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ESG performance and market risk: The mediating role of risk disclosure quality in the Brazilian market

Desempenho ESG e risco de mercado: O papel mediador da qualidade da divulgação de risco no mercado brasileiro

Desempeño ESG y riesgo de mercado: El papel mediador de la calidad de la divulgación de riesgo en el mercado brasileño

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ABSTRACT
Background: Environmental, social, and governance (ESG) aspects have attracted the attention of shareholders, investors, governments, and communities in recent years, being viewed as a framework that helps stakeholders understand how an organization manages risks and opportunities.
Objective: To investigate the relationship between ESG performance and market risk, and whether this relationship is mediated by the quality of risk disclosure in Brazil.
Method: To assess ESG performance, the study used the Refinitiv database, which classifies performance indicators across three pillars: environmental, social, and corporate governance. For the analysis of market risk, the beta extracted from Economática was used. To analyze the quality of risk disclosure, three readability metrics were employed: the Flesch index, the Fog index, and the natural logarithm of text length. Descriptive statistics and structural equation modeling were employed, covering the period from 2017 to 2022 for 67 Brazilian publicly traded companies.
Results: Significant relationships exist between ESG performance and beta at the 1% significance level, between beta and the natural logarithm of text length at the 1% level, and between the natural logarithm of text length and ESG performance at the 10% level. The analysis of the relationship between ESG performance and market risk, including the mediating variables natural logarithm of text length and Fog index, revealed an indirect effect, statistically significant at the 10% level.
Conclusions: Drawing on Stakeholder Theory and contributing to the discussion of the Brazilian market, the study revealed through structural equation modeling that risk disclosure quality is capable of mediating the relationship between ESG performance and market risk.
Keywords: ESG performance; market risk; risk disclosure quality; readability; stakeholders.

RESUMO
Contextualização: Os aspectos ambientais, sociais e de governança têm atraído a atenção de acionistas, investidores, governos e comunidades nos últimos anos, sendo vistos como uma estrutura que ajuda as partes interessadas a entenderem como a organização gerencia riscos e oportunidades.
Objetivo: Investigar a relação entre desempenho ESG e risco de mercado, e se essa relação é mediada pela qualidade da divulgação de risco no Brasil.
Método: Para a avaliação do desempenho ESG, foi usada a base Refinitiv que classifica indicadores de desempenho distribuídos em três pilares: meio ambiente, social e governança corporativa. Para a análise do risco de mercado foi utilizado o Beta extraído do Economática. Para a análise da qualidade da divulgação de risco foram utilizados três métricas de legibilidade: índice de Flesch, índice de Fog e o logaritmo natural da extensão do texto. Foram empregadas estatística descritiva e modelagem por equações estruturais, abrangendo o período de 2017 a 2022 de 67 companhias abertas brasileiras.
Resultados: Há relações significantes entre o desempenho ESG e o Beta ao nível de 1%, entre o Beta e o logaritmo natural da extensão ao nível de 1%, e entre o logaritmo natural da extensão e o desempenho ESG ao nível de 10%. A análise da relação entre o desempenho ESG e o risco de mercado com a presença das variáveis mediadoras logaritmo natural da extensão e índice de Fog evidenciou um efeito indireto, significante ao nível de 10%.
Conclusões: Apoiando-se na Teoria dos *Stakeholders* e ao contribuir para a discussão do mercado brasileiro, o estudo revelou por meio de modelagem por equações estruturais

que a qualidade da divulgação de risco é capaz de mediar a relação entre o desempenho ESG e o risco de mercado.
Palavras-chave: desempenho ESG; risco de mercado; qualidade da divulgação de riscos; legibilidade; *stakeholders*.

RESUMEN

Contextualización: Los aspectos ambientales, sociales y de gobernanza han atraído la atención de accionistas, inversionistas, gobiernos y comunidades en los últimos años, siendo considerados como una estructura que ayuda a las partes interesadas a comprender cómo la organización gestiona riesgos y oportunidades.
Objetivo: Investigar la relación entre desempeño ESG y riesgo de mercado, y si esa relación es mediada por la calidad de la divulgación de riesgos en Brasil.
Método: Para la evaluación del desempeño ESG, se utilizó la base Refinitiv que clasifica indicadores de desempeño distribuidos en tres pilares: medio ambiente, social y gobernanza corporativa. Para el análisis del riesgo de mercado se utilizó el Beta extraído de Economática. Para el análisis de la calidad de la divulgación de riesgos se emplearon tres métricas de legibilidad: índice de Flesch, índice de Fog y el logaritmo natural de la extensión del texto. Se emplearon estadística descriptiva y modelado por ecuaciones estructurales, abarcando el período de 2017 a 2022 de 67 compañías abiertas brasileñas.
Resultados: Existen relaciones significativas entre el desempeño ESG y el Beta al nivel de 1%, entre el Beta y el logaritmo natural de la extensión al nivel de 1%, y entre el logaritmo natural de la extensión y el desempeño ESG al nivel de 10%. El análisis de la relación entre el desempeño ESG y el riesgo de mercado con la presencia de las variables mediadoras logaritmo natural de la extensión e índice de Fog evidenció un efecto indirecto, significativo al nivel de 10%.
Conclusiones: Apoyándose en la Teoría de los Stakeholders y contribuyendo para la discusión del mercado brasileño, el estudio reveló por medio del modelado por ecuaciones estructurales que la calidad de la divulgación de riesgos es capaz de mediar la relación entre el desempeño ESG y el riesgo de mercado.
Palabras clave: desempeño ESG; riesgo de mercado; calidad de la divulgación de riesgos; legibilidad; stakeholders.

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1 INTRODUCTION

Environmental, Social, and Governance (ESG) practices help stakeholders understand how organizations manage risks and opportunities across these three dimensions (Zhao et al., 2023). ESG is crucial for characterizing a company's sustainability focus, as well as for signaling its commitment to social and environmental issues that help foster a close relationship between stakeholders and the interests of society (Reboredo & Sowaity, 2022). ESG can also be used as an indicator to measure performance across its environmental, social, and governance categories in light of the company's actions (Alsayegh, Rahman, & Homayoun, 2020).

The risk management literature suggests that, even in times of crisis, better ESG performance can sustain more favorable assessments by stakeholders, which may lower firm risk, as such assessments can positively influence stakeholders' attitudes and loyalty (Sassen, Hinze, & Hardeck, 2016; Shakil, 2021). It is worth noting that the adoption of practices aiming to resolve environmental, social, and governance concerns can help foster more stable relationships with the government and other stakeholders (Shakil, 2021). In this sense, higher standards of ESG practices act as a corporate risk protection mechanism (Sassen, Hinze, & Hardeck, 2016).

Santos and Coelho (2018) assert that risk management reporting maximizes the chances of business success, as it informs shareholders' investment decisions. From this perspective, and based on the findings of Bravo (2017), which highlight the utility of risk information disclosure in the dialogue between the company and its stakeholders, this study encompasses an analysis of risk disclosure quality in Brazilian companies from the perspective of the readability of risk reporting, an approach diverging from previous national studies, such as Klann, Kreuzberg, and Beck (2014) and Santos and Coelho (2018).

Given the context presented, the following question arises: What is the relationship between ESG performance, risk disclosure quality (readability), and market risk in Brazil? This research aims to investigate the relationship between ESG performance and market risk, examining whether this relationship is mediated by the quality of risk disclosure in Brazil.

To achieve this objective, descriptive statistics and structural equation modeling are employed, covering the period from 2017 to 2022 with a one-year time lag for beta (a proxy for market risk). Data from the Refinitiv and Economática databases were used to capture ESG performance and market risk, respectively, and Section 4 (Risk Factors) of the companies' Reference Form was used to assess the risk disclosure quality.

The study contributes to the Brazilian capital market by exploring the mediating role of corporate risk disclosure quality in the relationship between ESG performance and market risk. The study's contribution is further evident in its analysis of the risk disclosure quality using textual metrics (readability), whereas previous Brazilian studies (Klann, Kreuzberg, & Beck, 2014; Santos & Coelho, 2018) examined risk disclosure using content analysis and the level of detail/omission in the information disclosed by Brazilian companies regarding risk factors.

The literature on readability focuses primarily on documents written in English and in developed economies (Souza et al., 2019). Recent studies analyzing the relationship between the quality of risk disclosure and readability (Jia & Li, 2022; Ferri et al., 2023) have primarily explored mature markets, such as Europe and the United States. However, the Brazilian market exhibits institutional, regulatory, and economic characteristics that may alter this relationship. Regulatory oversight from agencies such as the Brazilian Securities and Exchange Commission (CVM) and the Central Bank, establishes specific guidelines for the disclosure of financial and risk-related information, while the country has a history of greater economic and political volatility. These factors may amplify the relevance of transparency practices, including the readability of corporate reports for stakeholder risk perception.

Although the relationship between ESG performance and market risk has been extensively analyzed in developed markets, the Brazilian context presents institutional, regulatory, and economic characteristics that may alter this relationship. The Brazilian capital market features greater macroeconomic volatility, lower liquidity, more concentrated ownership structures, and a high perception of country risk, factors that influence how investors price corporate risk. In this environment, the effects of ESG performance on market risk may differ from those observed in more mature economies.

Furthermore, the Brazilian regulatory framework requires extensive disclosure of risk factors, particularly through the Reference Form, but allows for discretion regarding the form and extent of such disclosures. As a result, risk disclosure tends to be more extensive and technically complex, and is also used as a mechanism for institutional legitimacy and for managing stakeholder perceptions. Thus, investigating this relationship in Brazil allows us to understand how the manner of risk disclosure conditions the effects of ESG performance on market risk in emerging economies, contributing to the literature by going beyond merely replicating evidence from developed markets.

Lastly, the adoption of ESG practices in Brazil is still consolidating, which amplifies the impact of risk disclosure quality on investor confidence and the reduction of information asymmetry. Unlike developed markets, where ESG practices tend to be more homogeneous, in Brazil there is greater heterogeneity across sectors and varying levels of maturity. Thus, studying the relationship between readability, ESG, and market risk in this context not only fills a gap in the domestic literature but also contributes to understanding how emerging markets react to standards of transparency and corporate governance.

2 THEORETICAL FRAMEWORK

2.1 ESG performance, market risk, and quality of risk disclosure

The acronym ESG first appeared in the United Nations Global Compact report titled *Who Cares Wins – Connecting Financial Markets to a Changing World in 2004*. The proposal originated from the then-Secretary-General of the United Nations (UN), Kofi Annan, who invited financial institutions to develop guidelines to integrate environmental, social, and governance aspects into business and investment decisions.

ESG performance has been widely discussed as a tool for improving the impacts of the impacts of corporate practices (Ferreira et al., 2023). The adoption of ESG practices, aligned with organizational strategies, aims to achieve sustainable outcomes both internally and externally, thereby enhancing performance, attracting investors, and strengthening competitive advantage (Habib, 2023).

Recent evidence suggests that ESG reporting transparency acts as a relevant informational mechanism, reducing information asymmetry and directly influencing investor behavior. Higher levels of ESG disclosure are associated with increased confidence, improved investment decision quality, and reduced perceived uncertainty, affecting market volatility and risk (Zheng, 2024). In this context, ESG performance reflects a company's actions and outcomes, thereby informing responsible investment decisions. The ESG agenda also encourages the disclosure of financial and socio-environmental information (Dai & Tang, 2022). Furthermore, ESG metrics capture intangible dimensions not explicitly reflected in financial data, such as reputation, safety, organizational culture, and governance strategies.

Among established measures of risk, beta (β) stands out; it was proposed by Sharpe (1964) as a component of the Capital Asset Pricing Model (CAPM) and represents systematic or non-diversifiable risk. This risk is determined by market factors that affect all companies in general.

According to Li, He, and Xiao (2019), information is the primary determinant of investment efficiency. In this sense, companies face pressures to gain social legitimacy and stakeholder acceptance (Buallay & Al-Ajmi, 2020). By disclosing voluntary information, companies reduce agency costs related to moral hazard and information asymmetry, thereby reducing uncertainty and improving access to capital and market valuation (Yu, Guo, & Luu, 2018). The disclosure of ESG information substantially mitigates factors and costs related to corporate risk, particularly in reducing the risk of sharp declines in stock prices (Wang et al., 2025).

Mazzioni et al. (2023) argue that companies invest in ESG performance to strengthen their reputation and legitimacy among stakeholders. Thus, greater engagement in ESG practices can drive more robust risk disclosure, given the growing demand for transparency. This disclosure communicates the social and environmental impacts of corporate operations and validates sustainable initiatives to stakeholders (Fontes Júnior et al., 2025).

Readability is essentially responsible for the effective communication written message to stakeholders. It reflects the text's level of complexity and is assessed through the message's formal characteristics, not its content (Souza et al., 2019). Li (2008) suggests measuring readability through specific metrics, such as the document's length.

The Flesch index is the most widely used metric in business readability studies to measure how easy a report is to read, considering the number of syllables per word and the number of words per sentence. The longer the terms and sentences, the more difficult the document will be to understand (Mesquita et al., 2022). As an alternative to the Flesch index, the Fog index is used in the readability literature (Holtz & Santos, 2020). This index is based on the average sentence length and the number of complex words (those with three or more syllables), classifying readability into levels: very easy (8 to 10), acceptable (10 to 12), ideal (12 to 14), difficult (14 to 18), and complex (18 or higher) (Li, 2008).

Expanding readability studies through the use of other metrics, Li (2008) also proposed measuring readability through text length, expressed as the natural logarithm of the number of words in the document. Holtz and Santos (2020) note that longer reports tend to require greater cognitive effort, making reading less transparent and, in some cases, allowing the concealment of controversial information. In light of the above, the quality of a company's risk disclosure can affect the associated market risk, such that investors' perceptions and market confidence regarding the disclosed information may be influenced. Therefore, clear, complete, and legible disclosure of a company's risks can help mitigate stock volatility and market uncertainty.

2.2 Related studies and hypothesis development

Recent studies reinforce that ESG performance plays a significant role in reducing corporate risk and shaping investor perceptions, especially in contexts of greater economic uncertainty (Broadstock et al., 2021; Gillan et al., 2021). Furthermore, the literature shows that ESG information disclosure contributes to reducing information asymmetry and improving corporate transparency (Raimo et al., 2021; Bose et al., 2022).

Regarding disclosure quality, recent research indicates that the complexity and readability of financial reports influence investors' capacity to interpret the disclosed information, directly affecting risk perception (Guay et al., 2022). These findings reinforce the relevance of analyzing not only the content but also the form of corporate communication in the context of ESG practices.

Specific ESG performance componentes may have distinct impacts on the propensity for corporate risk-taking, which reinforces the importance of analyzing these effects in a segmented manner, as opposed to aggregate analyses (Sun et al., 2024).

Recent studies have sought to systematize empirical evidence on the effects of ESG performance on organizations. A systematic literature review by Cunha et al. (2025) identifies that the impacts of ESG across various corporate outcomes are heterogeneous and dependent on the institutional context, the period analyzed, and the metrics adopted. The authors also highlight that much of the empirical evidence is concentrated in developed markets, with a scarcity of studies applied to emerging economies. This finding reinforces the need for research that considers specific institutional environments, such as the Brazilian market, where regulatory, economic, and informational characteristics may influence how ESG performance is priced by the market.

Recent empirical studies have examined the relationship between ESG performance and corporate risk in distinct socioeconomic contexts (Korinth & Lueg, 2022; He et al., 2023; Zhao et al., 2023). He et al. (2023) examined the impact of ESG performance on corporate risk-taking among firms in the Chinese market from 2010 to 2020, using regression analysis. The findings indicated that ESG performance significantly reduces corporate risk-taking, such that managers view ESG as a safe long-term investment tool. Although studies in developed markets indicate a negative relationship between ESG performance and market risk, this association may not replicate in the Brazilian context. The capital market in Brazil exhibits lower liquidity, greater ownership concentration, and high sensitivity to macroeconomic and institutional factors, which may reduce the weight attributed to ESG practices in risk pricing. Furthermore, although the Brazilian regulatory framework imposes a high level of mandatory disclosure, the maturity of ESG practices and the quality of disclosure remain heterogeneous, which may limit the capacity of ESG performance to effectively reduce market risk. Given these specificities, this study investigates whether, in the Brazilian context, ESG performance is associated with market risk.

In less liquid markets, such as the Brazilian market, ESG performance may not reduce market risk in the same way as in more mature economies. Lower liquidity, greater ownership concentration, and high sensitivity to macroeconomic and institutional shocks tend to heighten stock volatility. In this context, factors, such as country risk, political instability, and institutional uncertainty may weigh more heavily on risk perception than ESG practices.

Shah's (2025) study investigated the relationship between the disclosure of ESG (Environmental, Social, and Governance) risks and the financial performance of the 10 largest listed companies in China, India, and Pakistan between 2014 and 2024. The results demonstrate that better ESG risk disclosure is associated with better financial performance, particularly among firms with strong governance and lower risk.

The study's first hypothesis proposes a reduction in a firm's market risk through improved ESG performance in the Brazilian context, and is stated as follows:

H_1: There is a negative relationship between ESG performance and market risk.

Risk disclosure quality can be understood not only by the content disclosed, but also by the way the information is presented to the market. From an ESG perspective, companies with better social, environmental, and governance performance are expected to adopt clearer, more objective, and more accessible disclosures, thereby reducing information asymmetries and strengthening corporate transparency. In this sense, greater textual readability, reflected by higher Flesch scores and lower Fog scores, is consistent with good governance practices and responsible communication.

In addition, companies with high ESG performance are expected to present more concise risk disclosures, avoiding information overload that could hinder user comprehension. Overly long reports may signal strategies of information overload or impression management, reducing the effectiveness of transparency. Thus, from a good governance perspective, higher ESG performance would be associated with shorter risk reports.

Furthermore, studies such as Jia and Li (2022) and Ferri et al. (2023) have investigated risk disclosure from the perspective of readability. Jia and Li (2022), using data from Australian companies from 2010 to 2017, found that the existence and efficacy of risk management committees are associated with the readability of risk management disclosures.

Additionally, the literature suggests that the ESG disclosure information contributes to reduced information asymmetry and increased corporate transparency (Raimo et al., 2021; Bose et al., 2022).

Recent studies indicate that the complexity and readability of financial reports influence users' capacity to interpret the disclosed information, affecting risk perception and decision-making (Guay et al., 2022).

In the Brazilian context, Gomes et al. (2018) examined the effects of the adoption of OCPC 07 — Disclosure in General Purpose Financial Reports, issued by the Accounting Pronouncements Committee (CPC) — on the length and readability of Brazilian firms' notes to financial statements. Using mean difference tests and linear regression, they compared reports from 2013 and 2014 and found a reduction in the number of pages and words, although readability, as measured by the Flesch index, remained unchanged. It is worth noting that OCPC 07 was revised in 2023 (CPC, 2023).

Given this scenario, it is hypothesized that, in Brazil, ESG performance is positively related to the quality of risk disclosure. A higher level of disclosure brings several benefits, as it provides relevant and transparent information about

business activities, promoting more efficient decision-making (Fontes Júnior et al., 2025). Thus, more specifically, the second hypothesis of the study is formulated, broken down into the three readability metrics considered in the assessment of the quality of companies' risk disclosure, proposing that commitment to ESG performance is positively related to market risk disclosure quality:

H_{2a}: There is a positive relationship between ESG performance and risk report's Flesch index.
H_{2b}: There is a negative relationship between ESG performance and risk report's Fog index.
H_{2c}: There is a negative relationship between ESG performance and risk report length.

In the field of mediation, Zhou et al. (2023) analyzed whether ESG performance impacts sustainability through business innovation, using structural equation modeling. The results indicated that innovation exerts a mediating effect on the relationship between ESG and sustainability.

The study by Bachtiar et al. (2025) investigated the impact of environmental, social, and governance (ESG) performance on the relationship between financial reporting quality and corporate risk-taking. The results demonstrated that ESG performance mediates the relationship between information quality and risk, indicating that in more fragile institutional environments, higher financial reporting quality is associated with greater ESG engagement, which leads to more prudent risk-taking.

Given that disclosure helps clarify ESG factors by reducing information asymmetry among users, and that this can help reduce a firm's risk, the third hypothesis of the study is proposed:

H_3: Risk disclosure quality has a mediating effect on the relationship between ESG performance and market risk.

Based on the above, the delineation of the study's operational hypotheses is established, proposing an interplay between the constructs of ESG performance, risk disclosure quality, and market risk, as illustrated in Figure 1.

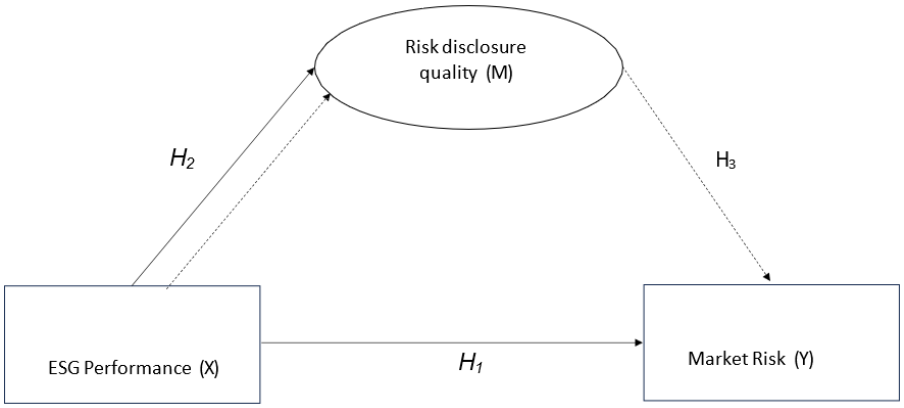

Figure 1. Outline of the study's operational hypotheses.
Source: Author's own work.

Based on Figure 1, this study analyzes the direct relationship between ESG performance and market risk, and the relationship between ESG performance and risk disclosure quality. In this regard, it also assesses the mediating role of risk disclosure quality in the relationship between ESG performance and market risk.

3 METHODOLOGY

The initial sample consists of firms that provide ESG and financial-accounting information available in the Refinitiv database during the study period (2017 to 2022). Table 1 shows the composition of the sample.

Table 1
Composition of the research sample

Operation	Description	Number of companies
=	Initial sample	77
(-)	Companies that did not provide Beta data on Economática	(7)
(-)	Companies that did not provide the Reference Form	(3)
=	Final sample	67

Source: Author's own work.

The final sample of the study thus comprises 67 publicly held companies listed on the B3, after excluding those for which data were not available during the collection period. The companies in the sample are distributed by economic sector and industry segment according to B3's classification (Table 2).

Table 2
Sectoral distribution of the research sample

Sector	Number of Companies	Number of Observations	Percentage (%)
Industrial Goods	6	36	8.96
Consumer Cyclical	10	60	14.93
Consumer Non-cyclical	6	36	8.96
Basic Materials	9	54	13.43
Information Technology	1	6	1.49
Unregulated	***32***	***192***	***47.76***
Communications	2	12	2.99
Finance	12	72	17.91
Oil, Gas, and Biofuels	4	24	5.97
Health	5	30	7.46
Public Utilities	12	72	17.91
Regulated	***35***	***210***	***52.24***
Total	**67**	**402**	**100.00**

Source: Author's own work.

Table 2 shows that the sample is fragmented and distributed across various economic sectors, with the highest representation in the Utilities, Finance, Consumer Cyclical, and Basic Materials, which together comprise for approximately 64.18% of the sample.

The companies' ESG performance is assessed using data extracted from the Refinitiv database, which provides ESG performance scores for over 15,000 companies worldwide on a scale of 0 to 100 (Refinitiv, 2022). The database integrates multiple sources, covers various aspects, and triangulates the data. Each company's Refinitiv index score is an average derived from multiple sources, standardized for countries and sectors. The secondary database features a continuously updated general CSR metric, aligned with corporate reporting standards, which will be used to assess the ESG performance of Brazilian companies. In addition, the study uses the metrics for each company's three ESG categories available in the database: environmental, social, and corporate governance. The use of these proxies (global and/or by category) is increasingly common in literature, notably in Duque-Grisales and Aguilera-Caracuel (2021), Ferri et al. (2023), Korinth and Lueg (2022), Sassen et al. (2016), Shakil (2021), and Vasconcelos et al. (2023).

The beta (β) was extracted from Economática, using monthly-estimated betas, based on a series of daily returns. A minimum of 90% daily data availability was required for the calculation of the betas. The proxy used to benchmark daily Brazilian stock prices was the Ibovespa, representing highly liquid stocks, and utilizing the Selic rate as the risk-free rate.

In this study, risk readability was measured using three metrics, with the aim of providing greater depth, robustness, and reliability to the findings, namely: (i) the Fog index (Gunning, 1952), which reflects the years of schooling required to clearly understand a text (Ferri et al., 2023), and is also used in the Brazilian context by Voigt, Machado, and Meurer (2020);

(ii) the Flesch index, which measures the text's readability, widely used in national readability research Gomes et al., 2018; Monteiro et al., 2020), although its application in this specific context is still nascent in Brazil; and (iii) the number of words in section 4 of the Reference Form, characterizing the text length, a variable used by Li (2008) and Holtz and Santos (2020) in natural logarithms.

Additionally, the study considers the following control variables: firm size (TAM), firm age (LnIDA), and firm growth (CRESC), existence of a risk committee (RISK), environmental performance (ENV), and regulated sector dummy (REG). The study used year dummies in all equations to control for the effects of changes in economic conditions, time-invariant unobservable heterogeneity (Vasconcelos et al., 2023).

Also noteworthy is the use of the ALT software, a tool developed to measure textual readability indices in the Portuguese language to calculate the Fog, Flesch, and length indices (Moreno et al., 2023).

Table 3 summarizes the proxies for measuring ESG performance and risk from both a financial perspective (market risk) and a qualitative perspective (readability of the risk report), including data sources and their respective theoretical underpinnings.

Table 3
Variables, approach, operationalization, data source, and theoretical basis

Type	Variable	Approach	Operationalization	Data source	Theoretical basis
Independent	ESG Performance	Overall	Average of the three categories (Environment, Social, and Governance)	Refinitiv	Sassen, Hinze, and Hardeck (2016); Duque-Grisales and Aguilera-Caracuel (2021); Korinth and Lueg (2022); Ferri et al. (2023)

Dependent	Financial risk	Stock market risk	Beta coefficient (β) calculated over a 60-month period (in the year)	Economática	Chollet and Sandwidi (2018); Shakil (2021)
Dependent and independent (mediator)	Quality of risk disclosure	Risk disclosure readability metrics	Flesch Index = 227 – (1.04 x words/sentences) – (72 x syllables/words) Fog Index = 0.49 x (words/sentences) + 19 x (complex words/words) Length = Natural logarithm of the number of words in the document	ALT *Software*	Li (2008); Loughran and McDonald (2014); Borges and Rech (2019); Monteiro et al. (2020); Holtz and Santos (2020); Ferri et al. (2023)

Source: Author's own work.

The structural equation models were estimated using the covariance-based technique (CB-SEM), based on the hypotheses proposed in this study. The CB-SEM technique involves a maximum likelihood process that minimizes the discrepancy between the observed and expected covariance matrices. Structural equation modeling is capable of testing mediation effects when a third variable intervenes between two other related constructs (Hair et al., 2009).

There is evidence that firm risk and risk disclosure may be related. This study evaluates the relationship between these constructs for Brazilian firms. It is worth noting that the research applies a one-year time lag for Beta. The study comprises the system of simultaneous equations (1) to (6):

$$Beta = \beta^0 + \beta^1\, ESG + \beta^2 FLESCH + \beta^3 REG + \beta^4 LnIDA + \beta^5 TAM + \beta^6 CRESC + \beta^7 RISK + \beta^8 ANO + \varepsilon \quad (1)$$

$$FLESCH = \beta^0 + \beta^1\, ESG + \beta^2\, REG + \beta^3 LnIDA + \beta^4 ENV + \beta^5 TAM + \beta^6 CRESC + \beta^7 ANO + \varepsilon \quad (2)$$

$$Beta = \beta^0 + \beta^1\, ESG + \beta^2 FOG + \beta^3 REG + \beta^4 LnIDA + \beta^5 TAM + \beta^6 CRESC + \beta^7 RISK + \beta^8 ANO + \varepsilon \quad (3)$$

$$FOG = \beta^0 + \beta^1\, ESG + \beta^2\, REG + \beta^3 LnIDA + \beta^4 ENV + \beta^5 TAM + \beta^6 CRESC + \beta^7 ANO + \varepsilon \quad (4)$$

$$Beta = \beta^0 + \beta^1\, ESG + \beta^2 LnEXT + \beta^3 REG + \beta^4 LnIDA + \beta^5 TAM + \beta^6 CRESC + \beta^7 RISK + \beta^8 ANO + \varepsilon \quad (5)$$

$$LnEXT = \beta^0 + \beta^1\, ESG + \beta^2\, REG + \beta^3 LnIDA + \beta^4 ENV + \beta^5 TAM + \beta^6 CRESC + \beta^7 ANO + \varepsilon \quad (6)$$

Equations (1), (3), and (5) use beta (β) as the dependent variable and include as independent variables ESG performance, risk disclosure measures (Flesch index, Fog index, and natural logarithm of text length), and control variables commonly found in the literature, such as firm age, size, growth, existence of a risk committee, industry regulation (REG), and year dummies (ANO). Equations (2), (4), and (6) use the Flesch index (FLESCH), the Fog index (FOG), and the natural logarithm of text length (LnEXT), respectively, as dependent variables, and use ESG performance (ESG) and other control variables as independent variables.

4 ANALYSIS AND DISCUSSION OF RESULTS

4.1 Descriptive Statistics

To characterize the profile of the firms in the sample, Table 4 displays the mean, minimum, maximum, standard deviation, and coefficient of variation of the variables used.

Table 4
Descriptive statistics of the research variables

Variable	Observations	Mean	Standard Deviation	Median	Minimum	Maximum	Coefficiente of Variation
ESG	402	54.13	21.03	57.63	5.09	92.27	0.39
FLESCH	402	21.31	5.76	21.80	7.5	39.2	0.27
FOG	402	18.08	1.75	17.9	11.7	22.4	0.10
LnEXT	402	9.05	0.64	9.09	6.36	10.59	0.07
Beta	402	1.04	0.52	1.00	–0.13	3.13	0.50
TAM	402	17.26	1.54	17.17	13.42	21.63	0.09
IDA	402	44.02	32.84	37.00	5.00	214.00	0.75
CRESC	402	1.13	0.47	1.09	–3.51	5.49	0.42

Source: Author's own work.

About ESG performance, the observed average was 54.13 points, with no firm achieving the maximum score of 100.00. This result is similar to that found by Duque-Grisales and Aguilera-Caracuel (2021), who identified an average ESG performance score of 59.62 points among multinationals in emerging markets in Latin America between 2011 and 2015.

Regarding readability metrics, the Flesch index, which ranges from 0 to 100, averaged 21.31 points, indicating that the Risk Factors section consists of very difficult texts and suggests low readability. In line with this finding, the Fog index, which estimates the educational level required to understand a text, recorded an average of 18.08, indicating that the texts are difficult and suitable for individuals with a college education. These results corroborate Ferri et al. (2023), who found a high degree of technical content and a significant number of complex words when assessing readability, using the Flesch

and Fog indices of risk disclosures by European banks from 2007 to 2018. Regarding the length of the risk report, measured by the natural logarithm of the number of words, an average of 9.05 and a maximum value of 10.59 were observed during the analyzed period. This finding is like that of Holtz and Santos (2020), who measured length in a similar manner and found an average of 9.16 in explanatory notes from Brazilian firms in 2005, 2010, and 2015.

Regarding market risk, the Beta coefficient had a mean of 1.04, indicating moderate market risk, higher than that of the market, since Beta values close to 1 reflect sensitivity similar to variations in the benchmark index, and a standard deviation of 0.52, indicating low dispersion and relative homogeneity among the analyzed firms. These results are like those reported by Shakil (2021), who observed a mean of 1.21 and a standard deviation of 0.45.

4.2 Multivariate analysis

4.2.1 Mediating variable: Flesch index of the risk disclosure

Table 5 presents estimation results for simultaneous equations 1 and 2. The results of the fit indices revealed a chi-square statistic of 6.18 with significance at the 1% level. The CFI and TLI indices were 0.99 and 0.95, respectively, indicating an excellent model fit. Therefore, the model is adequate and allows for the analysis of the estimated coefficients.

Table 5

Results of Structural Equation Models 1 and 2

	Beta (Equation 1)		Flesch Index (Equation 2)	
Variable	**Coefficient**	**Z-statistic**	**Estimator**	**Z-statistic**
Constant	0.7090	3.4675	–10.9083	–0.2204
ESG	–0.0044 ***	–3.1702	–0.1962	1.1527
FLESCH	0.0007	1.3409		
REG	–0.2223	–4.7108	–4.3550	–0.6803
LnIDA	0.0774	1.4833	6.8021 *	1.8854
ENV			0.2899 *	1.6814
TAM	0.0371 *	1.8157	5.0033 *	1.6782
CRESC	–0.1645	–1.4124	–4.7705	–0.6162
RISK	0.1388 *	1.6640		
Year Dummies	Yes		Yes	
R^2	0.1011		0.0914	
Observations	402		402	
Results of the goodness-of-fit indices				
(1) Chi-square statistic				6.1821 ***
(2) *Root Mean Square Error of Approximation* (RMSEA)				0.0721
(3) *Standardized Root Mean Square Residual* (SRMR)				0.0055
(4) *Comparative Fit Index* (CFI)				0.9965
(5) *Tucker-Lewis Index* (TLI)				0.9531

Note. Significance levels: (***) at 1%; (**) at 5%; (*) at 10%.

Source: Author's own work.

The results show that there is a negative and significant relationship at the 1% level (β = −0.0043, z = −3.1702, p = 0.0015) between ESG performance and beta (Equation 1). Thus, it is not possible to reject hypothesis H1, that there is a negative relationship between ESG performance and market risk. No significant relationship was found between the Flesch index and beta.

The results of the relationship between the Flesch index and ESG performance (Equation 2) indicate that there is no significant relationship between the constructs. Therefore, H2a is rejected, which states that there is a positive relationship between ESG performance and the Flesch index of the risk report. The results of the structural equation modeling indicated that there is a significant relationship between ESG performance and Beta. However, no significant relationships were observed between the Flesch index and beta, nor between the Flesch index and ESG performance. In summary, Table 6 presents the results of the mediation model for the simultaneous equations (1) and (2).

Table 6

Results of the mediation model for the Flesch index

Proposed Hypotheses	**Effect**	**Coefficient**	**SE**	**Z**	**p-value**
ESG → Beta	Direct	–0.0044***	0.0014	–3.1702	0.0015
FLESCH → Beta	Direct	0.0007	0.0005	1.3409	0.1800
ESG → FLESCH	Direct	–0.1962	0.1702	–1.1527	0.2490
ESG → FLESCH → Beta	Indirect	–0.0001	0.0002	–0.7915	0.4286
Total effect	**Total**	–0.0045***	0.0014	–3.2469	0.0012

Source: Author's own work.

Note. SE: Standard error. Z: Indicates the result of the significance test for the estimated coefficient. Significance levels: (***) at 1%; (**) at 5%; (*) at 10%.

To this end, the coefficient of the direct relationship between the Flesch index and beta (β = 0.0007) was multiplied by the coefficient of the direct relationship between ESG performance and the Flesch index (β = −0.1962), yielding the negative indirect effects of β = −0.0001, z = −0.7915, and p = 0.4286; however, these showed no statistical significance. Thus, it was not possible to verify the mediating effect of the Flesch index on the relationship between ESG performance and beta. Based on this, H3 is rejected, namely that the quality of risk disclosure, measured by the Flesch index, has a mediating effect on the relationship between ESG performance and market risk.

Also noteworthy is the total effect, which corresponds to the sum of the direct effect β = −0.0044 of ESG performance on beta and the indirect effect β = −0.0001, yielding a total effect of β = −0.0045 (z = −3.2469, p = 0.0012), significant at the 1% level. The result emphasizes that the relationship between ESG performance and beta is strong, as presented in H1. However, it is not possible to infer that the Flesch index acts as a mediating variable in the relationship between ESG performance and market risk (beta).

The findings partially corroborate the literature that associates ESG performance with reduced market risk, as evidenced in studies such as Albuquerque et al. (2019) and Lins et al. (2017), by indicating that ESG practices may act as a risk mitigation mechanism. However, unlike studies conducted in developed markets, the results suggest that, in the Brazilian context, the quality of risk disclosure, characterized by greater readability, does not play a significant mediating role in this relationship. This result may be associated with the lower average level of information sophistication among investors and the predominance of institutional users, for whom textual clarity may have a less relevant effect than the economic content of the disclosed information.

4.2.2 Mediating variable: Fog index of the risk disclosure

Table 7 displays the estimation results for the simultaneous equations (3) and (4). Upon examining the results of the fit indices, it was noted that the chi-square statistic was 6.71, with significance at the 5% level. Regarding the RMSEA and SRMR indicators, the RMSEA was 0.07, indicating a good fit, and the SRMR was 0.004, which was also considered acceptable. CFI and TLI indices had values of 0.99 and 0.95, respectively, indicating an excellent model fit. Thus, the adjusted model allows for the analysis of the presented coefficients.

Table 7
Results of Structural Equation Models 3 and 4

	Beta (Equation 3)			Fog Index (Equation 4)		
Variable	**Coefficient**		**Z-statistic**	**Estimator**		**Z-statistic**
Constant	1.0892	***	3.1089	19.3167	***	15.5508
ESG	–0.0044	***	–4.6352	0.0216	***	4.9888
FOG	–0.0225	**	–2.1621			
REG	–0.2215	***	–4.2331	0.1281		0.7093
LnIDA	0.0772	***	3.5433	–0.2296	**	–2.1426
ENV				–0.0252	***	–6.0097
TAM	0.0396	*	1.8067	–0.0240		–0.3314
CRESC	–0.1688	**	–2.5444	–0.1174		–0.2673
RISK	0.1352		1.4644			
Year Dummies	Yes			Yes		

Source: Author's own work.
Note. Significance levels: (***) at 1%; (**) at 5%; (*) at 10%.

As in Equation (1), the relationship between ESG performance and beta was analyzed. The results demonstrated a negative and significant relationship at the 1% level (β = −0.0044, z = −4.6352, p = 0.0000) between ESG performance and beta. Therefore, in this equation, it was also not possible to reject hypothesis H1, that there is a negative relationship between ESG performance and market risk. A relationship was observed between the Fog index and Beta, which was negative and significant at the 5% level (β = −0.0225, z = −2.1621, p = 0.0306). The result indicates that the Fog index is associated with a reduction in companies' market risk.

In Equation (4), the relationship between the Fog index and ESG performance was analyzed. According to the results, a positive and significant relationship at the 1% level was found between the Fog index and ESG performance (β = 0.0216, z = 4.9888, p = 0.0000). The result reveals that ESG performance increases the Fog index of risk disclosures by Brazilian firms. Therefore, H2b is rejected, which posits that there is a negative relationship between ESG performance and the Fog index of the risk report. The results of the structural equation modeling indicated that there are significant relationships between ESG performance and beta, between beta and the Fog index, and between ESG performance and the Fog index. The analysis of the relationship between ESG performance and beta, with the Fog index as a mediating variable, points to an indirect effect that can be calculated from the product of the coefficients of the direct effects. Table 8 presents the results of the mediation model for the simultaneous equations (3) and (4), highlighting the significance of the direct, indirect, and total effects.

Table 8
Results of the mediation model for the Fog index

Proposed Hypotheses	Effect	Estimate	SE	Z	p-value
ESG → Beta	Direct	–0.0044***	0.0010	–4.6360	0.0000
FOG → Beta	Direct	–0.0225**	0.0104	–2.1621	0.0306
ESG → FOG	Direct	0.0216***	0.0043	4.9888	0.0000
ESG → FOG → Beta	Indirect	–0.0005*	0.0003	–1.8424	0.0654
Total effect	**Total**	–0.0049***	0.0011	–4.3987	0.0000

Source: Author's own work.
Note. Significance levels: (***) at 1%; (**) at 5%; (*) at 10%.

To do so, the coefficient of the direct relationship between the Fog index and beta (β = −0.0225) was multiplied by the coefficient of the direct relationship between ESG performance and the Fog index (β = 0.0216), yielding the negative indirect effect of β = −0.0005, z = −1.8424, and p = 0.0654, which were significant at the 10% level. Thus, we observed competitive mediation, where the effects have opposite directions. Based on this, we cannot reject H3 that the quality of risk disclosure, measured by the Fog index, has a mediating effect on the relationship between ESG performance and market risk.

The total effect is also noteworthy, which corresponds to the sum of the direct effect β = −0.0044 of ESG performance on beta and the indirect effect β = −0.0005, yielding a total effect of β = −0.0049 (z = −4.3987, p = 0.0000), significant at the 1% level. The result emphasizes, as in the previous model, that the relationship between ESG performance and beta is strong, as presented in H1. Therefore, it can be observed that the quality of risk disclosure, when measured by the Fog index, acts as a mediating variable in the relationship between ESG performance and market risk (beta), which is positive and significant at the 1% level.

The positive effect of ESG performance on the textual complexity of risk disclosures aligns with evidence presented by Li (2008), which indicates that companies with greater regulatory exposure and a stronger focus on compliance tend to produce more technical and detailed disclosures.

4.2.3 Mediating variable: Natural logarithm of risk disclosure length

Table 9 presents the estimation results for equations (5) and (6). The results of the model's fit indices were examined. Initially, it was observed that the chi-square statistic was 9.7, with significance at the 1% level. Next, upon checking the RMSEA and SRMR indicators, it was found that the RMSEA indicator had a value of 0.09, which is at an acceptable level, and the SRMR indicator had a value of 0.008, which was also considered acceptable according to previous reference values. The CFI index had a value of 0.99, indicating a very good fit of the model, and the TLI index had a value of 0.93, indicating a good fit. Given this, the results of the five fit indices confirmed that the model fits the data, allowing for the analysis of the estimated coefficients in equations (5) and (6) (Table 8).

Table 9
Results of the structural equation models 5 and 6

	Beta (Equation 5)		Natural Log of Extension (Equation 6)	
Variable	**Estimator**	**Z-Statistic**	**Estimator**	**Z-Statistic**
Constant	–0.5583	–1.3658	6.12522 ***	21.5221
ESG	–0.0047 ***	–3.3912	0.00423 *	1.9246
LnEXT	0.2387 ***	4.7454		
REG	–0.2649 ***	–5.1278	0.15077 ***	3.3150
LnIDA	0.1038 ***	2.7494	–0.09701 ***	–2.8138
ENV			-0.00193	–1.0516
TAM	–0.002	–0.0741	0.16771 ***	8.0485
GROWTH	–0.1748 *	–1.6905	0.01938	0.1742
RISK	0.1788 *	2.2291		
Year *Dummies*	Yes		Yes	
R^2	0.1547		0.1547	
Observations	402		402	
Results of the goodness-of-fit indices				
(1) Chi-square statistic				9.7009 ***
(2) *Root Mean Square Error of Approximation* (RMSEA)				0.0979
(3) *Standardized Root Mean Square Residual* (SRMR)				0.0087
(4) *Comparative Fit Index* (CFI)				0.9948
(5) *Tucker-Lewis Index* (TLI)				0.9300

Source: Author's own work.
Note. Significance levels: (***) at 1%; (**) at 5%; (*) at 10%.

First, the relationship between ESG performance and beta was analyzed. The results demonstrated that there is a negative and significant relationship at the 1% level (β = −0.0047, z = −1.3658, p = 0.0007) between ESG performance and

beta. Therefore, we could not reject the hypothesis H1 that there is a negative relationship between ESG performance and market risk. This finding indicates that ESG performance reduces market risk in Brazilian companies. Notably, there is a relationship between the natural logarithm of the extent and beta that is positive and significant at the 1% level (β = 0.2387, z = 4.7454, p = 0.0000). This evidence suggests that reports of extensive risk increase companies' market risk. Next, we examined the relationship between the natural logarithm of the scope and ESG performance. According to the results, there is a positive and significant relationship at the 10% level between the natural logarithm of the scope and ESG performance (β = 0.0042, z = 1.9246, p = 0.0543). Therefore, H2c is rejected, which posits that there is a negative relationship between ESG performance and the length of the risk report. The result reveals that ESG performance influences the length (number of words) of the risk reports disclosed by Brazilian firms.

An analysis of the results for the coefficients of the control variables in Model (5), which estimated beta, revealed that all control variables were significant, except for firm size (TAM). This finding indicates that there is no relationship between firm size and beta, contradicting the finding by Shakil (2021), who found a negative and significant relationship between these variables. Thus, the coefficient of the direct relationship between the natural logarithm of disclosure length and beta (β = 0.2387) was multiplied by the coefficient of the direct relationship between ESG performance and the natural logarithm of disclosure length (β = 0.0042), yielding the positive indirect effect of β = 0.0010, z = 1.7781, and p = 0.0754, which were significant at the 10% level. Thus, complementary mediation was observed, where the direct effects have the same direction as the indirect effect, both of which are positive. The results also showed that sectoral regulation exerts a significant influence on market risk, an aspect discussed in the results section, indicating that the institutional environment is a central element in the pricing of risk by companies listed on the Brazilian stock market. Based on this, we cannot reject H3 that the quality of risk disclosure, measured by the natural logarithm of the extent, has a mediating effect on the relationship between ESG performance and market risk. Thus, the natural logarithm of the length variable plays a mediating role in the relationship between ESG performance and beta, as shown in Table 10.

Table 10
Results of the mediation model for the LnEXT variable

Proposed Hypotheses	Effect	Estimate	SE	Z	p-value
ESG → Beta	Direct	–0.0047***	0.0014	–3.3912	0.0007
LnEXT → Beta	Direct	0.2387***	0.0503	4.7454	0.0000
ESG → LnEXT	Direct	0.0042*	0.0022	1.9246	0.0543
ESG → LnEXT → Beta	Indirect	0.0010*	0.0006	1.7781	0.0754
Total effect	**Total**	–0.0037***	0.0014	–2.6757	0.0075

Source: Author's own work.
Note. Significance levels: (***) at 1%; (**) at 5%; (*) at 10%.

The total effect is highlighted, which corresponds to the sum of the direct effect β = −0.0047 of ESG performance on beta and the indirect effect β = 0.0010, resulting in a total effect of β = −0.0037 (z = −2.6757, p = 0.0075), which is significant at the 1% level. The result emphasizes that the relationship between ESG performance and market risk (beta) is strong, as presented in H1. In a general analysis, it can be stated that the natural logarithm of disclosure length is a mediating variable in the relationship between ESG performance and market risk, positive and significant at the 1% level.

The positive association between ESG performance and more extensive risk disclosures aligns with studies such as Merkl-Davies and Brennan (2007), which indicate that companies use more extensive disclosures as a strategy for legitimization and reduction of regulatory risks. However, as observed in the analysis of textual complexity, greater disclosure length was associated with higher levels of market risk, suggesting that excessively long disclosures may generate information overload and hinder investors' assimilation of the information.

4.2.4 Summary of the results of the multivariate analysis and discussion

Based on the results of the models estimated using structural equation modeling, Table 11 was prepared, presenting a summary of the research findings related to their respective hypotheses.

Table 11
Summary of the results obtained

Relationship	Hypothesis – Description	Observed relationship	Result
ESG → Beta	**H_1**: There is a negative relationship between ESG performance and market risk	Negative and significant	Hypothesis confirmed
ESG → Flesch	**H_{2a}**: There is a positive relationship between ESG performance and the Flesch index of the risk report	No relationship	Hypothesis not confirmed
ESG → Fog	**H_{2b}**: There is a negative relationship between ESG performance and the Fog index of the risk report	Positive and significant	Hypothesis not confirmed
ESG → LnEXT	**H_{2c}**: There is a negative relationship between ESG performance and the length of the risk report	Positive and significant	Hypothesis not confirmed

ESG → Flesch → Beta	**H3**: The quality of risk disclosure, as measured by the Flesch index, has a mediating effect on the relationship between ESG performance and market risk	No mediation	Hypothesis not confirmed
ESG → Fog → Beta	**H3**: The quality of risk disclosure, as measured by the Fog index, has a mediating effect on the relationship between ESG performance and market risk	Mediating effect	Hypothesis confirmed
ESG → LnEXT→ Beta	**H3**: The quality of risk disclosure, as measured by the length of the risk report, has a mediating effect on the relationship between ESG performance and market risk	Mediating effect	Hypothesis confirmed

Source: Author's own work.

Based on Table 11, the findings indicate that there is a negative relationship between ESG performance and market risk (beta) in all equations estimated in the study. In turn, regarding the relationship between ESG performance and the variables measuring the quality of risk disclosure, the proposed hypotheses were not confirmed.

Regarding the hypotheses about the mediation of risk disclosure quality metrics in the relationship between ESG performance and market risk, it was found that the Fog index and the length of the risk report are measures of readability capable of acting as mediators in the relationship between ESG performance and market risk (beta). The findings, aligned with Stakeholder Theory, suggest that the readability of risk reporting plays a fundamental role in this relationship, such that companies must also be committed to the quality of the reported risk information so that it is readable and understandable to stakeholders.

The findings of this study confirm the hypothesis that ESG performance is negatively associated with market risk, corroborating previous research that identifies ESG as a mechanism for protecting against corporate risk (Sassen, Hinze & Hardeck, 2016; Shakil, 2021). In this sense, the results reinforce the perspective of Stakeholder Theory, according to which engagement in ESG practices contributes to legitimizing business activities and reducing uncertainties perceived by investors (Buallay & Al-Ajmi, 2020).

Regarding the quality of risk disclosure, the results show that, although the hypothesis of an association between ESG performance and the Flesch index was not supported, both disclosure length and the Fog index proved to be significant mediators in the relationship between ESG and market risk. These findings suggest that readability plays a significant role in conveying risk information to the market, in line with international studies that highlight the importance of clarity and completeness in reporting (Li, 2008; Holtz & Santos, 2020). By revealing that more extensive and technically complex texts influence perceived risk, the results reinforce the need to align disclosure not only with the volume but also with the quality of the information disclosed. This finding indicates that companies with better ESG performance tend to presente more detailed and technically complex risk disclosures, even though this characteristic does not necessarily translate into a reduction in market risk.

Although one might expect ESG performance to be associated with greater readability and shorter risk reports, the empirical results for the Brazilian companies in the sample indicated a positive relationship between ESG performance, textual complexity, and the length of disclosures. This finding, though counterintuitive to normative expectations, can be interpreted considering the institutional and regulatory characteristics of the Brazilian context.

Companies with better ESG performance may adopt more cautious and detailed disclosure strategies, whether to meet the regulatory requirements of the Reference Form or to reinforce their institutional legitimacy in the eyes of investors and other stakeholders. In this context, more extensive and technically complex disclosures may reflect a conservative and defensive stance, aimed at mitigating regulatory and reputational risks, even if this results in lower immediate readability.

Thus, the results suggest that, in the Brazilian market, the quality of risk disclosures associated with ESG performance may be better reflected in the comprehensiveness and detail of the information rather than in textual simplicity, highlighting a tension between informational transparency and communicative clarity in less mature institutional environments.

Finally, the contribution of this study is also evident in situating Brazil within a debate still concentrated on mature markets, such as Europe, the United States, and Australia (Jia & Li, 2022; Ferri et al., 2023). In the national context, marked by institutional and regulatory volatility, transparency and readability become even more critical factors for reducing information asymmetry and sustaining investor confidence. By identifying that disclosure length and complexity can mediate the relationship between ESG and market risk, this research provides evidence that the quality of risk disclosure should be understood as a strategic component of corporate governance in emerging markets, contributing to both the literature and market practice.

5 FINAL CONSIDERATIONS

This study, grounded in Stakeholder Theory, was designed to investigate the relationship between ESG performance and market risk, and whether this relationship is mediated by the quality of risk disclosure in Brazil. Although the topics

addressed in this study are important for academia, few empirical studies jointly involving these constructs have been conducted in Brazil, so this research stands out by linking these themes within the context of Brazilian companies.

In general terms, the results indicate that companies' ESG performance improved over the analyzed period and that market risk increased in the first three fiscal years analyzed (2018 to 2020). As discussed in the hypothesis analysis section (2018 to 2020), the results of the structural equation modeling suggest that there are significant relationships between ESG performance and market risk, between market risk and the quality of risk disclosure, as measured by the natural logarithm of disclosure length, and between firm size and ESG performance. The analysis of the relationship between ESG performance and market risk (beta), including the natural logarithm of length as a mediating variable, reveals an indirect effect that can be calculated from the product of the coefficients of the direct effects. In the sample of Brazilian companies, the estimates of simultaneous equations revealed that the quality of risk disclosure, when measured using the natural logarithm of length and the Fog index, can mediate the relationship between ESG performance and market risk.

This study makes significant contributions by advancing the understanding of the relationship between ESG performance and market risk, as it incorporates, for the first time in the Brazilian context, the mediating role of risk disclosure quality, measured by textual readability metrics. Unlike domestic literature, which traditionally analyzes risk disclosure from the perspective of content or level of detail, this research introduces an approach based on the form of communication, highlighting how textual characteristics influence investors' perception of risk.

Accordingly, by anchoring and reinforcing the perspective of Stakeholder Theory and by demonstrating that companies with better ESG performance tend to disclose more extensive and technically complex risk information, the study contributes to showing that, in developing markets such as Brazil, transparency may manifest itself more through informational comprehensiveness than through textual simplicity. This occurs because these companies adopt a more conservative and defensive stance, resorting to technical detail as a legitimization strategy to mitigate regulatory and reputational risks. This finding expands the literature by indicating that the relationship between ESG, disclosure, and market risk is conditioned by institutional and regulatory factors, challenging the interpretation that the effects observed in developed markets are directly replicated in less mature economies.

From a practical standpoint, the results suggest that managers and regulators should pay attention not only to the volume of information disclosed but also to its clarity and communicative effectiveness, especially in environments with greater information asymmetry. This finding offers valuable and timely insights for the Brazilian capital market, particularly in the context of adopting new regulatory guidelines, such as CVM Resolution No. 193/2023, highlighting that the quality of disclosure should be treated as a strategic component of corporate governance.

The study has limitations that should be acknowledged. The sample, representing a portion of the Brazilian capital market, can be considered a limitation, given that only Brazilian firms for which information was made available by Refinitiv and that disclosed a Reference Form during the period from 2017 to 2022 were selected, which limits the

generalizability of the findings to other organizational types. For future research, we suggest expanding the sample and scope of analysis to include other institutional environments and economic contexts, such as privately held companies, cooperatives, financial firms, or third-sector organizations. It is also suggested to estimate systematic risk using multi-factor models, such as three- and four-factor models. Furthermore, it is worth noting that the analysis of the quality of risk disclosure was based on readability metrics, consequently, the content of the risk information was not analyzed. Based on this, it is suggested that future research conduct content analysis for information related to environmental, social, and governance risks, motivated by CVM Resolution No. 193, dated October 20, 2023, which provides for the preparation and disclosure of ESG information starting in fiscal year 2024.

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