brazil.

5. Conclusion

Our study investigates the moderating effect of analyst coverage on the relationship between the variable remuneration of the board and earnings management. The research sample gathers Brazilian listed firms between 2010 and 2019. The results of the estimated regression models suggest a positive and significant association between variable compensation for profit sharing and earnings management by accruals, suggesting that short-term variable compensation can encourage executives to adopt earnings management practices. The results also point out that the coverage of financial analysts moderates this relationship in the sense of mitigating the effect of variable remuneration on managerial opportunism through income-increasing accruals-based earnings management.

In the theoretical field, this study contributes to the literature on the determinants that can influence earnings management in organizations in emerging markets, such as Brazil. In addition, the results of this study reinforce the assumptions of the Agency Theory, as different mechanisms of corporate governance (variable compensation incentives and the coverage of financial analysts) are identified as encouraging or restricting the adoption of oportunisitic strategies by managers, thus influencing agency costs related to monitoring the actions of managers regarding the quality of accounting information.

The study also contributes to the development of the Brazilian stock market. Accounting information is essential for the proper functioning of the capital market (Healy & Palepu, 2001). Therefore, the findings of this research, as it identifies how some mechanisms can improve the quality of financial reports and reduce managerial opportunism, can help regulators in the design and implementation of public policies aimed at both improving the quality of information disclosed by organizations and promoting a more robust governance environment to attract investors. Finally, the results shown here may interest investors regarding the decision to invest in companies with stronger governance mechanisms, since it was possible to observe the relevance of the role of financial analysts in monitoring the actions of top management and to minimize the problems of information asymmetry.

Future studies could also be interested in investigating whether firms with different types of ownership structure (family, institutional, state, etc.) adopt higher levels (or not) of earnings management and how the coverage of analysts influences this relationship. It is also suggested to use other earnings management metrics and analyze these constructs in other financial markets, as countries' institutional characteristics can influence the relationship between compensation incentives and earnings manipulation practices, including comparative analyses.

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