XXIV SEMEAD
Seminários em Administração

novembro de 2021
ISSN 2177-3866

Executive compensation, sustainable compensation policy, carbon disclosure and dividends payments: An analysis of their relationships in Brazilian firms

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Agradecimento à orgão de fomento:
Agradecimento à CAPES

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1 Introduction

In recent years, companies have faced pressure for more disclosure of climate change strategies, like plans to reduce greenhouse gas emissions (Alsaifi et al., 2020) which play an important role in issues like climate change and global warming (Velte et al., 2020). This pressure is driven by various stakeholders concerned about physical risks to infrastructure and potential regulations that threaten climate change (Borghei, 2021). In this context, carbon disclosure is becoming management tool to achieve a transition to a low carbon economy and to manage firms (Caby et al., 2020). Thus, setting carbon reduction targets is a crucial step to developing climate change strategies (Shen et al., 2020).

Sustainability provides competitive advantage and can ensure corporate economic survival (Ali et al., 2021) being a strategic choice to increase the image, competitive advantage, and firm value (Sheikh et al., 2021). Companies committed to corporate environmental issues attract consumers who support environmental causes, resulting in positive financial returns, which enhances the company's ability to pay dividends (Saeed & Zamir, 2020). A dividend is the portion of profits that is distributed to the company's shareholders in accordance with the company's dividend policy and provide instructions on the frequency and amount paid by the company (Sheikh et al., 2021) and dividends are the most common payment device in the corporate world (Benlemlih, 2014). Dividend payments are usually related to the company's financial performance because an increase in dividend payments indicates better firm performance (Hasan & Habib, 2020). Moreover, dividends can signal to investors the company's long-term profitability and play an important role in the agency conflict between shareholders and managers by signaling the status of the firm (R.-S. Wu & Wu, 2020).

Compensation should be structured with incentives that increase shareholder value, discouraging executives' opportunistic behavior (Dias et al., 2020) and shareholders of modern companies are failing to monitor executive directors because of the lack of resources and skills (Lovett et al., 2021). Executive compensation contracts should be made in a way that aligns the interests of managers and shareholders (Bouteska & Mefteh-Wali, 2021) and is an important mechanism to mitigate the agency conflict between shareholders and managers, because it provides managers with incentives to maximize the shareholders' interests (Zoghlami, 2021). Therefore, executive compensation is a corporate governance mechanism that the firm designs to alleviate agency conflicts (Erkan & Nguyen, 2021).

Society is demanding an overhaul of corporate governance and executive compensation structures, and it is inevitable that in the "new normal of work," companies will develop sustainable businesses with sustainable compensation structures (Eklund, 2021). In this line, companies are gradually linking the compensation of their executive directors to sustainability-related aspects, with the inclusion of environmental goals among the non-financial goals desired by the organizations (Winschel, 2021). Alignment of interests between managers and stakeholders can be achieved through sustainable compensation systems (Velte, 2021) and the formulation of sustainable compensation policies, the participation of the company's external stakeholders is necessary, as they are benefit providers (Piwowar-Sulej, 2021). Companies tend to adopt a sustainable compensation policy to motivate their employees to develop innovative products that can mitigate carbon emissions, so a sustainable compensation policy seems to get powerful executives to address environmental issues such as carbon initiatives and greenhouse gas emissions (Haque, 2017).

Previous studies have shown the influence of social and environmental aspects on dividend payments (Benlemlih, 2014; Sheikh et al., 2021; Trihermanto & Nainggolan, 2018)

and the effect of executive compensation (Jeff Boakye et al., 2020; Zoghlami, 2021) and environmental performance (Francoeur et al., 2021; Kartadjumena & Rodgers, 2019). Previous studies also show the positive influence of executive compensation on environmental issues (Francoeur et al., 2021; Kartadjumena & Rodgers, 2019; Maas, 2018) and that sustainable compensation policy positively moderates executive compensation with environmental aspects (Berrone & Gomez-Mejia, 2009; Haque & Ntim, 2020). Thus, considering the empirical evidence, the study expands the debate on the relationship between dividends payment, carbon disclosure, executive compensation and sustainable compensation policy by examining the following research questions: (1) To what extent does carbon disclosure influence dividend payment? (2) To what extent does executive compensation moderate carbon disclosure - dividends payments nexus? (3) To what extent does executive compensation influence carbon disclosure? and (4) To what extent does sustainable compensation policy moderate executive compensation - carbon disclosure nexus? We used agency theory in the paper. Agency theory addresses the conflicts of interest between shareholders (principals) and managers (agents) arising from the separation of ownership and control (Tibiletti et al., 2021) and to motivate managers (agents) to perform actions that meet the interests of shareholders (principals), the board of directors, taking into account the interests of shareholders, prepares compensation agreements aimed at reducing agency conflicts (Pepper, 2021).

Our study contributes to the literature on carbon disclosure, executive compensation and dividends in a number of important ways. First, in recent years, Brazil's carbon emissions have been increasing steadily, from 327,983.8 kilotonnes (kt) to 533,530.2 kt in 2014, and to maintain development goals without negatively affecting economic activities, Brazil must reduce its total greenhouse gas emissions by 37% (Adebayo et al., 2021) and the projections of GHG emissions in the country were revised upwards, reflecting the increasing trend in the deforestation rate (United Nations Environment Programme, 2019). Thus, the research about the carbon disclosure in Brazilian companies is relevant. Second, the study extends the literature by quantitatively examining the relationship between carbon disclosure, dividend payments, executive compensation, and sustainable compensation policies. Third, The study creates a carbon disclosure index based on (Haque & Ntim, 2020). And finally, COVID-19 pandemic has affected countless businesses in a profound way, serving as a wake-up call for companies to rethink their way of acting, and also as an opportunity for companies to improve their relationship with their stakeholders and better define their priorities (Lu & Wang, 2021) and in this context the study of carbon disclosure, executive compensation, dividend payments and sustainable compensation policy is important for the post-pandemic world.

The remainder of this paper is structured as follows. The second section discusses the literature review. Next, we discuss our data and methodology. The fourth section presents the empirical analyses of the study. Finally, we discuss the findings and make concluding remarks, we point out to the research limitations and delineate the related future research directions.

2 Literature review and hypothesis development

2.1 The relationship between carbon disclosure and dividends payments

Companies with higher carbon disclosure are more likely to reduce information asymmetry between shareholders and managers providing comprehensive information to stakeholders (Bui et al., 2020) and environmental disclosure can be a tool for non-financial disclosure (Raimo et al., 2021). In companies susceptible to information asymmetry and its related high agency cost, environmental disclosure is more crucial, allowing, for example, capital providers to provide companies with cheaper external financing (Zadeh, 2020). Environmental disclosure can reduce information asymmetry between managers and external stakeholders by monitoring corporate managers, reducing agency costs caused by managers'

selfish behavior (Lu & Wang, 2021). Moreover, in line with agency theory, managers can use company's profit for their own benefit, unless it is paid as a dividend to shareholders, thus dividend payout helps reduce the inefficient use of company's resources by managers (Trihermanto & Nainggolan, 2018).

Investments in social and environmental activities can signal incentives to create sustainable and ethical wealth in line with the interests of financial and non-financial stakeholders (Sheikh et al., 2021). Companies with strong presence in environmental and social activities have higher income with low risk and this higher profit ability may result in a better position to pay more dividends (Cheung et al., 2018). A high dividend payment signals to the market that expenditures on environmental activities do not exhaust the company's cash flow, resulting in higher shareholder satisfaction and a better allocation of firm resources (Benlemlih, 2019). Companies with better environmental and social performance are more likely to pay dividends because they seek to signal a fair distribution of corporate resources, lower cost of capital and long-term profitability (Shahbaz, 2020). Moreover, companies with better environmental and social performance tend to adopt a high dividend paying strategy because they have reached the mature stage of their life cycle, allowing greater access to free cash (Benlemlih, 2014).

Empirically, Benlemlih (2014) showed that more socially responsible firms pay more dividends. Trihermanto and Nainggolan (2018) founded that CSR expenses positively affect dividend policy. Hasan and Habib (2020) showed a positive relationship between regional social capital and the payment of cash dividends. Sheikh et al., (2021) concluded that social and environmental activities increase the probability of dividend payout, but dividend-paying companies reduce the amount of dividend payout as CSR activities increase. Thus, in line with agency theory and prior empirical findings, the following hypothesis is proposed:

Hypothesis 1a: There is a positive relationship between carbon disclosure and dividend payment

2.2 The moderation effect of executive compensation on the relationship between carbon disclosure and dividends payments

According to agency theory, shareholders agree to provide an optimal compensation contract for managers to act in accordance with shareholders' interests, aligning the interests of shareholders and managers and thereby maximizing financial performance (Kartadjumena & Rodgers, 2019) and executive compensation can be an effective instrument to motivate managers in aligning the interests between managers and shareholders (Pepper & Gore, 2015). In this line, listed companies in developing countries apply executive compensation systems that align the interests of shareholders and management, making executives do their jobs better, improving the company's financial performance (Buachoom, 2017) and higher executive compensation allows shareholders to share the interests and benefits of higher business performance with managers (Zhou et al., 2021). In order for environmental initiatives, such as carbon reduction projects, to generate long-term financial gains, active participation by a powerful executive management is required companies that offer attractive remuneration are under pressure to behave better on environmental issues and thus tend to remain proactive on climate issues in order to increase corporate legitimacy (Haque & Ntim, 2020). Therefore, executive compensation can be considered as an effective mechanism to improve dividend payment through an improvement in carbon disclosure.

Empirically, and to the best of our knowledge, there is no evidence on whether executive compensation can moderate the link between carbon disclosure and dividends payments. However, past evidence indicates that executive compensation has a positive effect on: financial

performance (Jeff Boakye et al., 2020; Zoghlami, 2021) and environmental performance (Francoeur et al., 2021; Kartadjumena & Rodgers, 2019). In line with agency theory and prior empirical findings, the following hypothesis is proposed:

Hypothesis 1b: Executive compensation moderates positively the relationship between carbon disclosure and dividend payment.

2.3 The relationship between executive compensation and carbon disclosure

Executive directors are the company's strategic decision makers, and their monetary and non-monetary interests can affect decisions related to social and environmental investments (Malik et al., 2020). Executive compensation can be an effective mechanism that aligns the self-interest of managers with the "company common good", allowing for a greater concern with environmental issues (Kartadjumena & Rodgers, 2019) and better paid executives may be in a good position to get involved in environmental issues, satisfying the interests of the company's stakeholders (Francoeur et al., 2021). In this line, investment in social and environmental activities can be a strategy to improve business performance, aligning the interests of shareholders and managers (Karim et al., 2018). Therefore, compensation structure signals the company's commitment to social and environmental policies (Deckop et al., 2006).

Empirically, Kartadjumena & Rodgers (2019) founded that higher executive compensation in banking entities in Indonesia increase concern around climate and environmental issues. Maas (2018) found that using targets for social and environmental activities in executive compensation improves environmental performance results, especially for companies with low environmental performance. In line with prior empirical findings, the following hypothesis is proposed:

Hypothesis 2a: There is a positive relationship between executive compensation and carbon disclosure

2.4 The moderation effect of sustainable compensation policy on the relationship between executive compensation and carbon disclosure

In recent years, many companies are linking executive compensation to environmental aspects, for example Alcoa links 20% of its executive bonus plan to carbon dioxide reduction and other environmental and safety targets (Ikram et al., 2019). The use of executive compensation linked to social and environmental activities is relatively new, and there is significant room for organizational learning (Derchi et al., 2020) and it has gained importance in companies for responding to society's demands for sustainable corporate behavior (Baraibar-Diez et al., 2019).Thus, if the board of directors is concerned with corporate environmental performance, executive compensation should be linked explicitly to environmental performance results (Cordeiro & Sarkis, 2008). Moreover, sustainable compensation policy incorporates short- and long-term shareholder interests in relation to environmental, economic, and social aspects of the company's performance, and thus expects a sustainable compensation policy to strengthen the alignment of interests between executive officers and shareholders (Winschel & Stawinoga, 2019).

Previous studies show a positive relationship between sustainable compensation policies and social and environmental disclosure (Lu & Wang, 2021), social and environmental initiatives (Flammer et al., 2019; Ikram et al., 2019) and environmental performance (Kanashiro, 2020) and indicate that sustainable compensation policies positively moderate the

relationship between executive compensation and environmental performance (Berrone & Gomez-Mejia, 2009; Haque & Ntim, 2020).

Hypothesis 2b: Sustainable compensation policy moderates positively the relationship between executive compensation and carbon disclosure

3 Research design

3.1 Sample and data

The sample consists of 97 listed firms on the B3 (Brazil Stock Exchange and Over-the-Counter Market) collected from 2015 to 2019. The sample is unbalanced, because full data is not available for all companies and for all years, and it consists of a total of 329 firm-year observations. Our data set is made up of information from the Refinitiv database. Financial firms were excluded from the sample because they comply with specific accounting rules, making it difficult to compare annual financial statements between non-financial and financial companies (Pucheta-Martínez et al., 2021). Refinitiv database contains information of social and environmental aspects on an international level, covering several business sectors, and is considered the leading source of financial statement data for public companies (Pucheta-Martínez & Gallego-Álvarez, 2021) with its proprietary methodology, providing a quantile-based ranking of environmental and social aspects (Murè et al., 2021). Table 1 illustrates the sector classification used in this analysis, based on the Global Industry Classification Standard (GICS).

Table 1
Sample distribution by sector of activity

Sector	No. Firm	Frequency	
		Absolute	Relative
Communication services	6	22	6,06
Consumer discretionary	29	99	27,27
Consumer staples	7	24	6,61
Energy	4	13	3,58
Health care	4	12	3,30
Industrials	14	46	12,67
Information Technology	5	15	4,13
Materials	5	18	4,95
Real state	7	24	6,61
Utilities	16	56	15,42
Total	97	329	100

As is evident from the data in Table 1, the sample comprised ten activity sectors. Firms belonging to the consumer discretionary represent 27,27%, followed by the utilities and industrials sectors at 15,42% and 12,67%, respectively. The sector with the lowest representation was Health Care at 3,30%.

3.2 Empirical models and variables

In order to examine the relationships among executive compensation, sustainable compensation policy, carbon disclosure and dividend payments. Breusch-Pagan Langrange multiplier test and Wooldridge test were performed. The results of Breusch-Pagan Langrange multiplier test ($p<0.005$;) and Wooldridge ($p<0.005$) test showed the existence of heteroscedasticity in the data and first-order autocorrelation of errors. Moreover, the highest VIF of the study was 1,78, indicating that the study does not have a multicollinearity problem because the VIF was less than 10 (Hair et al., 2005).

To deal with the problems of autocorrelation and heteroscedasticity we used Panel-Corrected Standard Errors (PCSE). PSCE method allows you to retain Ordinary Least Squares (OLS) estimates by replacing the OLS standard errors with panel-corrected errors (Beck & Katz, 1995). PCSE controls heterogeneity issues and deals autocorrelation problems more efficiently (Xuezhou et al., 2021). PSCE provides an accurate estimate of the standard error, is less sensitive to outliers, and also provides an autocorrelation-free estimate (Ikpesu et al., 2019; Zakari & Toplak, 2021). Thus, this estimator addresses the problems of serial correlation, heteroscedasticity and cross-sectional dependence (Le & Park, 2021).

Using dividend payment as the dependent variable, we estimate the following models to examine the relationship between carbon disclosure and dividend payment (H1a), and to test if this relationship is moderated by the executive compensation (H1b). Equation (1) measures the direct relationship between carbon disclosure and dividend payment and Equation (2) estimates the moderating effect of executive compensation on the carbon disclosure-executive compensation nexus:

$$DIV_{i,t} = \beta_0 + \beta_1 CARB_{i,t} + \beta_2 EXECOMP_{i,t} + \beta_3 BSIZE_{i,t} + \beta_4 CEODUAL_{i,t} + \beta_5 QTOBIN_{i,t} + + \beta_6 ROA_{+} \beta_7 LEV_{i,t} + \beta_8 FSIZE_{i,t} + \varepsilon \quad (1)$$

$$DIV_{i,t} = \beta_0 + \beta_1 CARB_{i,t} * EXECOMP_{i,t} + \beta_2 BSIZE_{i,t} + \beta_3 CEODUAL_{i,t} + \beta_4 QTOBIN_{i,t} + \beta_5 ROA_{+} \beta_6 LEV_{i,t} + \beta_7 FSIZE_{i,t} + \varepsilon \quad (1)$$

where, DIV is the dividend payment. CARB is the carbon disclosure. EXECOMP is the executive compensation. BSIZE is the board size. CEODUAL is the is the duality between CEO and chairman. QTOBIN is the growth opportunities. ROA is the profitability. LEV is the leverage. Firm Size is the company size.

We estimate the following models to measure the relationship between the executive compensation and carbon disclosure (H2a) and to test if this relationship is moderated by the sustainable compensation policy (H2b). Equation (3) measures the direct relationship between executive compensation and carbon disclosure, and Equation (4) estimates the moderating effect of sustainable compensation policy on the executive compensation-carbon disclosure:

$$CARB_{i,t} = \beta_0 + \beta_1 EXECOMP_{i,t} + \beta_2 SUST_{i,t} + \beta_3 BSIZE_{i,t} + \beta_4 CEODUAL_{i,t} + \beta_5 QTOBIN_{i,t} + \beta_6 ROA_{+} \beta_7 LEV_{i,t} + \beta_8 FSIZE_{i,t} + \varepsilon \quad (3)$$

$$CARB_{i,t} = \beta_0 + \beta_1 EXECOMP_{i,t} * SUST_{i,t} + \beta_2 BSIZE_{i,t} + \beta_3 CEODUAL_{i,t} + \beta_4 QTOBIN_{i,t} + + \beta_5 ROA_{+} \beta_6 LEV_{i,t} + \beta_7 FSIZE_{i,t} + \varepsilon \quad (4)$$

where, CARB is the carbon disclosure. EXECOMP is the executive compensation. SUST is the sustainable compensation policy BSIZE is the board size. CEODUAL is the is the duality between CEO and chairman. QTOBIN is the growth opportunities. ROA is the profitability. LEV is the leverage. Firm Size is the company size.

We use dividend payment and carbon disclosure as the dependent variable. Dividend payment is measured by dividend per share (Farrukh et al., 2017). Carbon disclosure is calculated as the ratio between the aggregate of 14 items focused on carbon issues and the total number of items analyzed (Haque & Ntim, 2020). If the company discloses information on an item, this will take the value 1; if not, the value is 0. The 14 items analyzed of carbon disclosure are shown in Table 2.

Table 2
Carbon disclosure items

Emissions Trading	Policy Energy Efficiency	Climate Change Commercial Risks Opportunities	Environmental Project Financing	NOx and SOx Emissions Reduction	Policy Water Efficiency
Renewable/Clean Energy Products	Land Environmental Impact Reduction	Toxic Chemicals Reduction	Policy Sustainable Packaging	Environmental Supply Chain Management	Eco-Design Products
Env Supply Chain Partnership Termination	Biodiversity Impact Reduction				

3.3 Independent and moderating variables

Executive compensation was measured by the natural logarithm of total executive compensation (Flammer et al., 2019; Haque & Ntim, 2020; Wu et al., 2020) and sustainable compensation policy is a dummy variable, which takes value 1 if the company has a sustainable compensation policy and 0 otherwise (Haque & Ntim, 2020; Ikram et al., 2019; Kanashiro, 2020). See the variables description in Table 3.

Table 3
Variables description

Variable name	Variable name	Model name	Proxy
Dependent	Dividend payment	DIV	Dividend per share
Dependent/Independent	Carbon disclosure	CARB	Carbon disclosure items/ total number of items
Independent/Moderator	Executive compensation	EXECOMP	Natural logarithm of total executive compensation
Independent/Moderator	Sustainable compensation policy	SUST	Dummy variable, which takes value 1 if the company has a sustainable compensation policy and 0 otherwise
Control	Board size	BSIZE	Total number of board members
Control	CEO duality	CEODUAL	Dummy variable equals 0 if the company operates with the same person as CEO and chairman at the same time, and otherwise 1
Control	Company performance	QTOBIN	Market capitalization of common stock plus book value liabilities/book value of total assets.
Control	Profitability	ROA	Income after taxes for the fiscal period/Total assets
Control	Leverage	LEV	Total debt/Total assets
Control	Firm size	FSIZE	Natural logarithm of total assets

3.4 Control variables

Control variables regarding carbon disclosure were introduced to the regression model to decrease the likelihood of bias in the results. Board size is the total number of board member. CEO separation is dummy variable equals 0 if the company operates with the same person as CEO and chairman at the same time, and otherwise 0. Profitability is measured by the ratio between income after taxes for the fiscal period and total assets. Growth opportunities is market capitalization of common stock plus book value liabilities divided by the book value of total assets Leverage, was also controlled, measured as debt over total assets. Finally, the company size was calculated as natural logarithm of total assets. We do not explain the details of these control variables, in order to conserve space.

4 Results

4.1 Descriptive Statics

Table 4 reports a summary of the descriptive statistics for all variables considered in the study model. The average dividend payment is 0,114 with an SD of 0,148, and it ranges from 0 to 0,675. We observe that the average carbon disclosure is 0.299 with a SD of 0.214 and ranges from 0 to 9.23.

Table 4

Descriptive statics

Variables	N	Mean	SD	Minimum	Maximum
DIV	314	0,114	0,148	0	0,675
CARB	314	0,299	0,214	0	0,923
EXECOMP	314	16,44	1,274	9,074	18,92
SUST	314	0,191	0,393	0	1
BSIZE	314	9,375	3,037	2	23
CEODUAL	314	0,286	0,452	0	1
QTOBIN	314	1,555	1,642	0,183	13,38
ROA	314	0,062	0,150	-1,788	0,643
LEV	314	0,343	0,194	0	1,405
FSIZE	314	22,14	1,362	17,26	26,24

The average logarithm of executive pay is 16.44 and ranges from 9.074 to 18.92. Regarding compensation policies linked to environmental aspects, the average was 0.19, showing that only 19% of the companies have compensation policies linked to environmental areas. Board size presents an average of 9.37 which is considered a reasonable average and we note that 28% of the CEOs are not chairman of the board of the companies.

4.2 Multivariate analysis

The study used the xtpcse routine in the STATA 16 program. Stata software is the software package with the most internal consistency, empowering users more effectively than other statistical packages (Acock, 2008). Stata Software is a full-featured statistical package that enables graphing and data analysis and management, and is simple to use and available in most university libraries (Stockemer, 2019). Table 5 presents the results of models 1 and 2.

Table 5

Results

Variable dependent: Dividends Payment		
	Model I	Model II
	DIV	DIV
	Coef p-value	Coef p-value
CARB	0,089 0,007***	
EXECOMP	-0,003 0,430	
CARB*EXECOMP		0,004 0,023**
BSIZE	0,001 0,164	0,001 0,111
CEODUAL	0,010 0,204	0,009 0,229
QTOBIN	-0,001 0,741	-0,000 0,775
ROA	0,0243 0,687	0,016 0,773
LEV	-0,154 0,000***	-0,149 0,000***
FSIZE	0,028 0,004***	0,275 0,004***
Constant	-0,458 0,043**	-0,498 0,017**
N	97	97
Firms	314	314
R-squared	0,2872	0,2810
Wald-Chi (8)	35,25 0,000***	29,30 0,000***

Period	5	5

DIV is the dividend payment. CARB is the carbon disclosure. EXECOMP is the executive compensation. BSIZE is the board size. CEODUAL is the is the duality between CEO and chairman. QTOBIN is the growth opportunities. ROA is the profitability. LEV is the leverage. Firm Size is the company size. ***p < 0.01;**p < 0.05; *p < 0.1.

In Model 1 we explore the relationship between carbon disclosure and dividend payment. In Model 2 we examine the moderating role of executive compensation in the relationship between carbon disclosure and dividend payment. In Model 1, our results find a positive and significant relationship between carbon disclosure and dividend payment (coeff=0,089;p=0,007) supporting hypothesis 1. In Model 2, our results find that executive compensation positively moderates the relationship between carbon disclosure and dividend payment (coeff=0,004;p=0,0023), supporting hypothesis 2. See the results for models 3 and 4 in Table 6.

Table 6

Results

Variable dependent: Carbon disclosure				
	Model III		Model IV	
	Coef	p-value	Coef	p-value
EXECOMP	-0,008	0,225		
SUST	0,090	0,000***		
EXECOMP* SUST			0,005	0,000***
BSIZE	0,005	0,013**	0,005	0,013**
CEODUAL	0,011	0,497	0,010	0,522
QTOBIN	-0,004	0,936	-0,004	0,941
ROA	0,052	0,059*	0,052	0,050**
LEV	0,061	0,124	0,582	0,149
FSIZE	0,079	0,000***	0,771	0,000***
Constant	-1,42	0,000***	-1,51	0,000***
N	97		97	
Firms	314		314	
R-squared	0,3816		0,3729	
Wald-Chi (8)	230,59	0,000****	222,90	
Period	5		5	

EXECOMP is the executive compensation. SUST is the sustainable compensation policy. BSIZE is the board size. CEODUAL is the is the duality between CEO and chairman. QTOBIN is the growth opportunities. ROA is the profitability. LEV is the leverage. Firm Size is the company size. ***p < 0.01;**p < 0.05; *p < 0.1.

In Model 3 we explore the relationship between executive compensation and carbon disclosure. In Model 4 we examine the moderating role of sustainable compensation policy in the relationship between executive compensation and carbon disclosure. In Model 3, our results do not support hypothesis 3, since, the relationship between executive compensation and carbon disclosure is not significant (coeff=-0,008;p=0,225). In Model 4, the results show that sustainable compensation policy positively moderates the relationship between executive compensation and carbon disclosure (coeff=-0,005; p=0,000), supporting hypothesis 4.

5 Discussion

The results confirm the effect of carbon disclosure on dividend payments, corroborating the idea that greater carbon disclosure reduces informational asymmetry between shareholders and managers (agency theory), the results also confirm that companies with better environmental performance tend to pay more dividends to signal a fair distribution of company resources, supporting hypothesis 1.

These findings confirm previous studies (Benlemlih, 2014; Sheikh et al., 2021; Trihermanto & Nainggolan, 2018). Benlemlih (2014) analyzed whether socially responsible

firms pay more dividends, from a sample of 22,389 US firm-year observations over the period from 1991 to 2012, results showed that more socially responsible firms pay more dividends. Trihermanto and Nainggolan (2018) examined the association between corporate social responsibility, corporate life and dividend policy, using a sample of 527 Indonesian listed firms and 923 Indonesian firm-year observations between 2008 and 2015, the results showed that CSR expenses positively affect dividend policy. Hasan and Habib (2020) investigated the relationship between regional social capital and corporate payout policies, from a sample of 7962 firms and 54695 annual observations, the results showed a positive relationship between regional social capital and the payment of cash dividends. Sheikh et al., (2021) examined the relationship between corporate social responsibility and dividend payout using a sample of 1480 annual observations from 215 non-financial companies over the period 2010-2016, the results showed that social and environmental activities increase the probability of dividend payout, but dividend-paying companies reduce the amount of dividend payout as CSR activities increase.

The results also show that executive compensation positively moderates the relationship between carbon disclosure and dividend payout, supporting hypothesis 2. The results support the view that executive compensation is an effective mechanism for increasing dividend payouts through increased carbon disclosure. Furthermore, executive compensation is associated with financial performance by aligning the interests of shareholders with managers causing the company to improve its financial performance and it is seen in the literature that dividend payout is associated with company financial performance. Executive compensation is also related to environmental performance because companies that pay their managers well tend to care about long-term issues, such as environmental aspects.

There are no previous studies that moderate the relationship between executive compensation and dividend payment. However, there are studies that relate executive compensation to financial performance (Jeff Boakye et al., 2020; Zoghlami, 2021) and environmental performance (Francoeur et al., 2021; Kartadjumena & Rodgers, 2019). Jeff Boakye et al., (2020) investigated the relationship between executive compensation and financial performance in 201 UK companies listed on the Alternative Investment Market, the results showed that CEO compensation impacts accounting-based and market-based financial performance measures. Zoghlami (2021) examined the effect of executive compensation on corporate performance using a sample of 155 French companies listed on the SBF 120 over the period 2009-2018, the results showed that an increase in CEO compensation appears to improve company performance on an accounting basis, but hurts the market value of the company's stock.

Francoeur et al., (2021) investigated the impact of powerful CEOs on corporate environmental performance, based on a sample of 5222 annual observations of US companies over the period 2007-2017, the results showed that powerful CEOs are able to improve corporate environmental performance by creating resources and one of the variables used to measure CEO power is executive compensation. Kartadjumena and Rodgers (2019) examined whether executive compensation is made to motivate managers to improve corporate environmental performance, using a sample of 39 banking companies in Indonesia over the period 2007-2014, the results showed that higher executive compensation in Indonesian banking entities can motivate them to care about climate and environmental issues.

The results did not support hypothesis 3, showing that executive compensation has no significant relationship with carbon disclosure, i.e. higher executive compensation failed to mitigate existing agency conflicts between principal (shareholders) and agent (managers), an explanation for this may be that higher CEO compensation may have caused companies to decrease investments in disclosure of environmental aspects, such as carbon disclosure.

The results also show that compensation linked to environmental policies moderates the relationship between executive compensation and carbon disclosure, supporting hypothesis 4. The results show that although the practice of linking executive compensation to environmental aspects is relatively new, this practice has already achieved satisfactory results in business performance and empirically demonstrates that sustainable compensation policy can help align the interests between the principal and the agent.

These results are in line with the studies of Haque and Ntim (2020) who examined the relationship between executive compensation, sustainable compensation policy, and environmental performance with a sample of 4379 annual observations over the period from 2002 to 2016, the results showed that sustainable compensation policy positively moderates 51 the relationship between executive compensation and environmental performance. Berrone and Gomez-Mejia (2009) analyzed the relationship between executive compensation and environmental performance, from 489 US companies in the period between 1997 to 2003, the results showed that including environmental performance in executive compensation causes companies to have greater engagement in environmental activities. The summary of hypotheses is presented in Table 7.

Table 7

Summary of hypothesis

Hypothesis	Expected sign	Actual sign	Level of support
Hypothesis 1a: There is a positive relationship between carbon disclosure and dividend payment	(+)	(+)	Supported
Hypothesis 1b: Executive compensation moderates positively the relationship between carbon disclosure and dividend payment.	(+)	(+)	Supported
Hypothesis 2a: There is a positive relationship between executive compensation and carbon disclosure	(+)	(0)	Not Supported
Hypothesis 2b: Sustainable compensation policy moderates positively the relationship between executive compensation and carbon disclosure	(-)	(+)	Supported

Table 7 corroborates that hypothesis 1, 2 and 4 were supported, showing that there is a positive and significant relationship between carbon disclosure and dividend payout. Executive compensation positively moderates the relationship between carbon disclosure and dividend payout. Sustainable compensation policy positively moderates the relationship between executive compensation and carbon disclosure. Hypothesis 3, however, was not supported, showing that executive compensation is not significantly related to carbon disclosure.

Based on the results, the study has important practical and theoretical implications. The study shows the reality of Brazil, a country with unique characteristics (high ownership concentration, agency conflicts between majority and minority shareholders, and weak minority shareholder protection) and which presents evidence, such as deforestation of the Amazon rainforest of an increase in carbon emissions, after a period of reduced carbon emissions. The study identifies that higher carbon disclosure positively influences dividend payments, i.e., shareholders may pressure companies for increased carbon disclosure to receive more dividends. Another result of the study is in firms of managers who receive higher compensation carbon disclosure tends to have a more significant relationship with dividend payout, thus executive compensation is effective mechanism to increase dividend payout through carbon disclosure, i.e. managers can motivate themselves to disclose more environmental activities because it can increase their compensation. Finally, the study brings that remuneration based on environmental aspects moderates the relationship between executive remuneration and carbon disclosure, that is, in directors with remuneration based on environmental aspects, higher remuneration more strongly influences carbon disclosure, thus, society can demand that

companies remunerate their managers with remuneration linked to environmental targets, because this way a greater carbon disclosure occurs.

6 Conclusions

This study examines the relationship between dividend payment, carbon disclosure, executive compensation and sustainable compensation policy. Using data 97 listed firms on the B3 (Brazil Stock Exchange and Over-the-Counter Market) collected from 2015 to 2019, we employ the Panel-Corrected Standard Errors method. We measure dividend payment as dividend per share and carbon disclosure through an index of 14 indicators collected from the Refinitiv database, calculated from the ratio of disclosed carbon items to total environmental items. This paper shows the importance of studying carbon disclosure, executive compensation, and sustainable compensation policies in Brazilian companies and seeks to help managers with these issues, especially in the post-Covid-19 pandemic world, where environmental and financial issues will be increasingly in evidence.

We find a positive and significant relationship between carbon disclosure and dividend payment, this result is consistent with the voluntary disclosure theory. The results showed that executive compensation positively moderates the relationship between carbon disclosure and dividend payment. Our results also found that sustainable policy compensation positively moderates the relationship between executive compensation and carbon disclosure. However, executive compensation does not have a significant relationship with carbon disclosure.

This study suffers of some limitations. First, we use a quantitative approach in adopting the carbon disclosure index; future studies may adopt qualitative approaches or develop proxies, such as word counts. Second, we note that few companies disclose environmental information before 2014, preventing a larger longitudinal study. Finally, we also note that few companies disclose environmental information. Thus, future research can study a longer longitudinal period and countries with different institutional characteristics.

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