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Composition of the board of directors and the probability of disclosure of social responsibility reports

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Abstract

Purpose – To identify the relationship between characteristics of the board of directors and the probability of dissemination of social responsibility reports.

Theoretical framework – Considering the central role of the board of directors in mitigating conflicts of interest, the study is based on the stakeholder-agency theory.

Design/methodology/approach – The sample included 250 companies listed on the Brazilian Stock Exchange (B3). The data used were collected in the "Relate or Explain" Report, Economática®, and CVM Reference Form, and then operationalized using a binary logistic regression model.

Findings – The results suggest that the probability of dissemination of social responsibility reports is 1.52% higher for companies with more concentrated shares, 101.10% higher for larger companies, and 59.2% lower for companies with dual positions.

Practical & social implications of research – The findings may be useful for (i) guiding organizational strategies for board composition that improve the dissemination of social responsibility reporting, (ii) fostering discussions about changes in the classification of levels of corporate governance in the B3, and (iii) multi-stakeholder decision making.

Originality/value – For the accounting academia, the study promotes an additional debate on the role of the board of directors in dealing with the agency problem. The study is innovative in showing how the characteristics of the board of directors can change the potential for dissemination of social responsibility reports.

Keywords: Stakeholder-agency theory, corporate social responsibility, corporate governance.

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1 Introduction

With the aim of promoting transparency in corporate strategies and actions, Brasil, Bolsa, Balcão (B3) has launched the "Report or Explain" initiative to encourage the disclosure of corporate social responsibility (CSR) reports that incorporate the Sustainable Development Goals (SDGs) established by the United Nations (UN) (B3, 2019; United Nations Organization, 2021). "Report or Explain," published annually, compiles information provided by companies on the Brazilian Securities and Exchange Commission (CVM) Reference Form regarding the preparation of CSR reports based on different methodologies endorsed by organizations such as the Sustainability Accounting Standards Board (SASB), the Global Reporting Initiative (GRI), the International Integrated Reporting Council (IIRC), or similar.

CSR reports are non-financial and therefore lack standardization, unlike financial reports. However, some organizations are willing to provide guidelines to assist companies in creating reports of this nature. Consequently, the absence of standardized disclosure in these reports is likely to increase information asymmetry regarding the impact of organizations' practices on their stakeholders (Formigoni et al., 2021).

Information asymmetry can be mitigated through good corporate governance practices, which, according to Jensen and Meckling's agency theory (1976), add the alignment of interests between shareholders and administrators to the proper management of resources. Regarding good corporate governance practices, it should be noted that the board of directors (BoD), according to the agency theory, is the custodian of the company's management on behalf of the shareholders and, therefore, is an active participant in issuing CSR reports (Chijoke-Mgbame et al., 2020). It is worth noting that the conflict of interest is not limited to shareholders, given the collective interest of stakeholders, which would constitute an extension of the stakeholder-agency theory (Hill & Jones, 1992; Prior et al., 2008).

In previous studies, financial performance has been used as the dependent variable, while CSR reporting and corporate governance characteristics have been used as explanatory variables. Specifically, financial performance has been elucidated by factors such as increased board independence (Chijoke-Mgbame et al., 2020; Kao et al., 2019), higher shareholder concentration (Kao et al., 2019), a lower number of directors (Kao et al., 2019), and lower representation of women on the board (Roudaki, 2018).

Studies investigating the disclosure of CSR reports as a dependent variable have identified significant positive relationships between the level of disclosure and shareholder concentration (Crisóstomo & Freire, 2015), board size (Abu Qa'dan & Suwaidan, 2019; Dias et al., 2017; Formigoni et al., 2021; Mascena et al., 2020), companies without dual positions (Abu Qa'dan & Suwaidan, 2019), companies with dual positions (Dias et al., 2017; Giannarakis, 2014b), board independence (Formigoni et al., 2021; Forte et al., 2020; Jizi, 2017; Mascena et al., 2020), and the proportion of women (Formigoni et al., 2021; Jizi, 2017), and a negative relationship with the age of the directors (Abu Qa'dan & Suwaidan, 2019).

Due to the lack of regulation and standardization, it is expected that companies will voluntarily disclose CSR reports using the methodologies they deem appropriate. In the absence of a regulatory framework, it is understandable that companies will employ different approaches to the level of disclosure of these reports. The use of a single methodology in previous research could be seen as a selection bias, meaning that it may not accurately represent all the Brazilian companies in the model, considering the existence of multiple methodologies and the absence of a specific disclosure standard.

In order to fill the gap to mitigate the selection bias and the lack of consensus in the findings on some characteristics of the board of directors, this study uses as a proxy the disclosure of reports of any methodologies disclosed in "Report or Explain," i.e. the intention is not to investigate the volume of items disclosed (checklist) in CSR reports, but to answer the problem: What is the probability of Brazilian companies disclosing CSR reports, considering the characteristics of the board of directors?

Given the role of the board of directors in minimizing agency conflicts, this study aims to identify the relationship between board characteristics and the probability of disclosure of CSR reports. The binary logistic regression model was used, given its potential for identifying the probability of events occurring.

The study innovates by showing the relationship between the characteristics of the BoD and the greater or lesser potential for disclosure of CSR reports. The results may be useful for: (i) the implementation of organizational strategies related to the composition or attributes of the BoD that impact the probability of disclosure of reports in response to stakeholders; (ii) the promotion of discussions about changes in the classification of the B3's corporate governance levels; (iii) the decision-making of various stakeholders, especially those interested in companies with strategies linked to socially responsible actions.

2 Corporate governance and CSR in Brazil and worldwide

The growing pressure from stakeholders for greater transparency and disclosure of CSR reports requires the implementation of good corporate governance practices (Kaymak & Bektas, 2017). In Brazil, the Brazilian Institute of Corporate Governance (IBGC) has promoted practices and discussions about the best governance practices, with the aim of optimizing organizations to ensure the trust of their stakeholders The BoD is at the heart of corporate governance, and its characteristics can influence the decisions of organizations, including those related to CSR, as investigated in previous studies.

Studies linking CSR reporting and corporate governance characteristics can be separated into two groups according to their operationalization. The first group corresponds to those in which CSR reporting and/or governance characteristics have been treated as explanatory variables for companies' financial performance and/or market value.

When investigating the relationship between performance and governance characteristics in New Zealand agricultural companies, Roudaki (2018) found that the inclusion of women on the board reduces financial performance, despite the fact that women are better at external networking. The negative relationship between the proportion of women and financial performance may indicate that, in addition to this, the qualification and experience attributes of the professionals on the board should be considered.

By relating corporate governance and ownership structure characteristics to the value of Taiwanese companies, Kao et al. (2019) found that companies add value through smaller boards with a higher proportion of independent members and a higher concentration of institutional and foreign ownership. According to the authors, smaller boards reduce agency costs and increase monitoring effectiveness when there is less contact with insiders and greater independence among members.

In an investigation into the disclosure of CSR reports and the profitability of Nigerian companies, Chijoke-Mgbame et al. (2020) found that independent boards tend to lead to higher company performance because they strengthen monitoring and mitigate the potential interests of management to the detriment of shareholders. More indebted companies, in turn, tend to have worse financial performance.

At the same time as a link is perceived between the increased performance of organizations and the characteristics of corporate governance, especially those corresponding to the board of directors, there is also a link between the disclosure of CSR reports and organizational performance. These findings may indicate that such characteristics can also have an impact on CSR disclosure, given the central role of the BoD in mitigating conflicts, reinforcing the relevance of this investigation.

The second group of studies includes the disclosure of CSR reports as a dependent variable and is therefore closer to the present study, although they use indices based on the methodologies of specific bodies such as the GRI (Abu Qa'dan & Suwaidan, 2019; Formigoni et al, 2021; Forte et al., 2020; Mascena et al., 2020; Sharma et al., 2020), ESG (Giannarakis, 2014b), ISO (Abu Qa'dan & Suwaidan, 2019), and the Social Balance Sheet of the Brazilian Institute of Social and Economic Analysis - IBASE (Crisóstomo & Freire, 2015).

When investigating the relationship between corporate governance, financial characteristics, and the disclosure of CSR reports, Giannarakis (2014b) found that the size and profitability of companies are positively related to the disclosure of reports, while leverage is negatively related. Size and profitability are justified by the greater exposure of companies and leverage is justified by the high expenditure required for disclosure.

The disclosure of CSR reports is positively related to board size and negatively related to director age, position duality, and ownership concentration (Abu Qa'dan & Suwaidan, 2019). For the authors, larger boards include a wider range of experiences, younger directors have a greater capacity to absorb new ideas and behaviors, duality compromises monitoring, and more dispersed ownership reduces information asymmetry.

Studying the relationship between the financial performance and disclosure of ESG practices of Indian companies, Sharma et al. (2020) found that companies with greater disclosure of ESG practices have better financial performance and a larger size, indicating that disclosure stems from greater availability of financial resources.

Forte et al. (2020) found a positive relationship between the level of CSR reporting and board independence, and a negative relationship with the number of annual meetings. For the authors, independence ensures more efficient management, with greater transparency and objectivity in providing feedback on organizational performance. The negative relationship with the number of meetings is explained by the lack of priority given to essential agendas such as CSR and the high cost of meetings.

A positive relationship between the disclosure of GRI reports and board independence and size was identified by Mascena et al. (2020). The results indicate that independent companies go to great lengths to engage with stakeholder issues and that the larger the board, the more likely it is to include individuals focused on stakeholder interests.

When comparing the characteristics of the board of directors and the level of disclosure of CSR reports between Brazil and Spain, Formigoni et al. (2021) showed that the size of the board increases the level of disclosure in both countries, that the number of women increases the level of disclosure of CSR reports in Brazil, while disclosure in Spanish companies is positively related to the independence of the board. The participation of women is justified by their philanthropic vocation, the size of the board is justified by the range of people with different skills and experiences, and independence is justified by the effectiveness in meeting the interests of other stakeholders.

In the second group of studies, most of the authors explored the GRI disclosure methodology based on a checklist of disclosure levels, which may lead to selection bias. The findings lead to a call for further research that considers the case of disclosure of reports using any of the "Report or Explain" methodologies, making it appropriate to use a binary regression model. In addition, it is relevant to add variables focused on financial performance that have been explored in previous studies, since non-financial reports also depend on the mediating role of the BoD.

3 Theoretical framework

The existence of potential agency conflicts was mentioned by Adam Smith in *The Wealth of Nations* in 1776, when he noted that directors could not be expected to look after other people's money with the same zeal as they would their own (Smith, 1937). Debates about corporate governance, the separation of control and ownership of organizations, and their potential were more succinctly considered in the study by Berle and Means (1932).

Later, the work of Jensen and Meckling (1976) dealt with the agency relationship. The separation between ownership and management required a set of actions to control conflicts of interest. Control actions therefore became the conceptual basis of corporate governance. One of the mechanisms of good governance is the presence of a board of directors whose role is to mediate between shareholders and managers (Fama & Jensen, 1983).

The BoD is at the heart of corporate governance as it plays a vigilant and shareholder-protecting role, gets involved in corporate policy, deals with stakeholders, and participates in decisions on corporate transparency and disclosure, including CSR issues (Kaymak & Bektas, 2017). It should be noted that the conflict of interest is not limited to the bilateral relationship between managers and shareholders, but is multilateral, as it involves a set of stakeholders, configuring an increased agency problem (Hill & Jones, 1992; Prior et al., 2008), given that to some extent everyone bears a risk in relation to the decisions made in the corporate sphere (Clarkson, 1995).

CSR is a non-financial performance measure with information relevant to the value of the organization. Consequently, it is useful in increasing value for shareholders and other stakeholders, and corporate governance is a set of mechanisms that can predict the emergence of incentives based on social performance (Hong et al., 2016).

Considering the commitment to validating their image, companies tend to boost their socially responsible activities through the disclosure of CSR reports, safeguarding not only the interests of shareholders but also those of other stakeholders (Jizi, 2017). The mediating role of the board is fundamental in mitigating the asymmetry between managers and stakeholders (Valls Martínez et al., 2020). Thus, a greater probability of CSR reporting is expected, which is conditional on the attributes of the board.

4 Review of empirical literature and development of hypotheses

Attributes of the board include size, remuneration, the proportion of women, the proportion of independent members, the age of the board members, and duality of positions. Size is measured in terms of the absolute number of people on the board, and there is no consensus in the literature as to its ideal size.

Larger boards can be more efficient, given the multiplicity of ideas, which favors the issuance of CSR reports that require diverse experience to resolve conflicts.

Moreover, a larger board leads to better monitoring, collection, and processing of information to adapt the company to its environment (Giannarakis, 2014b; Pucheta-Martínez & Gallego-Álvarez, 2019). In addition, a larger number of directors increases the possibility of representing the interests of stakeholders other than shareholders (Dias et al., 2017; Jizi, 2017; Kaymak & Bektas, 2017).

On the other hand, larger boards can lead to communication problems and difficulties in team coordination (Jensen, 1993). The Code of the IBGC's Corporate Governance Report (Instituto Brasileiro de Governança Corporativa, 2015) recommends an odd number of board members, ranging from five to eleven. Considering the advantages of larger boards, given their representativeness and multiplicity of ideas, it is expected that discussions in favor of the disclosure of CSR reports will emerge, supporting the following hypothesis:

H_1: Companies with larger boards are more likely to disclose CSR reports.

Considering the high level of responsibility of board members when it comes to resolving conflicts of interest, remuneration is likely to be in line with the market and the qualifications of the board members. It is expected that the higher the remuneration, the greater the attractiveness to qualified and prestigious board members, who tend to influence decisions in favor of CSR investments in order to maintain a good reputation (Deschênes et al., 2015). The remuneration of board members is treated by the IBGC as a practice that contributes to good governance. Given the influence of these professionals, higher remuneration is therefore expected on the boards of companies that publish CSR reports:

H_2: Companies with higher board remuneration are more likely to disclose CSR reports.

It is likely that the attributes that most threaten the trustworthiness of a board are the independence of its members and the duality of positions, because they compromise the board's duty of oversight. An independent board member is one who has no relationship with any individual that would create a conflict of interest with the shareholders. Duality, in turn, corresponds to the accumulation of the positions of Chairman of the Board and Chief Executive Officer (CEO).

Board independence can be detrimental if external members lack accurate information about the company, despite mitigating the link between board members and the CEO (Fama & Jensen, 1983; Linck et al., 2008). There is also an expectation that independent members will be adept at good corporate citizenship, provide greater transparency and pay attention to sustainable agendas (Jizi, 2017), and encourage CSR reporting as a strategy to improve the company's image (Al Fadli et al., 2020; Kaymak & Bektas, 2017). Since an independent director is external to the organization, they can act in a more technical way and add experience in line with stakeholder expectations, favoring the disclosure of CSR reports. Thus, it is expected that:

H_3: Companies with a higher proportion of independent directors are more likely to disclose CSR reports.

Dual positions increase the company's efficiency due to the proximity between the other directors and board members, which improves financial performance (Chiang & Lin, 2007). In contrast, Jensen (1993) and Tien et al. (2013) argued that the separation of positions is important so that the CEO's personal interests do not outweigh organizational interests, as dual positions weaken monitoring. In addition, companies with dual positions tend to have less transparency and disclosure of CSR reports (Giannarakis, 2014b). Separating the positions of CEO and Chairman of the Board is considered a good governance practice as it does not burden the monitoring role of the board (Instituto Brasileiro de Governança Corporativa, 2015), thus increasing transparency and motivating the disclosure of CSR reports:

H_4: Companies without dual positions are more likely to disclose CSR reports.

Elements of diversity, such as gender and age, can be relevant in evaluating board attributes, as they allow for a plurality of arguments, thus enriching discussions. A greater proportion of women generates a constructive dialogue with stakeholders, as they pay more attention to social and environmental issues, favoring the disclosure of CSR reports (Jizi, 2017; Valls Martínez et al., 2020), are more risk-averse, therefore aligning the interests of managers and shareholders using social and ethical skills (Pucheta-Martínez & Gallego-Álvarez, 2019), and are more concerned with the long-term survival of the company (Lopatta et al., 2020). Given these arguments and the nature of the SDGs, which recommend gender equality, we propose the following hypothesis:

H_5: Companies with a higher proportion of female board members are more likely to disclose CSR reports.

As for age, the older the board members, the more averse they are to change and implementing innovative strategies, compared to younger board members who are more eager and willing to process CSR-oriented ideas (Abu Qa'dan & Suwaidan, 2019). A more conservative bias is expected from boards with a higher average age, while younger boards can assess risks effectively and are more likely to adopt socially responsible initiatives (Giannarakis, 2014b). Although experience is relevant to decision making, younger directors are expected to be less conservative and therefore more willing to defend the disclosure of CSR reports, as proposed by the following hypothesis:

H_6: Companies with younger directors are more likely to disclose CSR reports.

Considering the elements that characterize good governance practices (Instituto Brasileiro de Governança Corporativa, 2015), in addition to the evidence cited in this study, it is expected that companies with large BoDs, higher remuneration, a higher proportion of women, a higher proportion of independent members, younger members, and boards without dual positions are more likely to disclose CSR reports.

5 Methodological procedures

The binary logistic regression method was adopted in this research, since the phenomenon studied is represented by two categories (Fávero & Belfiore, 2017). The initial sample consisted of 387 companies, all of which are active on the Brasil, Bolsa, Balcão (B3). The disclosure of CSR reports was categorized according to the "Report or Explain" report released by the B3 platform in 2019, containing companies that did or did not disclose any social and environmental reports in 2018.

The explanatory variables were collected from the Brazilian Securities and Exchange Commission (CVM) Reference Form and the control variables from Economática®. Company size, return on assets, shareholder concentration, and leverage were used as control variables. Given the greater exposure to stakeholders and consequently greater operational impact (Barnea & Rubin, 2010; Giannarakis, 2014a) and greater availability of resources, larger companies tend to invest in CSR reporting (Ali et al., 2018; Ting, 2021). Among the reasons that inhibit the disclosure of CSR reports by smaller companies are the high cost of preparing these disclosures and the preservation of their competitive strategy (Gunardi et al., 2016).

Return on assets, which is commonly used as a control variable for financial performance, can affect the disclosure of CSR reports. More profitable companies have a greater share of resources available to support social initiatives (Ali et al., 2018; Giannarakis, 2014a) and tend to provide more detailed information to investors to dispel the assumption that the company only enriches its shareholders (Gunardi et al., 2016). More leveraged companies tend to disclose fewer CSR reports due to the high cost of preparation and disclosure (Barnea & Rubin, 2010; Giannarakis, 2014a). In general, leveraged firms prioritize debt repayment when faced with the decision to pay off debt or increase spending on CSR reporting (Habbash, 2016).

Shareholding concentration was also considered as a control variable, given that controlling shareholders exercise power in the selection of board members and, consequently, dominance over them, reducing conflicts between principals and agents and enabling greater disclosure of CSR reports aimed at building a better company reputation in the long run (Crisóstomo & Freire, 2015; Fallah & Mojarrad, 2019). Furthermore, in an environment of greater shareholder concentration, controlling shareholders tend to be less interested in spending money on CSR, while in a more dispersed environment, there is greater commitment and consequently less conflict between the interests of controlling shareholders and minority shareholders, making the relationship between ownership concentration and the disclosure of CSR reports negative (Ducassy & Montandrau, 2015). Therefore, it is expected that companies with a greater shareholder concentration are more likely to disclose CSR reports.

Chart 1 summarizes the variables used to compose the model (Supplementary Data 1 – Dataset with Variable Scores in Portuguese), with their respective definitions, studies that have explored the same typology in other scenarios, and the source used as a basis for this investigation.

Some companies were excluded from the initial sample due to sectoral particularities or lack of information in the reference form, such as the age of members and board remuneration on 12/31/2018. Considering the amplitude and discrepancy of the values of total assets and remuneration, which could affect the robustness of the modeling, the natural logarithm format was used for these data. The final sample consisted of 250 companies, as shown in Table 1.

In order to know the nature of the companies used in the study, Table 2 shows the frequency by sector, according to the B3 sector classification.

Chart 1
Variables used in the binary logistic model

Variables	Operationalization	References	Source
Dependent			
Disclosure of at least one type of sustainability report (CSR)	(1) for companies that reported (0) for companies that did not report	Chijoke-Mgbame et al. (2020), Ting (2021)	B3 “Report or Explain”
Independent			
Size of the board of directors (size)	Absolute number of board members	Dias et al. (2017), Giannarakis (2014a), Jizi (2017), Kao et al. (2019), Kaymak and Bektas (2017), Pucheta-Martínez and Gallego-Álvarez (2019), Roudaki (2018)	
Total remuneration of the board of directors (lnrenumeration)	Natural logarithm of the total remuneration of the board of directors	Deschênes et al. (2015), Roudaki (2018)	CVM Reference Form items 12 and 13 of Annex 24 of ICVM 480
Women on the board of directors (women)	Proportion of women among board members	Abu Qa’dan and Suwaidan (2019), Forte et al. (2020), Jizi (2017), Lopatta et al. (2020), Pucheta-Martínez and Gallego-Álvarez (2019), Roudaki (2018)	
Independence of the board (independence)	Ratio of the number of independent members to the total number of members of the board of directors	Abu Qa’dan and Suwaidan (2019), Al Fadli et al. (2020), Chijoke-Mgbame et al. (2020), Forte et al. (2020), Jizi (2017), Kao et al. (2019), Kaymak and Bektas (2017), Linck et al. (2008), Roudaki (2018)	
Age of the board of directors (age)	Average age of board members	Abu Qa’dan and Suwaidan (2019), Forte et al. (2020)	CVM Reference Form items 12 and 13 of Annex 24 of ICVM 480
Dual positions (duality)	(1) When a board member is also an executive director, (0) When no member is also an executive director	Abu Qa’dan and Suwaidan (2019), Giannarakis (2014a), Kao et al. (2019), Dias et al. (2017)	
Control			
Ownership concentration (major)	Proportion of shares held by the controlling shareholder with voting rights	Abu Qa’dan and Suwaidan (2019), Chijoke-Mgbame et al. (2020), Crisóstomo and Freire (2015), Ducassy and Montandrau (2015), Fallah and Mojarrad (2019)	Economática ®
Company size (lnassets)	Natural logarithm of total assets	Abu Qa’dan and Suwaidan (2019), Ali et al. (2018), Barnea and Rubin (2010), Chijoke-Mgbame et al. (2020), Giannarakis (2014b), Sharma et al. (2020), Ting (2021), Dias et al.(2017)	
Return on Assets (ROA)	Ratio of the sum of net profit and minority shareholding to total assets	Abu Qa’dan and Suwaidan (2019), Ali et al. (2018), Chijoke-Mgbame et al. (2020), Giannarakis (2014b), Gunardi et al. (2016), Sharma et al. (2020)	
Leverage (leverage)	Ratio of onerous liabilities to total assets	Abu Qa’dan & Suwaidan (2019), Barnea and Rubin (2010), Chijoke-Mgbame et al. (2020), Giannarakis (2014b), Habbash (2016), Kao et al. (2019), Roudaki, (2018), Sharma et al. (2020)	

Prepared by the authors.

In terms of frequency according to the B3 sector classification, there is a predominance of the cyclical consumption, industrial goods, public utilities, and financial sectors. It is worth noting that if the groupings of companies were ranked at the population level, the sectors would continue to behave similarly, even with the exclusion of financial companies (banks and insurance companies). The exclusion of these companies is justified by the impossibility of obtaining "leverage" due to the specific standards of their chart of accounts.

Using Stata®16 software, the first step in the analysis consisted of separating the qualitative and quantitative variables for preliminary analysis of the frequency table and descriptive statistics, respectively. The second step was to estimate the binary logistic regression model (logit), as shown in Table 1, to determine the statistical significance of the model parameters in explaining the dependent variable. When measuring the full logit model, the result required the use of the stepwise procedure to select explanatory variables, followed by the corresponding likelihood ratio test to identify the impact of the quality of the new estimation compared to the full model. Once the quality of the estimation was maintained, the final estimated equation was obtained, as according to Equation 1. The next step was to determine the probability of CSR reporting when one unit of each variable changed, *ceteris paribus*. In order to validate the results obtained in the analysis, sensitivity and specificity tests were carried out on the model in the last stage of the research.

Table 1
Sample selection

Selection stage	Quantity
Initial sample	387
(-) Banks and insurance companies	(30)
(-) Data missing from the reference form	(107)
(=) Sample	250

Note: Research data.

6 Presentation and analysis of results

For a preliminary assessment of the observations, the variables were summarized using a frequency table and descriptive statistics for qualitative and quantitative variables, respectively. The frequency analysis (Table 3) shows the frequency of observations distributed in their respective categories (Yes=1 and No=0).

Table 2
Sample sector frequency

B3 Sector	Frequency	Percentage (%)	Cumulative Percentage (%)
Industrial goods	45	18.0	18.0
Communications	4	1.6	19.6
Cyclical consumption	65	26.0	45.6
Non-cyclical consumption	15	6.0	51.6
Finance	25	10.0	61.6
Basic materials	24	9.6	71.2
Others	1	0.4	71.6
Oil, gas, and biofuels	10	4.0	75.6
Health	16	6.4	82.0
Information technology	5	2.0	84.0
Public utility	40	16.0	100.0
Total	**250**	**100**	

Note: Research data.

Table 3
Frequency table

Variable		Frequency	Percentage (%)	Cumulative Percentage (%)
Disclosure of CSR reports	No	140	56	56
(CSR)	Yes	110	44	100
Dual positions	No	112	44.8	44.8
(duality)	Yes	138	55.2	100
Total		250	100	

Source: Research data.

It can be seen (Table 3) that, for the sample used, most companies did not publish CSR reports in 2018, and most of them have duality of the aforementioned functions. Regarding frequency, it is worth noting that the binomial models for identifying the occurrence of a given phenomenon do not require the use of a sample with proportionally balanced categories to respect the natural occurrence obtained in the database (Fávero & Belfiore, 2017). Table 4 shows the descriptive statistics for the quantitative variables.

Table 4 shows that the boards of directors have an average of seven members (as expected by the IBGC), are predominantly male, have an average age of 57, are composed of people who already work in the companies, and that remuneration varies widely between companies.

Although there are companies with no female board members, there are also companies with only female board members. It should also be noted that the position is generally held by more mature people, aged over 40. The estimated models are shown in Table 5.

Table 4
Descriptive Statistics

Variable	n	Average	Standard Deviation	Minimum	Maximum
Women on the board of directors (%)	250	11.1208	14.70755	0	100
Size of the board of directors	250	7.8	3.839135	1	27
Board independence (%)	250	27.15292	26.0685	0	100
Age of the board of directors	250	56.93312	6.943811	40	79.5
Total remuneration of the board of directors	250	13.82736	1.833107	1.386294	20.82546
Ownership concentration (%)	250	47.95856	26.7853	0.6	100
Company size	250	21.80844	1.908896	16.23	27.48
Leverage	250	30.36292	30.1876	0	230.78
Return on assets (ROA)	250	0.41376	20.135	-226.14	62.99

Source: Research data.

Table 5
Estimated logit models

	Complete Model		Final Model (Stepwise)	
rsc	Coef.	z	Coef.	z
Constant	-16.86827	-5.82	-15.82177	-6.93 ***
Duality	-0.874782	-2.71***	-0.8919705	-2.91 ***
Major	0.0215614	3.24***	0.0150664	2.64 ***
Inactive	0.6663998	5.54 ***	0.6986511	6.90 ***
Women	0.0202757	1.62		
Tamca	0.0566605	1.10		
Independence	0.0152892	2.17 **		
Age	0.0121019	0.53		
Remuneration	-0.0293405	-0.26		
Leverage	0.0022172	0.39		
Roa	-0.0080673	-0.86		
LL function		-127.40232	LL function	-131.91883
LR $chi^2(10)$		88.16	LR chi^2 (3)	79.13
Prob > chi^2		0	Prob > chi^2	0
Pseudo R^2		0.2571	Pseudo R^2	0.2307
Observations		250	Observations	250
	Likelihood-ratio test		LR chi^2 (7)	9.03
			Prob>chi^2	0.2503

Notes: **p-value<5%; ***p-value<1%. LL function: Log Likelihood.
Source: Research data

In the complete model (Table 5), there is a positive relationship between the disclosure of CSR reports, which is inversely proportional to board duality and remuneration and ROA, and proportional to the coefficients of the other variables: board size, independence, presence of female directors, older board members, greater shareholding concentration, larger companies, and more leveraged companies.

As for the significance of the respective parameters, based on the complete model, at a 5% significance level, it can be said that at least one of the explanatory variables is statistically significant in increasing or decreasing the probability of disclosing CSR reports, since the p-value χ^2 is less than 0.05. In addition, based on the Wald Z p-value, at a 5% significance level, not all parameters are statistically different from zero, which requires the stepwise procedure to select the explanatory variables, as shown in Table 5.

Given that the selection of variables can limit the robustness of the model, the likelihood-ratio test was used to compare the two estimated models. This test indicated that excluding the variables using the stepwise procedure did not alter the quality of the fit, which demonstrates the superiority of this model in relation to the estimated parameters of the full model that are statistically different from zero at a 5% significance level. Table 6 summarizes the results of the hypothesis tests.

Although they behaved as expected, the lack of significance of the parameters leads to the rejection of hypotheses H_1, H_3 and H_5. In addition, hypotheses H_2 and H_6, in addition to being non-significant, resulted in parameters with different signs to those expected in the respective hypotheses. Regarding remuneration, it is likely that directors with higher remuneration are more comfortable and therefore less engaged in CSR reporting. As for age, the relationship differs from what was expected due to the predominance of older people on Brazilian boards, with an average age of 57 years.

Based on the final model, obtained after the stepwise approach, given that duality assumes that the value of the dummy is equal to 1 if a board member also performs the role of executive director and the sign of the parameter is negative (-0.8919705), it is possible to state that, on average, companies that do not have dual roles are more likely to disclose CSR reports, other things being equal. The result is significant and therefore hypothesis H_4 cannot be rejected, confirming the findings of Abu Qa'dan and Suwaidan (2019) and the arguments of Giannarakis (2014b) and Tien et al. (2013). The finding signals that the board of directors plays the role of mediator, so that the organizational interests outweigh the personal interests of the CEO, promoting transparency of information to stakeholders through the disclosure of CSR reports.

The signs of the estimated parameters of the variables natural logarithm of total assets and proportion of majority shareholder with voting rights are +0.6986511 and +0.150664, respectively. It can be said that, on average, larger companies with a higher shareholding concentration are more likely to disclose CSR reports, other things being equal.

Regarding shareholder concentration, the findings of this research corroborate the studies of Fallah and Mojarrad (2019) and Crisóstomo and Freire (2015), and diverge from the findings of Ducassy and Montandrau (2015) and Abu Qa'dan and Suwaidan (2019), who found a negative relationship between CSR reporting and ownership concentration. This finding shows that the controlling shareholders of Brazilian companies select board members in line with the search for long-term reputation, through greater disclosure of CSR reports.

Table 6
Summary of hypothesis tests

Hypothesis	Board Characteristics	Expected Sign	Obtained Sign	Significant?	Results
H_1	Board size	(+)	(+)	No	Rejected
H_2	Remuneration	(+)	(-)	No	Rejected
H_3	Independence	(+)	(+)	No	Rejected
H_4	Duality	(-)	(-)	Yes	Not rejected
H_5	Women	(+)	(+)	No	Rejected
H_6	Young people	(-)	(+)	No	Rejected

Source: Research results.

In relation to company size, the findings show that Brazilian companies follow the same trend as other studies (Ali et al., 2018; Giannarakis, 2014b; Ting, 2021), which also found positive significance with the size variable, and an inverse trend to the result of Barnea and Rubin (2010), who, although they defended the significance associated with larger companies, found a negative relationship between size and disclosure of CSR reports. After indicating the parameters, it is possible to state that the average probability of disclosure of CSR reports by Brazilian companies in 2018 can be estimated according to Equation 1.

$$p_{CSR} = \frac{1}{1+e^{-\left(\begin{array}{c}-15.82177+0.0150664 major\\+0.6986511 lnassets-0.8919705 duality\end{array}\right)}} \qquad (1)$$

To obtain an average of how much the probability of disclosing CSR reports changes when the explanatory variables are altered by one unit, holding other conditions constant, the probability of the event occurring (odds ratio) was estimated for each variable calculated, as shown in Table 7.

Based on the results shown (Table 7), it can be said that when shareholder concentration increases by 1%, the probability of disclosing CSR reports increases by an average factor of 1.01518, i.e. the probability is 1.52% higher. When the logarithm of total assets increases by one, the probability of disclosing CSR reports increases by an average factor of 2.011038, i.e. the probability is 101.10% higher.

If the company has dual positions, the factor is multiplied by 0.4098473, i.e., a company with dual positions is 59.02% less likely to disclose a CSR report. This result is in line with the stakeholder-agency theory, as duality weakens monitoring, resulting in information asymmetry due to the non-disclosure of social and environmental information that may be of interest to shareholders (and stakeholders). To validate the results obtained in the analysis, the sensitivity and specificity tests of the model used in the investigation are presented, considering a cutoff of 0.5, as shown in Chart 2 and supplemented by Figure 1.

Table 7
Probability of disclosure of social responsibility reports

CSR	Odds Ratio	Standard Error	Z
Constant	1.34E-07	3.07E-07	-6.930
Duality	0.4098473	0.1255434	-2.910
Lnassets	2.011038	0.2036577	6.900
Major	1.01518	0.0057903	2.640
	LL function		-131.91883
	LR chi^2 (3)		79.13
	Prob > chi^2		0
	Pseudo R^2		0.2307
	Observations		250

Source: Research results.

Chart 2
Sensitivity analysis of the model (cutoff=0.5)

Classification	Actual Incidence of Event	Actual Incidence of Non-Event
Classified as Event	75	29
Classified as Non-Event	35	111
	Sensitivity	**68.18%**
	Specificity	**79.29%**
	Overall Model Efficiency	**74,.0%**

Source: Research results.

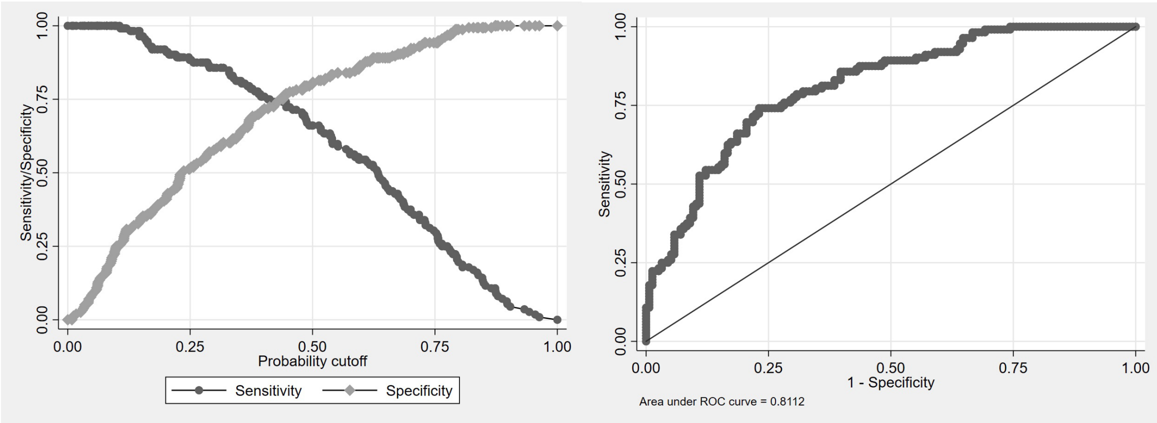

Figure 1. Sensitivity curve and ROC curve
Source: Research data

From the sensitivity results, we can see that the percentage of correctness of the model was 74.4% of the total classification, in which 186 observations were classified correctly, where 75 were events and classified as such and 111 were non-events and classified as such, for a cutoff of 0.5. Of the 64 observations wrongly classified by the model, 35 were events classified as non-events and 29 were non-events classified as events. Considering the cutoff variation between 0 and 1, the sensitivity curve for each cutoff and the receiver operating characteristic (ROC) curve for the cutoff possibilities were plotted (Figure 1).

It can be seen (Figure 1) that the cutoff probability for the sensitivity and specificity values to be equal is approximately 0.44. The ROC curve, in turn, indicates that the area in the final model represents a reasonable predictive value, obtaining an area under the curve of 0.8051, which reinforces the assertion that new explanatory variables could be added to the model in future estimations.

7 Conclusion

The aim of this study was to identify the characteristics of the board of directors that can impact the probability of disclosing CSR reports in a sample of 250 Brazilian publicly traded companies. To this end, the binary logistic regression model was used, so that the classification of the dependent variable was based on the 2019 "Report or Explain" report published by the B3, where the event corresponded to companies that disclosed any CSR reporting methodologies such as the Sustainability Accounting Standards Board (SASB), the Global Reporting Initiative (GRI), the International Integrated Reporting Council *(*IIRC), or similar.

It was found that a larger company size, a greater shareholding concentration, and the lack of accumulation of board member and management positions are statistically significant characteristics that affect the probability of disclosing CSR reports, which confirms the evidence from other studies (Ali et al., 2018; Crisóstomo & Freire, 2015; Fallah & Mojarrad, 2019; Giannarakis, 2014b; Ting, 2021). The probability of disclosing CSR reports is 1.52% higher in companies with more concentrated shares, 101.10% higher in larger companies, and 59.2% lower in companies with dual positions.

In terms of the nature of the results obtained, they can be justified by the fact that larger companies are more exposed to the judgments of the various stakeholders regarding socially responsible actions. The concentration of powers in the hands of one person, who simultaneously performs the functions of Chairman of the Board and Chief Executive Officer, could jeopardize the exercise of the director's function with regard to disclosure initiatives. The greater concentration of shares may be justified by the power of the majority shareholder to select the members of the board, so that conflicts between principals and agents are reduced, enabling greater disclosure of CSR reports with a view to improving the company's reputation in the long run.

In terms of practical implications, the results may be beneficial for business strategies in terms of value creation, given the implementation of guidelines and premises aimed at corporate governance to adapt or insert people engaged in CSR. In addition, the results could help stakeholders to make decisions when selecting companies focused on strategies related to socially responsible actions and/or encourage potential changes in the classification of the B3 corporate governance levels.

The study makes advances by considering the probability of CSR reports being disclosed according to all the methodologies included in the reference report disclosed to the CVM, unlike previous studies that were limited to only one type of methodology, which could lead to selection bias in the approach to the subject. Since there is no single regulation for CSR reporting standards, it is up to each company to disclose according to the methodology it chooses, which reinforces the importance of considering the various types of disclosure methodologies.

The study also adds value by using the disclosure of CSR reports as a dependent and binary variable, whereas most studies have considered this as an explanatory variable for organizational performance in multiple regression analyses. By exploring binary logistics, it was also possible to estimate the probability of the event (disclosure) occurring for each estimated variable.

Future research could explore the probability of CSR reporting from the perspective of the characteristics of the CEO and/or the audit committee to complement the findings of this study, given the role of the CEO in implementing CSR actions and the potential need to audit non-financial reports, since auditing is not formally carried out due to the lack of standardization of reports.

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Supplementary Material

Supplementary material accompanies this paper.
Supplementary Data 1 – Dataset with Variable Scores in Portuguese
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