

# Beyond Tokenism: How Female Presence Redefines Governance and ESG Disclosure

**Abstract** Grounded in Critical Mass Theory and Agency Theory, this study investigates whether female representation on corporate boards and institutional investor monitoring influence corporate transparency. The objective is to assess the impact of women's participation on ESG disclosure in Brazilian firms and examine the potential moderating role of institutional ownership. Using robust OLS regressions with panel data, the results show that the percentage of women on boards positively affects all ESG pillars, indicating that gender diversity enhances informational quality. The critical mass threshold of 30% is significant only for the Governance pillar, suggesting that deeper structural changes in compliance and transparency require surpassing tokenistic representation. Contrary to expectations, institutional ownership is negatively associated with Governance scores, and its moderating effect is not significant. Overall, the findings indicate that female presence on boards is a key driver of corporate sustainability in Brazil and operates independently of institutional investor pressure.

**Keywords:** ESG; Female Presence; Board of Directors; Institutional Ownership; Corporate Governance.

**JEL Codes:** G30, G32.

## 1. Introduction

Over the past decades, the ESG (Environmental, Social and Governance) agenda has shifted from a peripheral element in corporate discourse to a central component of legitimacy narratives and value creation in contemporary capitalism (Edmans, 2023; Elkington, 2011). What initially emerged as a response to mounting social and environmental pressures—catalyzed by financial crises, environmental disasters, and transnational social demands—has increasingly been instrumentalized as a strategic component of corporate management, shaping investment decisions, governance structures, and disclosure practices (Ribeiro & Lima, 2022; Xie et al., 2019).

Within this context, corporate governance—particularly its dimension related to the composition and dynamics of the board of directors—assumes a prominent role, functioning both as a mechanism for aligning firms with stakeholder expectations and as a safeguard against institutional volatility and market fluctuations (Adams & Ferreira, 2009; Shakil, Tasnia & Mostafiz, 2021). The literature recognizes that, under the hegemonic logic of shareholder value maximization, the incorporation of ESG practices carries an inherent tension: on one hand, it responds to growing demands for socio-environmental responsibility and transparency; on the other, it remains vulnerable to rhetorical appropriation that reinforces structural inequalities and preserves the primacy of private interests (Birindelli, Chiappini & Jalal, 2024; Ma et al., 2024).

This incongruity is particularly evident in emerging markets such as Brazil, where institutional fragilities, information asymmetries, and concentrated ownership structures shape both the scope and authenticity of ESG practices (Bukari, Agyemang & Bawuah, 2024; La Porta, Lopez-De-Silanes & Shleifer, 1999; Valcanover & Sonza, 2023). In such environments, institutional investors — actors with

the potential to exert significant influence — may either actively promote sustainable policies or restrict their engagement to traditional profitability metrics (Bena et al., 2017; Ferreira & Matos, 2008; Matos, 2020).

In the realm of corporate governance, female presence on boards—particularly through the lens of the female critical mass (three or more women directors)—has become central to debates on equity and sustainability. Prior studies indicate that more diverse boards tend to adopt policies with greater social and environmental sensitivity and to promote enhanced transparency in ESG disclosure (Khatri, 2022; Torchia et al., 2011). However, women’s access to strategic positions continues to face structural barriers, whether due to persistent exclusionary power networks or the adoption of symbolic inclusion practices such as tokenism, which do little to alter decision-making dynamics (Degenhart et al., 2024; Kanter, 1977; Joecks et al., 2013).

Understanding how the interaction between female critical mass and institutional ownership influences ESG disclosure in Brazilian firms therefore represents both an analytical challenge and an opportunity to expose the limits and contradictions of a governance model that, while appropriating the discourse of sustainability, remains anchored in logics of economic power reproduction. By examining this relationship, the present study advances the understanding of how governance variables and ownership structures may—or may not—contribute to more substantive ESG practices, enriching the debate on the true drivers of corporate transformation into an economic system shaped by stakeholder interest balancing.

This discussion aligns with global institutional commitments such as the United Nations’ 2030 Agenda (ONU, 2015). In this context, gender diversity on corporate boards emerges not only as an internal governance mechanism, but also as a direct expression of Sustainable Development Goal 5 (SDG 5), which advocates gender equality and the full and effective participation of women in leadership and decision-making positions.

Accordingly, the primary objective of this study is to analyze the influence of female presence on corporate boards—through the combined lenses of Critical Mass Theory and institutional ownership—on ESG disclosure in Brazilian firms, and to assess whether institutional ownership moderates the relationship between women’s participation on boards and ESG reporting. The relevance of this research lies in the need to understand the true engines of corporate transformation in emerging markets characterized by institutional weaknesses, information asymmetries, and concentrated ownership structures. Although the literature suggests that more diverse boards tend to adopt policies with greater socioenvironmental sensitivity, female inclusion in the upper echelons of Brazilian corporations continues to be constrained by structural domination and symbolic inclusion practices such as tokenism.

Thus, this study contributes to the literature by employing Critical Mass Theory to test whether improvements in ESG transparency require overcoming the isolation of women on boards. Furthermore, by incorporating institutional ownership as both a direct and moderating variable, the research advances

the Agency Theory debate by revealing whether large investors genuinely act as promoters of governance and sustainability in Brazil or whether their engagement remains limited to superficial activism. The findings offer practical and regulatory insights by delineating the boundaries between rhetorical discourse and effective corporate governance.

## **2. Female Presence, Institutional Investors and ESG**

The ESG (Environmental, Social, and Governance) framework and its reporting mechanisms have become a consolidated reference for evaluating the non-financial performance of organizations and are considered a central indicator of long-term performance from the perspective of investors who adopt socially responsible investment criteria (Edmans, 2023; Ribeiro & Lima, 2022). Recent studies show that the adoption of ESG criteria may represent a competitive advantage and can be perceived as an impression-management strategy capable of positively influencing corporate reputation and firm value (Lokuwaduge & Heenetigala, 2017; Xie et al., 2019). In this sense, ESG is embedded in a context increasingly shaped by social, regulatory, and market pressures, gaining centrality in contemporary corporate agendas and institutional legitimization processes (Elkington, 2011; Ribeiro & Lima, 2022).

Legitimacy theory provides an appropriate analytical lens for understanding the motivations behind ESG disclosure, particularly in sectors with high socioenvironmental sensitivity, where alignment between organizational discourse and societal expectations becomes vital for the continuity of operations (Amos, 2024). Legitimacy theory is grounded in the notion that organizations operate within an implicit “social contract” with society, requiring their actions to conform to prevailing norms, values, and beliefs (Suchman, 1995). Within this context, ESG disclosure emerges as a strategic tool for securing or restoring social acceptance. The organizations tend to disclose information about activities and initiatives directed at specific stakeholders as a means of demonstrating alignment with their expectations (Lokuwaduge & Heenetigala, 2017).

Organizations therefore tend to seek public perceptions that their activities align with socially accepted standards and norms, operating within the boundaries expected by their respective societies (Khamisu, Paluri & Sonwaney, 2024). This approach is consistent with Suchman’s (1995) definition of legitimacy as a generalized perception of the appropriateness or desirability of organizational actions within a socially constructed system of values and expectations. In this scenario, ESG disclosure assumes a strategic role as a form of institutional signaling, allowing firms to demonstrate alignment with social demands even in less stringent regulatory environments, as is often the case in many emerging economies (Khamisu, Paluri & Sonwaney, 2024).

ESG disclosure may also be used symbolically by firms, serving more as a mechanism to demonstrate adherence to global practices and trends—largely shaped by multilateral organizations and Western capital markets—and to preserve reputation, rather than as evidence of substantive

improvements in socioenvironmental performance (Khamisu, Paluri & Sonwaney, 2024). Such symbolic use can contribute to obtaining or maintaining organizational legitimacy even in the absence of substantial internal changes. This observation aligns with critiques of the superficiality of certain sustainability practices and the selective nature of disclosed content, such as greenwashing and pinkwashing, in which ESG communication is used as a marketing or public-relations tool (Brugman, van Huijstee & Droog, 2024; Sterbenk et al., 2022).

Within modern corporate structures, the Board of Directors (CA) emerges as a central arena for strategic deliberation, where not only the classical dilemmas of Agency Theory unfold but also contemporary debates involving legitimacy, diversity, and socioenvironmental responsibility (Adams & Ferreira, 2009). In particular, board composition and characteristics have gained prominence in discussions on corporate governance practices aligned with sustainable development objectives, especially regarding environmental, social, and governance commitments (Issa, 2023; Katmon et al., 2019; Khatri, 2022; Menicucci & Paolucci, 2023). Accounting and finance literature has increasingly sought to understand not only the economic performance of organizations but also their capacity to describe and respond—through their decision-making structures—to the ethical-political imperatives that define post-Cold War capitalism (Elkington, 2011; Fukuyama, 1992).

In this context, the role of female presence on boards gains prominence both as a normative aspiration of the United Nations' 2030 Agenda (SDG 5) and as a functional element for enhancing governance quality (Khatri, 2022). The presence of women on boards has been associated with more prudent decision-making, greater sensitivity to ESG-related risks, and improvements in the quality of socioenvironmental disclosure (Adams & Ferreira, 2009; De Masi et al., 2021; Katmon et al., 2019).

In core economies, one observes a normative shift toward more diverse boards; however, in peripheral countries such as Brazil, the inclusion of women in upper corporate echelons continues to confront deeply entrenched structures of male domination (Piccinin, Degenhart, & Adriel, 2024). Between 2015 and 2022, fewer than 11% of board seats in Brazilian companies were held by women, and in 25% of the sample there was not a single female director—clear evidence of the structural resistance to gender equity within the national corporate field (Piccinin, Degenhart, & Adriel, 2024). Nevertheless, the data indicate that firms with greater female representation on their boards exhibit higher ESG scores, reinforcing the functional role of this variable as a governance mechanism rather than a mere ideological imposition (Khatri, 2022; Menicucci & Paolucci, 2023).

Additionally, Tran et al. (2024) found that the inclusion of women on corporate boards functions as a mechanism for mitigating reputational risk. This evidence suggests that firms exposed to such risks may seek to capitalize both on the monitoring benefits derived from diversity and on the symbolic power associated with the presence of women in governance structures.

The term *tokenism*, introduced by Kanter (1977), refers to the practice of incorporating individuals from historically marginalized groups in such small numbers that their presence becomes merely decorative, lacking the capacity to meaningfully influence norms, practices, or decisions. In these

contexts, such professionals are often perceived as representatives of their social group rather than as full individuals, and they are subjected to mechanisms of hypervisibility, isolation, and deliberative exclusion (Kanter, 1977). Tokenism therefore perpetuates unequal power structures under the appearance of pluralism, functioning as a superficial legitimizing device for diversity and undermining its potential to enhance corporate governance mechanisms documented in the literature (Adams & Ferreira, 2009; Khatri, 2022). Its critique lies precisely in exposing the performative nature of certain corporate inclusion initiatives that aim to satisfy institutional pressures and reputational demands without disrupting the exclusionary patterns that characterize organizational decision-making cores (Torchia, Calabrò & Huse, 2011).

The contribution of Nuber and Velte (2021) examines the role of female presence on boards as a superior monitoring resource capable of enhancing environmental, social, and governance (ESG) performance. Grounded in Resource Dependence Theory and Stakeholder Theory, Nuber and Velte (2021) argue that women on boards provide distinct perspectives and greater sensitivity to the demands of non-financial stakeholder groups, thereby strengthening the board's effectiveness in overseeing sustainable practices.

Nuber and Velte (2021) emphasize that the influence of female presence may not be uniform across the different ESG pillars, reinforcing the importance of analyzing the environmental, social, and governance dimensions separately. Moreover, Nuber and Velte (2021) explore the role of transparency as a mediating mechanism, suggesting that more diverse boards tend to promote higher levels of non-financial disclosure. This posture does not necessarily mitigate agency conflicts but enhances organizational legitimacy in the market, as women at the top of the decision-making hierarchy tend to be more inclined to adopt strategies aimed at long-term sustainability rather than immediate financial gains. Based on the dialogue with the literature, the following research hypotheses is developed:

***H1. A higher proportion of women on the Board of Directors is positively associated with the level of environmental (E), social (S), and governance (G) disclosure.***

The theoretical foundation on board diversity traces back to Kanter's (1977) seminal work, which established that group dynamics are intrinsically affected by the proportional representation of their members. Kanter classified groups into four types (uniform, skewed, tilted, and balanced), identifying that in "skewed" groups—where a minority represents up to 15% of the total—minority individuals are treated as "tokens." At this stage, female directors face three psychosocial barriers: excessive visibility (performance pressure), polarization (exaggeration of differences between the dominant group and the minority), and assimilation (distortion of women's characteristics to fit group stereotypes) (Kanter, 1977). Overcoming this isolation occurs only when the group transitions to the "tilted" stage, where the minority reaches a critical mass.

As argued by Torchia, Calabrò, and Huse (2011), critical mass alters the dominant group's perception, allowing the minority to cease being viewed as representatives of a category ("the woman on the board") and instead be recognized for their individual competencies. Only when critical mass—commonly operationalized as three women or 30% of board seats—is achieved does an environment of legitimacy and reciprocity emerge, enabling female directors to act with greater autonomy and exert substantive influence on corporate practices (Torchia, Calabrò & Huse, 2011; Joecks, Pull & Vetter, 2013). Joecks, Pull, and Vetter (2013) reinforce this thesis by identifying a U-shaped relationship between diversity and performance: initially, the entry of a single woman may generate conflict and reduce performance due to tokenism; however, once the critical mass threshold is reached, the benefits of diversity—such as new perspectives and improved monitoring—outweigh the initial friction costs.

Complementarily, Liu, Wei, and Xie (2014) demonstrate that in emerging markets, where governance structures may be less mature, critical mass is even more essential to ensure that boards fulfill their monitoring role independently. In the context of this research, critical mass is not treated merely as a numerical threshold but as a strategic resource that, as suggested by Nuber and Velte (2021), enhances transparency and the firm's ethical commitment to its stakeholders, directly contributing to improvements in ESG indicators.

The Nordic evidence presented by Khatri (2022) demonstrates that boards with only one or two women are unable to exert meaningful influence on the environmental and social dimensions, reinforcing the notion that the female "voice" requires numerical support to overcome dominant cultural norms. By confirming that the relationship between diversity and sustainability is strengthened only after the 30% threshold is reached, Khatri (2022) provides a valuable parallel for emerging markets such as Brazil, suggesting that the impact of diversity is not merely a matter of presence but of strategic proportionality within the board.

Taken together, these studies challenge the functionalist and instrumental approach to the diversity discourse, showing that the mere inclusion of women on boards is insufficient to disrupt institutionalized power structures. Effective representation—rather than symbolic inclusion—is necessary to break with tokenistic dynamics. Accordingly, we developed the following research hypotheses:

***H2: Female critical mass on the Board of Directors increases the Environmental (E), Social (S) and Governance disclosure.***

The rise of institutional investors as active monitors of diversity and sustainability practices has taken on new contours over the past decade, shifting from a peripheral concern to a central pillar of global capital allocation strategies (Drobetz et al., 2025; Thompson, 2024). This movement was catalyzed largely by the annual letters sent by Larry Fink, CEO of BlackRock, to the CEOs of portfolio companies (Thompson, 2024), particularly the 2018 letter titled *A Sense of Purpose*. In that document,

Fink argued that a firm's financial performance cannot be dissociated from its social purpose and internal governance. From this perspective, ESG disclosure and diversity, equity, and inclusion metrics—such as female presence on boards—began to be interpreted by major asset managers not only as indicators of equity but also as markers of decision-making quality and risk mitigation. Institutional investors, acting as “Universal Owners”, have incentives to push for structural changes that elevate ESG disclosure standards across the market, thereby protecting their portfolios from negative externalities (Drobetz et al., 2025; Fink, 2018; Thompson, 2024).

Ferreira and Matos (2008) were pioneers in demonstrating, in an international study, that foreign and independent institutional investors play a significant disciplinary role in investee firms, improving operational performance and curbing inefficient capital expenditures. According to Ferreira and Matos (2008), this monitoring capacity—often absent among dispersed shareholders—stems not only from the magnitude of their ownership stakes but also from their independence from firm management.

Reviewing the literature on responsible institutional investment, Matos (2020) confirms that this new class of shareholders has acted as a diffuser of shareholder-centric governance practices, exporting Anglo-American models to contexts previously dominated by concentrated ownership or stakeholder-oriented logics, thereby reshaping the landscape described by La Porta, Lopez-de-Silanes, and Shleifer (1999). The growing presence of foreign institutional investors has led to the adoption of mechanisms such as independent boards, unified share classes, and stronger links between executive compensation and performance, including effects on the dismissal of underperforming CEOs (Matos, 2020). Long-term investors such as pension funds and endowments, promote strategic alignment with long-term value creation, whereas short-term investors tend to use the threat of divestment as a pressure mechanism—a strategy known as the “Wall Street walk” (Drobetz et al., 2025; Johnson & Greening, 1998).

In this context, the rise of passive funds—particularly BlackRock, Vanguard, and State Street—raises concerns regarding their actual capacity for engagement. Although they hold substantial voting power, many of these funds exhibit low propensity for activism, creating an asymmetry between influence and accountability (Matos, 2020). Critics argue that such investors concentrate power without applying proportional monitoring effort, a phenomenon that may exacerbate agency problems, especially in markets with weak shareholder protection (Drobetz et al., 2025). Matos (2020) notes that institutional investor engagement in governance issues has intensified over the past decade, particularly through shareholder proposals, board restructurings, and revisions to compensation policies. However, the author warns of the risk of “symbolic activism.” Matos (2020) argues that this mismatch between power and actual engagement is particularly problematic in markets where minority shareholder rights are weak, allowing superficial activism—anchored in reports, discourse, and vague targets—to substitute for concrete action. The asymmetry between rhetoric and practice may reinforce what the

critical literature calls “ESG decoupling,” in which governance and sustainability are performed as market language without substantively altering power structures (Yang et al., 2024).

Nevertheless, it would be reductive to interpret institutional investor behavior as homogeneous or inherently passive. Broad international evidence presented by Bena et al. (2017) offers a counterpoint to this view. Rather than acting as opportunistic predators, foreign institutional investors have, on average, generated positive and lasting effects on local firms, particularly in contexts marked by weak governance and concentrated corporate power. By exploiting exogenous variation in foreign institutional ownership generated by the inclusion of stocks in MSCI indices, Bena et al. (2017) demonstrate that increases in the presence of these investors are associated with significant rises in long-term investment, employment, human capital, and—most notably—technological innovation, measured by the volume of granted patents. In markets where internal control mechanisms are dysfunctional or captured, the disciplinary presence of foreign investors—equipped with greater relational independence and diversification capacity—acts as a substitute for ineffective boards, mitigating managerial entrenchment and breaking the insulation of strategic decision-making.

These findings further indicate that institutional origin matters: investors from countries with a common-law legal tradition tend to “export” good governance practices, positively influencing the behavior of target firms. Thus, under specific institutional and legal conditions, foreign institutional capital can function as a vector of organizational modernization and as an inducer of alignment between corporate decisions and long-term objectives, even when this role is driven less by normative convictions and more by reputational incentives and global benchmarking mechanisms (Bena et al., 2017; Ferreira & Matos, 2008; La Porta, Lopez-de-Silanes & Shleifer, 1999; Matos, 2020). In this context, we formulated the following hypothesis.

***H3. Higher institutional investor ownership is positively associated with the level of environmental (E), social (S), and governance (G) disclosure.***

The ownership structure of firms and, consequently, the participation of institutional investors emerges as a factor that simultaneously amplifies and tensions the effects of board diversity. The literature has debated whether these actors, by concentrating ownership power and exerting strategic pressure on firms, contribute to fostering ESG practices or, conversely, become complicit in logics oriented exclusively toward short-term financial returns. Although evidence suggests that institutional investors in developed markets act as active promoters of diversity, equity, inclusion, and sustainability (Arduini & Beck, 2024; Blay et al., 2024; Drobetz et al., 2025), the following hypothesis is established:

***H4: The impact of female critical mass on environmental (E), Social (S) and Governance (G) disclosure is strengthened by the presence of institutional investors.***

### 3. Methodology

The target population of this investigation comprises all Brazilian companies listed on B3 with available data on the LSEG Eikon® platform, totaling an initial sample of 363 firms. The decision to use companies listed on the country's main stock exchange as the empirical universe is justified both by their higher informational transparency and data standardization, as well as by the central role these organizations play in the dynamics of the contemporary Brazilian economy. In this context, firms that had their listing interrupted during the period analyzed (2015–2023) were retained in the dataset as long as they presented relevant information for the purposes of the study. This decision aims to mitigate survivorship bias, an undesirable effect in longitudinal research that may compromise external validity by arbitrarily excluding firms discontinued for various reasons—such as mergers, acquisitions, or bankruptcies—during the study period (Brown et al., 1992; Valcanover & Sonza, 2023).

The data were structured and organized in spreadsheets, then imported and processed in Stata version 19, a statistical environment that supports dynamic modeling, robust specification tests, and estimation procedures aligned with panel data assumptions. The database was constructed by consolidating multiple sources: accounting variables, ESG scores, and information on female board representation were obtained from LSEG Eikon®. Corporate governance and board composition data were sourced from B3, with extraction and processing guided by the methodology and structured-data algorithms developed by Perlin, Kirch, and Vancin (2018). The only exception was the percentage of institutional ownership, which was manually collected from reference forms.

Descriptive statistics were computed for all variables, including measures of central tendency (mean and median) and dispersion (standard deviation, minimum, and maximum), with the objective of characterizing the sample and identifying data behavior. A Student's *t*-test was also employed to analyze mean differences between firms within and outside the female critical mass threshold on the board of directors. To address outliers that could distort estimates, continuous variables were winsorized at the 1% and 99% tails, preserving sample integrity without eliminating valid observations. Finally, the empirical analysis was conducted using panel-data regression models estimated through the ordinary least squares (OLS) method. Based on research hypotheses, the general econometric model is established in Equation (1).

$$ESG_{it} = \alpha + \beta_1 PMC_{i,t} + \beta_2 IMC_{i,t} + \beta_3 PI_{i,t} + \beta_4 (IMC_{i,t} \times PI_{i,t}) + \Sigma CTRL + \Sigma SET + \Sigma ANO + \varepsilon_{it} \quad (1)$$

Tabela 1 – Main Variables

Variables	Description	Authors	
<b>Dependent Variables</b>			
Environmental Disclosure (E)	ESG score — Environmental pillar reported by LSEG Eikon (1–100 scale)	(Degenhart et al., 2024; Khatri, 2022; Shakil, 2021)	
Social Disclosure (S)	ESG score — Social pillar reported by LSEG Eikon (1–100 scale)	(Degenhart et al., 2024; Khatri, 2022; Shakil, 2021)	
Governance Disclosure (G)	ESG score — Governance pillar reported by LSEG Eikon (1–100 scale)	(Degenhart et al., 2024; Khatri, 2022; Shakil, 2021)	
ESG	Aggregated	(Degenhart et al., 2024; Khatri, 2022; Shakil, 2021)	
<b>Main Independent Variables</b>			
Variables	Description	Sig.	Authors
Female Critical Mass (IMC)	Dummy variable for $\geq 3$ or 30% women on the Board of Directors	+	(Amorelli; García-Sánchez, 2020; De Masi et al., 2021; Khatri, 2022)
Women on the Board (MNC)	Percentage of women on the board		(Amorelli; García-Sánchez, 2020; De Masi et al., 2021; Khatri, 2022)
Institutional Ownership (PI)	Percentage of voting shares held by institutional investors	+/-	(Blay et al., 2024; Drobotz et al., 2025; Matos, 2020)
Moderation Term (PIMC)	Interaction term testing whether institutional ownership moderates the relationship between female critical mass and ESG disclosure	+/-	(Blay et al., 2024; Drobotz et al., 2025; Matos, 2020)
<b>Controls</b>			
Board Size (NC)	Log of total number of board members	+	(Amorelli; García-Sánchez, 2020; De Masi et al., 2021; Khatri, 2022)
Independent Directors (CI)	Percentage of independent directors on the board	+	(Abdullah et al., 2024; Valcanover; Sonza, 2023)
CEO Duality (DUAL)	Dummy indicating whether the CEO also serves as board chair	+/-	(Aabo; Giorici, 2023; Abdullah et al., 2024; Romano et al., 2020)
CEO Age (ICEO)	CEO age at fiscal year-end (ln)	-	(Aabo; Giorici, 2023; Abdullah et al., 2024; Garcia-Blandon; Argilés-Bosch; Ravenda, 2019; Romano et al., 2020)
CEO Tenure (TCEO)	Average age of the members of the Board of Directors.	-	(Aabo; Giorici, 2023; Abdullah et al., 2024; Romano et al., 2020)
Executive Team Size (TD)	Average number of executives on the top management team.	+/-	(Aabo; Giorici, 2023; Abdullah et al., 2024; Romano et al., 2020)
Average Board Tenure (TC)	Average tenure of the members of the Board of Directors.	+/-	(Abdullah et al., 2024; Valcanover; Sonza, 2023)
Busy Directors (BUSY)	Percentage of directors who simultaneously serve on three or more different boards	+/-	(Ferris; Jayaraman; Liao, 2020; Lewellyn; Muller-Kahle, 2024; Piñeiro-Chousa et al., 2025)
Big Four Audit (BIG4)	Dummy variable indicating whether the firm is audited by one of the Big Four audit companies (PwC, Deloitte, KPMG, EY).	+/-	(Velte, 2016)
Female Directors' Family Ties (PCF)	Proportion of female directors with family ties to controlling shareholders or executives.	-	(Valcanover; Sonza, 2023; Anderson; Reeb, 2003; Villalonga; Amit, 2006; Miller et al., 2007)
Return on Equity (ROE)	Net income divided by shareholders' equity; proxy for financial performance	+	(Myers and Majluf, 1984, Huang et al. 2016; Valcanover; Sonza, 2023)
Firm Size (LAT)	Logarithm of total assets; controls for scale effects on explanatory variables.	+	(Shakil, 2021a; Hernandez-Nicolas et al. 2015; Zeng; Wang, 2015)
Industry Fixed Effects (Sector)	Industry dummy variables to control sector-specific characteristics.	N/A	(Valcanover; Sonza, 2023; Villalonga; Amit, 2006; Miller et al., 2007)
Year Fixed Effects (Year)	Year dummy variables capturing exogenous shocks and trends from 2015–2022.	N/A	(Valcanover; Sonza, 2023; Villalonga; Amit, 2006; Miller et al., 2007)

Font: Elaborated by the authors (2026).

In the model presented,  $ESG_{it}$  represents the ESG disclosure (and, in its disaggregated form, the Environmental, Social, and Governance dimensions) of firm  $i$  in year  $t$ .  $PMC_{i,t}$  represents the percentage of women on the board of directors, while  $IMC_{i,t}$  corresponds to the dummy variable for female critical

mass on the board.  $PI_{i,t}$  denotes the participation of institutional investors. The interaction term  $IMC_{i,t} \times PI_{i,t}$  captures the moderating effect of ownership structure on female presence.  $\Sigma CTRL$  includes variables such as firm size, ROE, Big Four audit, CEO duality, and the additional financial and governance controls previously described. Furthermore, binary variables were included to control for industry fixed effects ( $\Sigma SET$ ) and year fixed effects ( $\Sigma ANO$ ), capturing sectoral heterogeneity and temporal shocks that affect all firms simultaneously.  $\varepsilon_{it}$  is the error term.

Given the structure of the collected data and the sample limitations observed, the Ordinary Least Squares (OLS) method with pooled data (Pooled OLS) was adopted. This decision was based on the results of the Hausman test, which rejected the null hypothesis and indicated that the Fixed Effects model was the most appropriate. However, the subsequent Chow F-test did not reject its null hypothesis, suggesting that the pooled model would be the preferable specification. To capture the influence of macroeconomic factors and industry-specific characteristics that vary across time and firms, the model incorporates year and industry fixed effects. Additionally, following the recommendations of Wooldridge (2010) and Fávero and Belfiore (2017) for samples with residual heterogeneity, White's robust covariance matrix was employed to ensure the validity of statistical inferences even in the presence of heteroskedasticity.

The validity of the classical linear regression model (OLS) requires compliance with specific statistical assumptions. Residual normality was assessed using the Shapiro–Wilk test. Although the normality assumption may be relaxed in large samples due to the Central Limit Theorem (Wooldridge, 2010), the test provides useful indications regarding data distribution. Regarding multicollinearity among regressors, which may inflate the variances of estimated coefficients, the Variance Inflation Factor (VIF) was employed. VIF values below 10 (or, more conservatively, below 5) indicate the absence of severe multicollinearity (Fávero & Belfiore, 2017).

Finally, the presence of heteroskedasticity (non-constant variance of error terms) was examined using the Breusch–Pagan/Cook–Weisberg test. Regardless of the test outcome, robust standard errors based on White's covariance matrix were used as a precautionary measure, ensuring that hypothesis tests ( $t$ -statistics and  $F$ -statistics) remain valid even under heteroskedasticity or non-normal errors. Table 1 presents the variables applied in the study.

#### 4. Results

This section presents the study's findings, beginning with an overview of the descriptive statistics. To assess whether qualified female representation significantly alters firm characteristics, Table 2 reports the  $t$ -test for mean differences between companies with and without female critical mass on the board of directors (Group 1 and Group 0, respectively).

**Table 2 - t-test for mean differences**

Variables	Mean without women	Mean with women	Diference	T-test	p-value
Environmental Disclosure (E)	0.49	0.61	-0.12	-4.18	0.00 ***
Social Disclosure (S)	0.55	0.68	-0.13	-4.97	0.00 ***
Governance Disclosure (G)	0.52	0.65	-0.12	-4.88	0.00 ***
Aggregated ESG	0.52	0.65	-0.13	-5.68	0.00 ***
Institutional Ownership (PI)	0.18	0.20	-0.02	-0.62	0.53
Independent Directors (CI)	0.43	0.51	-0.08	-2.65	0.01 ***
Board Size (NC)	9.05	10.12	-1.07	-3.03	0.00 ***
Average Board Tenure (TC)	4.75	5.49	-0.73	-1.40	0.16
Family ties (PCF)	0.01	0.01	-0.01	-2.20	0.03 **
Busy Directors (BUSY)	0.16	0.12	0.04	1.27	0.20
CEO Age (ICEO)	52.88	51.46	1.43	1.00	0.32
CEO Tenure (TCEO)	3.87	4.19	-0.32	-0.44	0.66
Executive Team Size (TD)	5.45	5.58	-0.13	-0.28	0.78
Return on Equity (ROE)	0.08	0.06	0.02	1.49	0.14
Size (LAT)	4020.00	7220.00	-3190.00	-2.15	0.03 **

Note: \*\*\*  $p < 1\%$  \*\*  $p < 5\%$  \*  $p < 10\%$

Font: Elaborated by authors (2026)

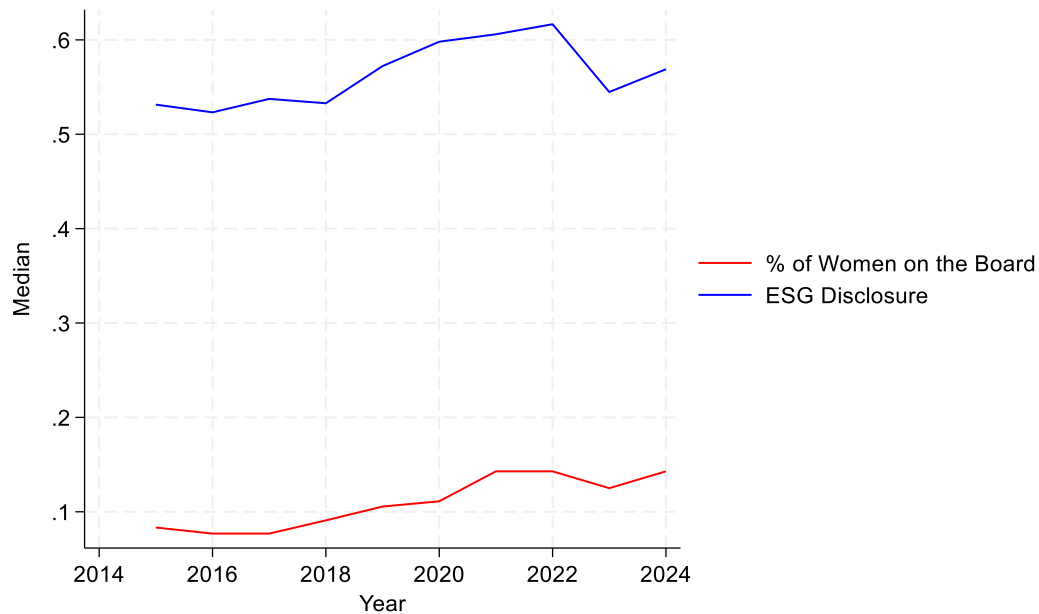
The results of the *t*-tests reported in Table 2 reveal systematic differences between firms with and without female representation on their boards. Companies with women directors exhibit significantly higher levels of environmental, social, and governance disclosure, as well as higher aggregated ESG scores, with all differences statistically significant at the 1% level. These firms also tend to have governance structures characterized by a larger board size, a higher proportion of independent directors, and slightly older board members.

Additionally, they display fewer family ties within the board, a difference significant at the 5% level. In contrast, no statistically significant differences emerge for institutional ownership, board tenure, director busyness, CEO characteristics, executive team size, or financial performance as measured by return on equity. Finally, firms with women on the board are significantly larger on average, suggesting that firm size may play a role in shaping board composition and disclosure practices. Collectively, these findings indicate that the presence of women on corporate boards is associated with more robust governance attributes and enhanced ESG transparency, although not necessarily with differences in financial performance.

The visual inspection of Figure 1 suggests that the median ESG score and the median percentage of women on the board follow broadly parallel trajectories over the 2014–2024 period. Although the two variables differ in magnitude—ESG scores consistently remaining at higher levels—their year-to-year movements appear to evolve in a similar direction. Both lines show gradual increases over time, with no major divergences or abrupt shifts that would indicate contrasting dynamics. This parallel pattern may imply that improvements in board gender diversity and ESG practices have progressed simultaneously, potentially reflecting shared underlying drivers such as regulatory developments,

stakeholder pressure, or broader corporate commitments to sustainability and governance reforms. While the figure does not establish causality, the alignment of trends reinforces the notion that gender diversity and ESG performance may be evolving in tandem within the corporate landscape.

**Figure 1 – Medians of ESG Score and Percentage of Women on the Board of Directors**



Font: Elaborated by authors (2026).

Table 4 presents the results of the multiple linear regression model employed. Prior to interpreting the coefficients obtained from the regression models, it is essential to validate the statistical assumptions underlying the Ordinary Least Squares method. As emphasized by Fávero and Belfiore (2017) and Wooldridge (2010), the reliability of statistical inferences and the absence of bias in the estimators depend on meeting fundamental assumptions, such as the absence of multicollinearity, homoscedasticity of the residuals, and normality of the distribution. Although the Pearson correlation matrix did not indicate coefficients above 0.70, the Variance Inflation Factor (VIF) test was conducted to rule out the presence of multivariate multicollinearity in the regression model. According to Fávero and Belfiore (2017), VIF values below 5 (or 10 under more flexible criteria) indicate that multicollinearity does not compromise coefficient estimation. In the present study, the mean VIF ranged between 1.41 and 1.74, which confirms the absence of severe multicollinearity, consistent with the assumptions discussed by Wooldridge (2010).

To complement the assessment of assumptions, the Breusch–Pagan test was applied to verify the presence of heteroscedasticity in the model, that is, to confirm whether the variance of the residuals is constant (homoscedasticity). The validity of statistical inferences depends on this assumption, as heteroscedasticity may lead to biased standard errors and compromise the significance of the

coefficients. The test yielded a p-value of 0.3826, which prevents the rejection of the null hypothesis of constant variance. This result indicates methodological robustness, confirming that the linear regression model satisfies the homoscedasticity requirement and reinforces the reliability of the *t*-statistics and significance levels reported. Combined with the absence of multicollinearity confirmed by the VIF test, the data demonstrate adherence to the classical regression assumptions (Fávero & Belfiore, 2017; Wooldridge, 2010).

Table 3 - Multiple Linear Regression Results

Variables	Environmental (E)		Social (S)		Governance(G)		Aggregated (ESG)					
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.				
PIMC	0.14	0.92	0.14	0.26	0.11	0.51	0.09	0.34				
MNC	0.86	0.00	***	0.60	0.00	***	0.64	0.00	***			
IMC	0.10	0.63	0.11	0.65	0.38	0.03	**	0.20	0.23			
PI	-0.02	0.83	-0.13	0.19	-0.21	0.01	**	-0.12	0.10			
CI	-0.17	0.08	*	0.06	0.50	0.44	0.00	***	0.11	0.13		
BIG4	0.09	0.06	*	0.03	0.60	-0.03	0.62	0.03	0.46			
NC	0.12	0.14	0.10	0.24	0.42	0.00	***	0.21	0.001	***		
TC	0.02	0.51	0.03	0.45	-0.01	0.82	0.01	0.60				
PCF	-0.70	0.34	-0.85	0.26	-1.27	0.07	*	-0.94	0.15			
BUSY	0.43	0.02	**	0.61	0.00	***	0.49	0.02	**	0.51	0.00	***
ICEO	0.33	0.02	**	0.38	0.02	**	-0.10	0.51	0.20	0.09	*	
TCEO	0.02	0.04	**	0.01	0.43	0.01	0.30	0.01	0.12			
TD	0.01	0.39	0.00	0.67	0.02	0.04	**	0.01	0.12			
ROE	0.12	0.04	**	0.07	0.36	0.03	0.60	0.07	0.13			
LAT	0.06	0.04	**	0.04	0.05	**	0.02	0.32	0.04	0.03	**	
DUAL	0.02	0.65	0.01	0.84	0.03	0.48	0.02	0.58				
R <sup>2</sup>	0.63		0.58		0.67		0.67					
Teste F	9.13	0.00	***	6.28	0.00	***	13.63	0.00	***	10.21	0.00	***
VIF	1.41		1.57		1.74		1.25					

Legend: \*\*\* p < 1%, \*\* p < 5%, \* p < 10% MNC: % of women on the board IMC: female critical mass dummy ( $\geq 30\%$ ) PI: institutional ownership CI: independent directors BIG4: Big Four auditor dummy NC: board size TC: board tenure PCF: family ties among female directors BUSY: busy directors ICEO: CEO age TCEO: CEO tenure TD: executive team size ROE: return on equity LAT: total assets (log) DUAL: CEO duality.

Fonte: Elaborated by the authors (2026).

The first regression, focused on the Environmental Pillar (E), reveals a statistically robust model, with an R<sup>2</sup> of 0.63, indicating that the selected variables explain approximately 63% of the variation in the environmental performance of the firms in the sample. Regarding the variables representing female participation, the percentage of women on the board of directors (MNC) exerts a positive and highly significant influence on environmental disclosure, with a coefficient of 0.86 and significance below 1%. This finding indicates that corporate transparency on environmental issues increases as the proportion of women on the board rises, corroborating the seminal study by Adams and

Ferreira (2009), which suggests that female directors tend to exercise more rigorous monitoring and participate more actively in governance committees.

This evidence aligns closely with contemporary international literature. For example, Shakil (2021b) argues that female presence on the board mitigates environmental risks and enhances ESG performance by introducing ethical perspectives and social values into decision-making. Similarly, Khatri (2022) highlights that boards with greater female representation are more oriented toward stakeholder interests and long-term sustainability performance. Furthermore, the results converge with the conclusions of Menicucci and Paolucci (2022), who emphasize that female presence strengthens the board's commitment to sustainable practices due to greater sensitivity to external issues and environmental protection. Therefore, the data suggest that increasing female representation on Brazilian boards acts as a catalyst for more transparent and responsible environmental management.

In contrast to the strong significance of the percentage of women, the variable representing Critical Mass (IMC) did not exhibit statistical relevance for the environmental pillar in this sample ( $p = 0.63$ ), suggesting that reaching a fixed threshold of representation was not sufficient to influence environmental disclosure in isolation. From the perspective of Kanter's (1977) classical theory, critical mass represents the inflection point at which a minority ceases to be treated as "tokens"—symbolic figures under conformity pressure—and becomes capable of influencing group culture and decision-making. However, the lack of significance for IMC, while MNC remains robust, indicates that the effect of diversity in the Brazilian environmental context appears to be incremental and continuous rather than dependent on a specific numerical "trigger" of three or more women.

This observation resonates with the discussions of Nuber and Velte (2021), who investigate whether female presence on the board truly functions as a superior monitoring resource for ESG performance. Nuber's study highlights that although critical mass theory is widely accepted, the effectiveness of this threshold may be mitigated by institutional factors and the intrinsic complexity of each sustainability pillar. In the environmental case, the lack of impact of the binary IMC variable may reflect that the "female voice" on the board already exerts influence even at lower proportions, or that the Brazilian market has not yet reached a level of maturity in which the critical mass threshold can overcome structural barriers in corporate governance (Nuber & Velte, 2021; Piccinin, Degenhart & Adriel, 2024). This suggests that the influence of women on environmental issues is a process of legitimacy building that strengthens with each additional seat occupied, regardless of reaching Kanter's (1977) theoretical threshold.

With respect to the influence of ownership structure, the regression results for the environmental pillar indicate that Institutional Ownership (PI) did not exhibit statistical significance, with a coefficient of  $-0.02$  and a  $p$ -value of  $0.83$ . Similarly, the moderating variable PIMC, representing the interaction between institutional ownership and female critical mass, was also not significant ( $0.14$ ;  $p = 0.92$ ),

suggesting that, in the analyzed sample, the presence of institutional investors does not amplify the effect of female presence on environmental disclosure.

This lack of significance challenges part of the classical literature, such as the study by Ferreira and Matos (2008), which positions institutional investors as active monitors capable of reducing agency costs and promoting better governance practices globally. Likewise, the results diverge from the evidence presented by Bena et al. (2017), who argue that long-term institutional ownership is associated with greater investments in innovation and corporate social responsibility. In the Brazilian context, the neutrality of the PI variable may indicate that these investors do not yet prioritize the environmental pillar as a decisive monitoring factor, or that local ownership concentration mitigates the influence of these external agents, as discussed by Matos (2020) in his critical review of responsible investment.

The analysis of the second regression, focused on the Social Pillar (S), reveals an explanatory power of 0.58, indicating that the independent and control variables account for approximately 58% of the variability in firms' social disclosure. Similar to the environmental pillar, the variable MNC (percentage of women on the board) demonstrated a positive and highly significant effect (0.60;  $p < 0.01$ ), reinforcing that proportional female representation is a central determinant of the advancement of corporate social practices. This finding is supported by Shakil (2021a), who argues that boards with greater female presence are more likely to adopt ethical values and demonstrate heightened sensitivity to the needs of employees and communities, reflecting a stronger orientation toward social responsibility. Furthermore, the significance of MNC corroborates the argument of Menicucci and Paolucci (2022) that women in top leadership positions tend to be more attuned to the demands of non-financial stakeholders, thereby fostering a culture of social transparency.

The Critical Mass variable (IMC), however, remained statistically insignificant ( $p = 0.65$ ), maintaining the pattern observed in the previous pillar. This result suggests that, within the Brazilian social context, merely reaching the threshold of three women or 30%—as proposed by Amorelli and Garcia-Sanchez (2020), Kanter (1977), and Khatri (2022)—does not, by itself, generate an immediate structural change in social disclosure. As discussed by Nuber and Velte (2021), the impact of diversity may be diluted by institutional barriers, indicating that the proportional voting power of women on the board (MNC) is a more accurate metric of influence than the attainment of a fixed numerical target. Thus, the evidence indicates that female participation in the social pillar operates incrementally, gaining strength as relative representation increases rather than through the achievement of a specific threshold.

Regarding control and ownership mechanisms, Institutional Ownership (PI) and its interaction with critical mass (PIMC) again did not reach statistical significance ( $p = 0.19$  and  $p = 0.26$ , respectively). This scenario suggests that, although institutional investors are frequently cited as promoters of governance, as argued by Ferreira and Matos (2008), their influence on the social pillar appears to be indirect or constrained by other portfolio priorities within the Brazilian market. As highlighted by Matos (2020), the effectiveness of responsible investment may vary depending on the pillar under analysis, and the lack of influence of PI in this context reinforces the notion that institutional

monitoring may be more focused on financial metrics or governance *stricto sensu* than on issues of direct social impact.

The linear regression for the Governance Pillar (G) reveals the model with the highest explanatory power in the entire study, presenting an  $R^2$  of 0.67, indicating that approximately 67% of the variation in governance practices among the firms in the sample can be explained by the selected variables. Unlike the environmental and social pillars—where only the proportion of women (MNC) was statistically relevant—the governance pillar exhibits a distinctive phenomenon: both MNC and Critical Mass (IMC) are statistically significant and display positive coefficients. The MNC variable maintained its robustness and high statistical significance (0.64;  $p < 0.01$ ), confirming that continuous female representation positively influences governance outcomes. Moreover, the central point of analysis regarding the relationship between female presence and governance disclosure lies in the IMC variable (0.38;  $p = 0.03$ ).

This finding suggests that the critical mass theory proposed by Kanter (1977) applies more precisely to structures of power and compliance than to external sustainability practices. In the Brazilian context, reaching the threshold of three women (Kanter, 1977) or 30% of the board (Khatri, 2022) appears to be a turning point for the quality of governance *stricto sensu*—including transparency, shareholder rights, and board structure—positively influencing these mechanisms. This indicates that, to alter institutional functioning and internal control mechanisms, the presence of a cohesive subgroup (critical mass) is effective, enabling women to actively influence the design of governance controls (De Masi et al., 2021; Khatri, 2022).

This result aligns directly with the evidence presented by Torchia et al. (2011), who examine the transition from “tokenism” to critical mass. According to the authors, a critical mass (at least three female directors) does the minority group gain psychological comfort and legitimacy to influence organizational innovation and strategic monitoring. The significance of IMC in the governance pillar therefore suggests that restructuring internal governance norms requires the collective strength of a cohesive subgroup capable of challenging the status quo of the male-dominated majority.

The results also align with the study by Lu and Herremans (2014) on the impact of female directors in China, which offers a useful parallel for the Brazilian data. The effect of women on board monitoring and firm performance is significantly stronger when there are three or more female directors. Lu and Herremans (2014) argue that this level of representation reduces communication barriers and facilitates the sharing of critical information—elements essential for governance scores. Thus, the findings of this research corroborate the view that effective governance and its disclosure depend on a minimum threshold of female representation.

The analysis of the impact of Institutional Ownership (PI) on the Governance Pillar (G) revealed a negative and statistically significant association ( $-0.21$ ;  $p = 0.01$ ), while the moderating effect of PI on the relationship between critical mass and governance was not statistically significant. This indicates

that, in this sample, an increase in capital concentration in the hands of institutional investors is associated with lower governance scores. This result diverges from the traditionally optimistic view presented by Ferreira and Matos (2008) and Bena et al. (2020), who argue that the presence of institutional investors—particularly foreign and independent ones—tends to elevate corporate governance standards globally, acting as an external monitoring mechanism capable of aligning interests and reducing agency costs.

To understand this inverse relationship in the Brazilian context, it is useful to draw on the distinction proposed by Johnson and Greening (1999) regarding the heterogeneity of institutional investors. The authors argue that not all institutions engage in activism in the same way; while pension funds may be more vocal on long-term issues, other types of asset managers may adopt more passive stances or focus exclusively on short-term financial metrics, neglecting demands for structural improvements in governance mechanisms.

The negative influence suggests that the predominant class of institutional investors in the sample may be prioritizing immediate returns or aligning with controlling shareholders rather than allocating resources to active monitoring that would enhance governance scores. Additionally, Matos (2020), in his discussion of responsible investment, offers an explanatory lens for this phenomenon. The author highlights that, despite the growth in PRI (Principles for Responsible Investment) signatories, there remains a significant gap between discourse and actual ESG integration, with many institutions merely “following the index” without genuine engagement in governance issues within their portfolio firms. In this scenario, high institutional presence may occur in firms with weaker governance simply because these companies offer attractive returns or liquidity, and investors choose not to exert—or are unable to exert—sufficient pressure to alter the internal power structure.

In the fourth regression, The MNC variable (percentage of women on the board) maintained its statistical significance and positive sign related to the aggregated ESG, reaffirming that female presence exerts a transversal influence on disclosure. Unlike variables that could potentially generate conflicting effects—such as positively influencing the social dimension while negatively affecting governance—female participation proved beneficial across all fronts, which is reflected in the robustness of the coefficient in the overall model. This finding validates the theoretical premise that boards open to female participation elevate the standard of strategic discussion, integrating environmental and social demands into governance practices (Adams & Ferreira, 2009; Khatri, 2022; Shakil, 2021b).

The aggregated examination of the control variables across Environmental (E), Social (S), Governance (G) and overall ESG models reveals a heterogeneous yet theoretically coherent pattern regarding the determinants of corporate sustainability disclosure. While several variables exhibit pillar-specific effects, others demonstrate consistent influence across multiple dimensions, underscoring the multifaceted nature of ESG reporting.

The effect of independent directors varies substantially across pillars. CI is marginally significant and negative for the Environmental dimension ( $p < 0.10$ ), suggesting that higher

independence does not necessarily translate into stronger environmental disclosure. Conversely, CI is strongly positive and highly significant for Governance ( $p < 0.01$ ), aligning with classical agency theory (Fama & Jensen, 1983) and most recent works (Abdullah et al., 2024; Valcanover; Sonza, 2023), which posits that independent oversight enhances monitoring quality. The absence of significance in the Social and Aggregated models indicates that independence primarily strengthens governance-related transparency rather than broader ESG practices.

The presence of a Big Four auditor shows weak and inconsistent effects. It is marginally positive for Environmental disclosure ( $p < 0.10$ ), but non-significant for the other pillars. This suggests that audit quality may contribute modestly to environmental reporting credibility but does not systematically influence broader ESG transparency, in step with the work of Velte (2016). Board size emerges as a relevant determinant of governance quality. While NC is not significant for Environmental or Social disclosure, it is strongly positive for Governance ( $p < 0.01$ ) and for the Aggregated ESG score ( $p < 0.01$ ). Larger boards may provide greater expertise and monitoring capacity, particularly in governance-related processes, reinforcing the notion that board structure is central to internal control mechanisms (Amorelli; García-Sánchez, 2020; De Masi et al., 2021; Khatri, 2022).

Board tenure shows no significant effect across any ESG dimension, suggesting that director longevity does not materially influence sustainability disclosure. This neutrality may reflect competing forces: experience may enhance oversight, but long tenure may also reduce independence. Family ties among female directors exhibits a negative and marginally significant effect only for Governance ( $p < 0.10$ ). This result is consistent with concerns that family ties may weaken monitoring incentives and compromise board independence, thereby reducing governance transparency. The absence of significance in the Environmental and Social pillars suggests that kinship effects are more detrimental to internal governance mechanisms than to external sustainability reporting (Valcanover; Sonza, 2023; Anderson; Reeb, 2003; Villalonga; Amit, 2006; Miller *et al.*, 2007).

The BUSY variable is consistently positive and significant across all pillars, with the strongest effect observed in the Social dimension ( $p < 0.01$ ). Contrary to the “busy directors hypothesis”, which predicts overload and reduced monitoring capacity, this result is consistent with Piñeiro-Chousa et al. (2025), who indicate that multi-seat directors bring experience, networks, and knowledge.

CEO age is positively associated with Environmental and Social disclosure ( $p < 0.05$ ), but non-significant for Governance. This pattern suggests that more senior executives may prioritize socio-environmental initiatives—possibly due to reputational concerns or long-term orientation—while governance structures remain more dependent on board-level dynamics. In the same way, CEO tenure shows a small but significant positive effect only for the Environmental pillar ( $p < 0.05$ ). Longer-tenured CEOs may have greater organizational influence to implement environmental initiatives, although this effect does not extend to Social or Governance disclosure. These findings contradict the main studies

that indicate that older age and longer service time lead to managerial entrenchment, hindering ESG actions (Aabo; Giorici, 2023; Abdullah et al., 2024; Romano et al., 2020).

Executive Team Size is significant only for Governance ( $p < 0.05$ ), indicating that larger executive structures may facilitate more formalized governance processes and reporting (Abdullah et al., 2024). Its non-significance in other pillars suggests that administrative capacity is more relevant for internal governance mechanisms than for socio-environmental initiatives. CEO duality shows no significant effect in any model, indicating that the concentration of leadership roles does not materially influence ESG transparency in the sample analyzed.

ROE is positively associated with Environmental disclosure ( $p < 0.05$ ), but not with Social or Governance transparency. This suggests that financially stronger firms may allocate more resources to environmental initiatives, although profitability does not systematically drive broader ESG disclosure (Huang *et al.* 2016). Firm size (log of total assets) is one of the most consistent predictors across models. LAT is significant for Environmental ( $p < 0.05$ ), Social ( $p < 0.05$ ), and Aggregated ESG ( $p < 0.05$ ), though not for Governance. Larger firms face greater public scrutiny and possess more resources, which is likely to explain their higher levels of ESG disclosure (Hernandez-Nicolas *et al.* 2015).

The pervasive statistical significance observed across all ESG dimensions suggests that the positive effect of female participation on corporate boards represents a generalized trend of improvement in socio-environmental and governance disclosure. Even after controlling for variables such as firm size, industry, and profitability, the results underscore the role of gender diversity as a structural determinant of transparency. Given this systematic convergence across all estimated models, the data provides the empirical support necessary for the non-rejection of Hypothesis H1.

The second hypothesis of this study sought to investigate whether achieving a female critical mass on the board of directors would result in higher levels of ESG transparency. Unlike the transversal results observed for H1, the analysis based on the linear regression models reveals a segmented impact, leading to the partial non-rejection of Hypothesis H2. The central evidence for this conclusion lies in the model estimated for the Governance Pillar (G). As presented in Table 3, the IMC variable (representing critical mass) exhibited a positive coefficient of 0.38, with statistical significance at the 5% level ( $p = 0.03$ ). This finding indicates that, in the Brazilian context, the influence of female critical mass is particularly decisive for the structuring and disclosure of corporate governance mechanisms.

The third hypothesis examined the influence of Institutional Ownership (PI) on ESG disclosure levels, based on the premise that institutional investors would play a monitoring role capable of enhancing corporate transparency. However, the results obtained through the linear regression models do not support this premise, culminating in the rejection of Hypothesis H3. The pillar-specific analysis shows that Institutional Ownership does not exhibit statistical significance in explaining disclosure levels in the Environmental Pillar ( $p = 0.83$ ) or the Social Pillar ( $p = 0.19$ ). These findings suggest that, within the sample studied, the presence of institutional investors does not translate into effective pressure

for socio-environmental transparency, contradicting the expectation that these agents would act as promoters of sustainable practices.

The most striking result, however, emerges in the model estimated for the Governance Pillar (G). Contrary to the expected positive sign, the PI variable presented a negative coefficient of  $-0.2072$ , with statistical significance at the 5% level ( $p = 0.011$ ). This negative impact indicates that, as the concentration of institutional investors increases in the ownership structure of the Brazilian firms analyzed, governance transparency levels tend to decline. The fourth hypothesis (H4) proposed that the positive relationship between female critical mass and ESG disclosure would be strengthened (moderated) by the presence of institutional investors. However, the empirical tests conducted through the inclusion of the interaction variable (PIMC) in the regression models resulted in the rejection of Hypothesis H4. The analysis shows a complete absence of statistical significance for the moderating effect across all dimensions tested. Specifically, the PIMC variable did not exhibit relevance in explaining transparency scores in the Environmental Pillar ( $p = 0.92$ ), the Social Pillar ( $p = 0.26$ ), or the Governance Pillar ( $p = 0.51$ ).

**Table 4 - Hypothesis Testing**

Hypothesis	Description	Result	Justification
H1	Gender diversity (MNC) positively influences ESG disclosure.	Not rejected	Positive and significant effect ( $p < 0.01$ ) across all pillars (E, S, G, and Total).
H2	Reaching female critical mass (IMC) positively influences ESG disclosure.	Partially rejected (G)	Statistically validated only for the Governance pillar ( $p = 0.031$ ).
H3	Institutional ownership (PI) positively influences ESG disclosure.	Rejected	Non-significant results for E and S, and a significant negative effect for G.
H4	Institutional ownership positively moderates the relationship between critical mass and ESG.	Rejected	The interaction term (PIMC) was not statistically significant in any model.

Font: Elaborated by authors (2026).

This evidence is fully consistent with the findings of Hypothesis H3. If Institutional Ownership, in isolation, already demonstrated a null or even negative relationship with transparency in the Brazilian sample, it logically follows that these investors do not act as amplifiers of the impact exerted by female critical mass on ESG disclosure. The rejection of H4 suggests that the strength of gender diversity—particularly in the governance pillar—operates independently of the pressure exerted by institutional shareholders. Table 4 synthesizes the hypothesis testing conducted based on the results of the linear regression.

## 5. Conclusions and Final remarks

The main evidence of this study is the positive and robust influence of the percentage of women on the board (MNC) on all pillars of ESG disclosure (Environmental, Social, Governance, and Total).

This finding corroborates recent international literature, such as Khatri (2022) and Shakil (2021), reinforcing that more diverse boards tend to be more sensitive to non-financial stakeholder demands and more oriented toward long-term sustainability. In the Brazilian context, the results align with Degenhart et al. (2024), confirming that female expertise and perspective enhance the environmental transparency of Brazilian firms.

Critical Mass Theory (Kanter, 1977; Khatri, 2022; Torchia et al., 2011) was validated specifically for the Governance (G) pillar. While in the environmental and social pillars the influence of women appears to manifest only incrementally and continuously (via MNC), in the governance pillar the attainment of the threshold of three women or 30% of the board (IMC) emerged as a statistical turning point. This result suggests that, although environmental and social disclosure does not require a numerical threshold for female influence to materialize, governance-related disclosure does.

Conversely, the negative relationship observed between Institutional Ownership (PI) and the governance score challenges the premise that large investors invariably act as active monitors in Brazil (Bena et al., 2017; Matos, 2020). This finding echoes Matos's (2020) critiques regarding gaps in responsible investment, suggesting that ownership concentration and local market specificities—discussed since La Porta et al. (1999)—may weaken the effectiveness of external institutional monitoring in favor of short-term objectives or control preservation.

The lack of significance in the moderation effect (PIMC) also raises important reflections about power dynamics within boards. Although recent literature, such as Drobetz et al. (2025), suggests that institutional investors can act as catalysts for corporate governance reforms internationally, the results of this study indicate that the combination of female critical mass and institutional pressure did not produce a synergistic effect on ESG disclosure. It is possible that the distinction between types of institutions, as proposed by Johnson and Greening (1998), serves as an explanatory factor, given that pension funds and asset managers may have different appetites for sustainability issues. This may cause the aggregated PI variable to neutralize specific monitoring effects. Thus, for the environmental pillar, governance appears to be more sensitive to the direct composition of the board than to pressure exerted by institutional ownership.

From a practical standpoint, this research provides insights for regulators and managers by demonstrating that female presence mitigates informational asymmetry and enhances the firm's reputational capital. For companies, the results indicate that promoting women to the board should be viewed as a governance strategy that strengthens monitoring and enhances the disclosure of information increasingly relevant to investors, society, and regulators.

In terms of social applications, the findings of this study directly align with the goals of the 2030 Agenda (ONU, 2015). The confirmation that proportional female participation (MNC) increases transparency across all dimensions empirically reinforces that achieving SDG 5 is not merely a matter of social equity but also a vector of informational efficiency. However, the finding that critical mass (IMC) restricts its additional benefits to the governance pillar, combined with the negative effect of

institutional ownership, raises a regulatory warning: the advancement of gender equality in Brazilian corporations still faces severe structural barriers. It becomes evident that the local capital market, on its own, does not act as a natural promoter of this sustainable agenda.

This study was limited to the period and sample of listed firms with available ESG data. Future research could explore the segmentation of institutional ownership by investor type—such as domestic versus foreign, state-owned versus private, pension funds versus investment funds—as suggested by Bena et al. (2017). This approach could reveal whether active monitoring is more prevalent among global funds than domestic ones, or more common among state-owned funds than private funds.

## References

- Aabo, T., & Giorici, I. C. (2023). *Do female CEOs matter for ESG scores? Global Finance Journal*, 56
- Abdullah, M., et al. (2024). CEO power, board features and ESG performance: An extensive novel moderation analysis. *Corporate Social Responsibility and Environmental Management*.
- Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1107721>
- Amorelli, M.-F., & García-Sánchez, I.-M. (2020). Critical mass of female directors, human capital, and stakeholder engagement by corporate social reporting. *Corporate Social Responsibility and Environmental Management*, 27(1), 204–221. <https://doi.org/10.1002/csr.1781>
- Amos, G. J. (2024). Corporate social and environmental reporting in the mining sector: Seeking pragmatic and moral forms of legitimacy? *Journal of Accounting in Emerging Economies*, 14(3), 548–584. <https://doi.org/10.1108/JAEE-07-2022-0204>
- Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *Journal of Finance*, 58(3), 1301–1328.
- Arduini, S., & Beck, T. (2024). Gender diversity: An empirical study on 4,151 US investment funds. *International Conference on Gender Research*, 7(1), 27–35
- Bena, J., Ferreira, M. A., Matos, P., & Pires, P. (2017). Are foreign investors locusts? The long-term effects of foreign institutional ownership. *Journal of Financial Economics*, 126(1), 122–146. <https://doi.org/10.1016/j.jfineco.2017.06.004>
- Birindelli, G., Chiappini, H., & Jalal, R. N.-U.-D. (2024). Greenwashing, bank financial performance and the moderating role of gender diversity. *Research in International Business and Finance*, 69. <https://doi.org/10.1016/j.ribaf.2024.102219>
- Blay, M. W., et al. (2024). Impact of board committee characteristics on social sustainability reporting in Sub-Saharan Africa: The moderating role of institutional ownership. *Journal of Risk and Financial Management*, 17(7), 302
- Brown, S. J., et al. (1992). Survivorship bias in performance studies. *Review of Financial Studies*, 5(4), 553–580.
- Brugman, B. C., van Huijstee, D., & Droog, E. (2024). Debunking the corporate paint shop: Examining the effects of misleading corporate social responsibility claims on social media. *New Media & Society*. <https://doi.org/10.1177/14614448241287340>
- Bukari, A., Agyemang, A. O., & Bawuah, B. (2024). Assessing the moderating role of ESG performance on corporate governance and firm value in developing countries. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2023.2295201>
- De Masi, S., Paci, A., Paoloni, N., & Sorrentino, M. (2021). Toward sustainable corporate behavior: The effect of the critical mass of female directors on environmental, social, and governance disclosure. *Business Strategy and the Environment*, 30(4), 1865–1878. <https://doi.org/10.1002/bse.2716>

- Degenhart, L., Hein, N., Klann, R. C., & Silva, A. (2024). Diversidade de gênero, expertise do conselho de administração e a transparência da divulgação ambiental, social e de governança (ESG): Evidências do Brasil. *Enfoque: Reflexão Contábil*, 43(2), 40–56. <https://doi.org/10.4025/enfoque.v43i2.65863>
- Drobetz, W., Haller, A., & Meier, I. (2025). Beyond ownership: The role of institutional investors in international corporate governance. *Corporate Governance: An International Review*. <https://doi.org/10.1111/corg.12532>
- Edmans, A. (2023). Applying economics—not gut feel—to ESG. *Financial Analysts Journal*, 79(4), 16–29. <https://doi.org/10.1080/0015198X.2023.2239164>
- Elkington, J. (2011). *Sustentabilidade: Canibais com garfo e faca*. M. Books.
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The journal of law and Economics*, 26(2), 301-325.
- Fávero, L., & Belfiore, P. (2017). *Manual de análise de dados: Estatística e modelagem multivariada com Excel, SPSS e Stata*. Elsevier.
- Ferreira, M. A., & Matos, P. (2008). The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics*, 88(3), 499–533. <https://doi.org/10.1016/j.jfineco.2007.07.003>
- Ferris, S. P., Jayaraman, N., & Liao, M.-Y. (Stella). (2020). Better directors or distracted directors? An international analysis of busy boards. *Global Finance Journal*, 44, 100437.
- Fukuyama, F. (1992). *The end of history and the last man*. Free Press.
- Garcia-Blandon, J., Argilés-Bosch, J. M., & Ravenda, D. (2019). Exploring the relationship between CEO characteristics and performance. *Journal of Business Economics and Management*, 20(6), 1064–1082.
- Hernandez-Nicolas, C. M., Martín-Ugedo, J. F. & Mínguez-Vera, A. (2015). The influence of gender on financial decisions: Evidence from small start-up firms in Spain. *Business Administration and Management*, 18(4), 93-107. [DOI: 10.15240/tul/001/2015-4-007]
- Huang, J. & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, 108, 822-839. [DOI: 10.1016/j.jfineco.2012.12.005]
- Issa, A. (2023). Shaping a sustainable future: The impact of board gender diversity on clean energy use and the moderating role of environmental, social and governance controversies. *Corporate Social Responsibility and Environmental Management*, 30(6), 2731–2746. <https://doi.org/10.1002/csr.2437>
- Joecks, J., Pull, K., & Vetter, K. (2013). Gender diversity in the boardroom and firm performance: What exactly constitutes a “critical mass?” *Journal of Business Ethics*, 118(1), 61–72. <https://doi.org/10.1007/s10551-012-1553-6>
- Johnson, R. A., & Greening, D. W. (1999). The effects of corporate governance and institutional ownership types on corporate social performance. *Academy of Management Journal*, 42(5), 564–576. <https://doi.org/10.5465/256977>
- Kanter, R. M. (1977). *Men and women of the corporation*. Basic Books.
- Katmon, N., Mohamad, Z. Z., Norwani, N. M., & Al Farooque, O. (2019). Comprehensive board diversity and quality of corporate social responsibility disclosure: Evidence from an emerging market. *Journal of Business Ethics*, 157(2), 447–481. <https://doi.org/10.1007/s10551-017-3672-6>
- Khamisu, M. S., Paluri, R. A., & Sonwaney, V. (2024). Environmental social and governance (ESG) disclosure motives for environmentally sensitive industry: An emerging economy perspective. *Cogent Business & Management*, 11(1), 2322027.
- Khatri, I. (2022). Board gender diversity and sustainability performance: Nordic evidence. *Corporate Social Responsibility and Environmental Management*, 30(3). <https://doi.org/10.1002/csr.2410>
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *The Journal of Finance*, 54(2), 471–517. <https://doi.org/10.1111/0022-1082.00115>
- Lewellyn, K., & Muller-Kahle, M. (2024). *ESG leaders or laggards?* A configurational analysis of ESG performance. *Business & Society*, 63(5), 1149–1202
- Lokuwaduge, C. S. D. S., & Heenetigala, K. (2017). Integrating environmental, social and governance (ESG) disclosure for a sustainable development: An Australian study. *Business Strategy and the Environment*, 26(4), 438–450. <https://doi.org/10.1002/bse.1927>

- Ma, Y., Zhang, X., Li, W., & Zhou, G. (2024). ESG disclosures, green innovation, and greenwashing: All for sustainable development? *Sustainable Development*. <https://doi.org/10.1002/sd.2634>
- Matos, P. (2020). ESG and responsible institutional investing around the world: A critical review. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3668990>
- Menicucci, E., & Paolucci, G. (2023). The influence of Italian board characteristics on environmental, social and governance dimensions. *Management Decision*, 61(10), 3082–3105. <https://doi.org/10.1108/MD-12-2021-1703>
- Miller, D., Le Breton-Miller, I., Lester, R. H., & Cannella, A. A. (2007). Are family firms really superior performers? *Journal of Corporate Finance*, 13(5), 829–858.
- Myers, S. C. & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13 (2), 187–221.
- Nuber, C., & Velte, P. (2021). *Board gender diversity and carbon emissions: European evidence on curvilinear relationships and critical mass*. *Business Strategy and the Environment*, 30(4), 1958–1992.
- Organização das Nações Unidas. (2015). Transformando nosso mundo: A Agenda 2030 para o desenvolvimento sustentável. ONU.
- Perlin, M., Kirch, G., & Vancin, D. (2018). Accessing financial reports and corporate events with GetDFPdata. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3116087>
- Piccinin, Y. G., Degenhart, L., & Adriel, J. (2024). Efeitos do desempenho ambiental, social, diversidade de gênero e controvérsias ESG no risco financeiro. *BASE – Revista de Administração e Contabilidade da Unisinos*, 21(1).
- Piñeiro-Chousa, J., López-Pérez, M. L., López-Cabarcos, M. Á., & Šević, A. (2025). Busy boards and environmental, social and governance performance: a gender perspective on NASDAQ-100 firms. *Review of Managerial Science*, 19(12), 3663-3686.
- Ribeiro, T. de L., & Lima, A. A. de. (2022). Environmental, social and governance (ESG): Mapeamento e análise de clusters. *Revista de Governança Corporativa*, 9(1), e0120. <https://doi.org/10.21434/rgc.v9i1.120>
- Romano, M., *et al.* (2020). ESG (Environmental, social and governance) performance and board gender diversity: The moderating role of CEO duality. *Sustainability*, 12(21).
- Shakil, M. H. (2021). Environmental, social and governance performance and financial risk: Moderating role of ESG controversies and board gender diversity. *Resources Policy*, 72. <https://doi.org/10.1016/j.resourpol.2021.102144>
- Sterbenk, Y., *et al.* (2022). Is femvertising the new greenwashing? Examining corporate commitment to gender equality. *Journal of Business Ethics*, 177(3), 491–505. <https://doi.org/10.1007/s10551-021-04968-3>
- Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3), 571–610. <https://doi.org/10.2307/258788>
- Thompson, G. (2024). Letters as organizational rhetoric on environmental social and governance (ESG): The case of Larry Fink and BlackRock from 2018 to 2023. *Corporate Communications: An International Journal*. <https://doi.org/10.1108/CCIJ-03-2023-0039>
- Torchia, M., Calabrò, A., & Huse, M. (2011). Women directors on corporate boards: From tokenism to critical mass. *Journal of Business Ethics*, 102(2), 299–317. <https://doi.org/10.1007/s10551-011-0815-9>
- Tran, M.-M.-A., *et al.* (2024). *Do firms with environmental, social, and governance reputational risk take into account board gender diversity? An analysis on a global scale*. **Social Science Quarterly**, 105(4), 1396–1418.
- Valcanover, V. M., & Souza, I. B. (2023). “Family business”: Does the family structure affect the performance of listed companies? *Revista de Administração Mackenzie*, 24(3). <https://doi.org/10.1590/1678-6971/eRAMR230044>
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.

- Villalonga, B., & Amit, R. (2009). How are U.S. family firms controlled? *Review of Financial Studies*, 22(8), 3047–3091.
- Xie, J., Nozawa, W., Yagi, M., Fujii, H., & Managi, S. (2019). Do environmental, social, and governance activities improve corporate financial performance? *Business Strategy and the Environment*, 28(2), 286–300. <https://doi.org/10.1002/bse.2224>
- Young, M. N., *et al.* (2008). Corporate governance in emerging economies: A review of the principal–principal perspective. *Journal of Management Studies*, 45(1), 196–220.
- Zeng, S. & Wang, L. (2015). CEO gender and corporate cash holdings. Are female CEOs more conservative? *Asia-Pacific Journal of Accounting & Economics*, 22(4), 449-474. [DOI:10.1080/16081625.2014.1003568]