

ESG Practices and Financial Performance: Evidence from the B3

Práticas ESG e Desempenho Financeiro: Evidências da B3

Prácticas ESG y Desempeño Financiero: Evidencias de la B3

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Resumo: Esta pesquisa investiga a relação entre indicadores *Environmental, Social and Governance* (ESG) e o desempenho financeiro. A amostra compreende 60 companhias listadas na B3 no período de 2012 a 2019, correspondente ao cenário pré-pandêmico. Na análise empírica, foram estimados sete modelos econométricos por meio de regressão com dados em painel, considerando indicadores ESG (ambiental, social e governança), métricas financeiras (ROA, ROE e LPA) e variáveis de controle. Os dados socioambientais foram obtidos na *CSRHub*, enquanto os dados financeiros foram extraídos da CVM. Os resultados indicam que a dimensão ambiental apresenta relação negativa com o desempenho financeiro (LPA), sugerindo a existência de *trade-offs* no curto prazo. A dimensão social não apresentou significância estatística, enquanto a governança evidenciou relação positiva com o LPA, indicando seu papel na criação de valor. Adicionalmente, identificou-se efeito negativo do desempenho financeiro sobre o ESG, reforçando evidências de relações bidirecionais em economias emergentes. Os achados evidenciam a complexidade dessa relação e contribuem para a literatura ao analisar, de forma desagregada, os pilares ESG no contexto brasileiro, indicando que os efeitos dessas práticas podem divergir das previsões teóricas, especialmente no curto prazo e em ambientes em desenvolvimento, apresentando evidências que contrastam com os pressupostos da Teoria dos *Stakeholders*.

Palavras-chave: ESG. Governança. Stakeholders.

Abstract: This study investigates the relationship between *Environmental, Social and Governance* (ESG) indicators and financial performance. The sample comprises 60 companies listed on B3 from 2012 to 2019, corresponding to the pre-pandemic period. In the empirical analysis, seven econometric models were estimated using panel data regression, considering ESG indicators (environmental, social, and governance), financial metrics (ROA, ROE, and EPS), and control variables. Socio-environmental data were obtained from *CSRHub*, while financial data were extracted from the Brazilian Securities and Exchange Commission (CVM). The results indicate that the environmental dimension has a negative relationship with financial performance (EPS), suggesting the existence of short-term trade-offs. The social dimension was not statistically significant, while governance showed a positive relationship with EPS, indicating its role in value creation. Additionally, a negative effect of financial performance on ESG was identified, reinforcing evidence of bidirectional relationships in emerging markets. The findings highlight the complexity of this relationship and contribute to the literature by analyzing ESG pillars at a disaggregated level in the Brazilian context, indicating that the effects of these practices may diverge from

theoretical predictions, particularly in the short term and in developing environments, providing evidence that contrasts with the assumptions of Stakeholder Theory.

Keywords: ESG. Governance. Stakeholders.

Resumen: Este estudio investiga la relación entre los indicadores Environmental, Social and Governance (ESG) y el desempeño financiero. La muestra comprende 60 empresas cotizadas en B3 durante el período de 2012 a 2019, correspondiente al escenario previo a la pandemia. En el análisis empírico, se estimaron siete modelos econométricos mediante regresión con datos de panel, considerando indicadores ESG (ambiental, social y de gobernanza), métricas financieras (ROA, ROE y BPA) y variables de control. Los datos socioambientales se obtuvieron de CSRHub, mientras que los datos financieros fueron extraídos de la Comisión de Valores Mobiliarios de Brasil (CVM). Los resultados indican que la dimensión ambiental presenta una relación negativa con el desempeño financiero (BPA), lo que sugiere la existencia de trade-offs en el corto plazo. La dimensión social no mostró significancia estadística, mientras que la gobernanza evidenció una relación positiva con el BPA, indicando su papel en la creación de valor. Además, se identificó un efecto negativo del desempeño financiero sobre el ESG, reforzando evidencias de relaciones bidireccionales en economías emergentes. Los hallazgos evidencian la complejidad de esta relación y contribuyen a la literatura al analizar, de forma desagregada, los pilares ESG en el contexto brasileño, indicando que los efectos de estas prácticas pueden divergir de las previsiones teóricas, especialmente en el corto plazo y en entornos en desarrollo, aportando evidencias que contrastan con los supuestos de la Teoría de los Stakeholders.

Palabras clave: ESG. Gobernanza. Stakeholders.

1 Introduction

In recent years, Environmental, Social, and Governance (ESG) has been adopted as a tool for measuring companies' environmental, social, and governance practices, as well as for promoting alignment between financial returns and demands for sustainability, driven by the expansion of socially responsible investments (Casartelli, Klotzle, & Silva, 2026; Friede, Busch, & Bassen, 2015; Ramić, 2019). Despite this growing relevance, the literature still presents inconclusive results regarding the effects of ESG practices on companies' financial performance, especially in emerging economies.

In this context, the Stockholders' Theory, grounded in Friedman (1970), posits that the primary objective of corporate management is limited to maximizing returns for shareholders. Under this logic, investments in social and environmental responsibility are viewed as costs that reduce shareholder wealth and, consequently, the value of the organization (DeAngelo, 2025). However, this paradigm has been progressively reevaluated in light of changes in the economic and institutional environment (Barbero & Marchiano, 2016). In contrast, stakeholder theory proposes a more comprehensive approach by integrating social and environmental practices into the creation of organizational value (Freeman & McVea, 2001; Freeman & Phillips, 2002; Hart & Bouchet, 2025; Taliento, Favino, & Netti, 2019; Zhao et al., 2018; Spercel, 2024). From this perspective, stakeholders such as customers, suppliers, and employees exert significant influence over corporate decisions (Taimo, Souza, Lemes, & Silva, 2025), reinforcing the relevance of ESG in contemporary business dynamics and highlighting the need for empirical research to clarify its relationship with financial performance.

ESG has established itself as an important source for corporate risk assessment, capable of influencing companies' financial performance and profitability, as well as fostering dialogue among various stakeholders, as evidenced by studies conducted in different countries (Boccaletti & Gucciardi, 2025; Paranita, Ramadian, Wijaya, Nursanti, & Judijanto, 2025; Shi et al., 2025; Yadav & Asongu, 2025; Pinheiro, Dos Santos, Cherobim, & Segatto, 2024; Rahayu

& Sanjaya, 2024; Dobrick, Klein, & Zwergel, 2023; Denis, 2023; Gregory, 2022; Dempetic, Klein, & Zwergel, 2020; Possebon, Cippiciani, Savoia, & Mariz, 2024; Taliento et al., 2019; Ramić, 2019; Yoon, Lee & Byun, 2018; Zhao et al., 2018; Velte, 2017; Friede et al., 2015).

In addition, the literature also explores the relationship between ESG and Corporate Social Responsibility (CSR), highlighting the convergence between these constructs within the context of sustainable management (Candio, 2024). Recent studies also investigate this relationship in developing countries, revealing results that remain heterogeneous and dependent on the institutional context (Alslaibi & Abdelkarim, 2024; Gao, Tan, & Chen, 2025; Parikh, Kumari, Johann, & Mladenović, 2023; Moreira, Araújo, Silva, & Lucena, 2023; Garcia & Arango, 2020; Garcia, Orsato & Silva, 2017). Furthermore, the literature addresses the intersection between corporate governance and CSR, highlighting its role in promoting sustainable practices and creating value for stakeholders (Degenhart, Vogt, & Hein, 2018; Fontes Filho & Alves, 2018). In this sense, the adoption of sustainable practices involves not only operational and financial aspects but also cognitive and organizational dimensions that influence their strategic incorporation (Nobre & Ribeiro, 2013).

In Brazil, empirical evidence regarding the relationship between ESG performance and financial performance is mixed (Casartelli et al., 2026). Studies point to a positive relationship, particularly associated with the social dimension (Alexandrino, 2020). On the other hand, there is evidence of a negative relationship between the environmental dimension and financial performance in Latin American companies (Garcia & Arango, 2020). Results have also been identified indicating a significant relationship between CSR and financial performance (Degenhart et al., 2018), as well as evidence of negative effects associated with social pressure that is still in its early stages in the Brazilian context (Crisóstomo, Freire & Vasconcellos, 2014; Soares, Abreu, & Rebouças, 2020).

Recognizing the role of ESG information in corporate management and in the decision-making process of investors, regulators, and other stakeholders, as well as the need for further research on its impacts on the financial performance of Brazilian companies, this study aims to analyze the relationships between ESG indicators and financial performance indicators. To this end, multiple linear regression with panel data is used, through the estimation of seven econometric models. The first three models investigate the effects of the ESG dimensions, environmental (ENV), social (SOC), and governance (GOV) on firms' financial performance, measured, respectively, by return on assets (ROA), earnings per share (EPS), and return on equity (ROE). Next, three additional models analyze the impact of the aggregate ESG indicator on these same variables (ROA, EPS, and ROE). Finally, the seventh model examines the inverse relationship, assessing whether companies' financial performance influences the level of adoption of ESG practices. The models were estimated using a sample of 60 companies listed on B3 from 2012 to 2019, totaling a balanced panel with 480 observations.

This research contributes by jointly analyzing the effects of the ESG dimensions environmental, social, and governance on financial performance, an area still largely unexplored in Brazil. Furthermore, it investigates the inverse relationship between financial performance and ESG, considering a pre-pandemic period, in line with the strategy adopted by Roger (2024). In this way, it contributes to advancing the debate on ESG, aiding in the understanding of strategic, policy, and risk management decisions in emerging markets.

Beyond this introduction, the article is organized as follows: the next section presents the theoretical elements of the research and a summary of the studies underpinning the hypotheses. Section 3 describes the methodological procedures and econometric models.

Section 4 presents and discusses the results. Finally, Section 5 brings together the concluding remarks, limitations, and suggestions for future research.

2 Theoretical Elements of the Research

2.1 Relationship between ESG and Financial Performance in Light of Stakeholder Theory

The stockholder theory (Friedman, 1970) maintains that the objective of corporate management should be focused on profit maximization, viewing social and environmental investments as costs that reduce shareholder wealth and firm value (DeAngelo, 2025). This perspective, predominant in traditional finance (Barbero & Marchiano, 2016), suggests a negative relationship between sustainable practices and financial performance, especially in the short term.

In contrast, Stakeholder Theory (Freeman, 1984) proposes that the creation of organizational value depends on the ability to address the interests of multiple stakeholders, integrating economic and socio-environmental dimensions (Freeman & McVea, 2001; Freeman & Phillips, 2002; Freeman, Wicks, & Parman, 2004; Feng et al., 2025; Taimo et al., 2025). From this perspective, the effective management of these relationships can strengthen long-term financial performance (Freeman, Phillips, & Sisodia, 2020; Júnior; Machado; Moraes; Petean, 2025).

Building on this theoretical foundation, concepts such as sustainability (World Commission on Environment and Development [WCED], 1987), the Triple Bottom Line (Elkington, 2001), and Corporate Social Responsibility (Carroll, 1991) have broadened the understanding of business operations by incorporating economic, social, and environmental dimensions (Nobre & Ribeiro, 2013). Although often used as synonyms, sustainability and CSR present conceptual distinctions, as highlighted by ISO 26000, which differentiates the integrated approach of sustainability from the organizational focus of CSR (Cararo & Basso, 2021; Inmetro, 2021).

In this evolving context, ESG (Environmental, Social, and Governance) emerges as an expansion of these approaches by explicitly incorporating governance as a central element in the assessment of corporate practices and risk management (Gillan, Koch, & Starks, 2021; Singhanian & Saini, 2021). Originating from international initiatives, ESG has come to be widely used as a criterion for measuring sustainable performance and for investor decision-making.

Companies implement strategies based on the three pillars of ESG: the environmental pillar, related to the impacts of operations on the environment; the social pillar, associated with relationships with internal and external stakeholders; and governance, which involves aspects such as transparency, board independence, and shareholder relations, the latter of which is often most valued by investors (Ramić, 2019).

In recent years, ESG has established itself as one of the key indicators in academic and professional discourse, driven by the growing demand for responsible investments and the need for risk mitigation (Friede et al., 2015; Yadav & Asongu, 2025). However, the literature still presents inconclusive results regarding its relationship with financial performance, especially in emerging economies, highlighting the need for analyses that consider its different dimensions and the heterogeneity of institutional contexts (Giuli, Grechi, & Tanda, 2023; Ramić, 2019; Shi et al., 2025; Roger, 2024; Casartelli et al., 2025).

In light of these empirical divergences and the lack of consensus in the literature, especially in emerging economies, a disaggregated analysis of the ESG pillars is essential for understanding their effects on financial performance. Evidence indicates that the impacts of the environmental, social, and governance dimensions are not homogeneous and may exhibit distinct relationships in terms of magnitude and significance (Ramić, 2019; Friede, Busch, & Bassen, 2015). Furthermore, studies suggest that while governance tends to have more consistent and positive effects, the environmental and social dimensions may yield ambiguous or even negative results in the short term, particularly in less developed institutional contexts (Crisóstomo et al., 2014; Garcia & Arango, 2020; Taliento et al., 2019).

In this sense, the use of disaggregated indicators allows for a more precise capture of the specific effects of each pillar, avoiding potential biases associated with aggregated ESG metrics and contributing to an analysis more aligned with the reality of emerging economies. Thus, this study proposes the following research hypotheses.

2.2 Research Hypotheses

The literature on the relationship between ESG and financial performance presents mixed results. Evidence suggests that sustainable practices can create value by reducing risks and increasing operational efficiency (Friede et al., 2015; Yadav & Asongu, 2025). However, empirical studies show divergent results, especially in emerging economies, where institutional and structural factors may limit the financial returns of these practices in the short term (Crisóstomo et al., 2014; Garcia & Arango, 2020; Orellano & Quiota, 2011). Furthermore, global analyses indicate that this relationship between ESG and financial performance varies significantly across companies and contexts (Ramić, 2019; Candio, 2024), highlighting the need for more specific investigations by ESG dimension.

In regards to the environmental dimension, the literature presents contradictory evidence. While some studies suggest positive impacts on financial performance (Ramić, 2019), research in emerging economies identifies negative effects associated with high costs and long-term returns (Crisóstomo et al., 2014; Garcia & Arango, 2020). Additionally, Soares et al. (2020) found, for Brazilian and Canadian firms, a negative relationship between ease of access to capital markets and investments in socio-environmental practices. Given this divergent evidence, the following hypothesis is formulated:

H₁: Environmental practices positively influence the financial performance of companies listed on B3.

Regarding the social dimension, the results are also inconclusive. Studies indicate positive effects on market value and financial performance (Yoon et al., 2018; Zhao et al., 2018; Alslaibi & Abdelkarim, 2024), while others point to a lack of impact in the short term (Taliento et al., 2019). Furthermore, evidence suggests that institutional factors influence the intensity of social practices (Singhania & Saini, 2021). Thus, we propose:

H₂: Social practices positively influence the financial performance of companies listed on B3.

As far as governance is concerned, the literature shows greater convergence, indicating that good practices are associated with better financial results, primarily due to the reduction of agency conflicts and increased transparency (Ramić, 2019; Boccaletti & Gucciardi, 2025; Possebon et al., 2024). Thus, the following is established:

H₃: Good corporate governance practices positively influence the financial performance of companies listed on B3.

Finally, recent literature also considers the possibility of an inverse relationship, in which financial performance influences ESG practices. While some studies indicate the absence of a significant relationship (Garcia et al., 2017), others identify negative effects in emerging economies, suggesting the existence of trade-offs in the short term (Rodrigo, Duran, and Arenas, 2016). Given the scarcity of conclusive evidence, we formulate:

H₄: A company's financial performance positively influences its ESG practices.

3 Methodological Elements of the Research

3.1 Data source and description of variables

The research sample for this study comprises non-financial companies listed on the Brasil, Bolsa, Balcão (B3) exchange. Initially, the sample included approximately 400 companies listed on B3, excluding those without a rating in the CSRHub Consensus ESG Ratings database, which provided information for 75 companies with ESG ratings in 2012. However, since this is a balanced panel, companies that did not have complete data throughout the entire period in the CSRHub database were also excluded, resulting in a final sample of 60 companies.

The choice of 2012 as the starting point is justified by the limited coverage of Brazilian companies by CSRHub in previous years—2008 (1), 2009 (10), 2010 (44), and 2011 (67)—which would have significantly reduced the sample size. Furthermore, the number of companies listed on B3 varied over time, dropping from approximately 432 companies in 2008 to lower levels in subsequent years (CVM, 2021). Added to this is the fact that, starting in 2010, the adoption of international accounting standards became mandatory for Brazilian companies (Machado, Machado, Souza & De Oliveira, 2012), which contributes to greater comparability of financial information. The analysis period ended in 2019 to avoid potential distortions resulting from the effects of the COVID-19 pandemic, in line with the strategy adopted by Roger (2024) for U.S. companies. As a result, a balanced panel with 480 observations was obtained.

The variables used in the study were classified into financial, ESG, and control variables. The data used to calculate financial performance were collected from the balance sheets and income statements for the fiscal year available on the CVM website (CVM, 2021). To assess ESG performance, data were collected from the CSRHub Consensus ESG Ratings database, a rating agency established in 2008. Its database provides information on the CSR of companies worldwide. The agency collects and organizes information from various data sources and, using a specific metric, ranks companies based on their socially responsible practices and disclosures on a scale of 0 to 100, considering averages above 50 as positive (CSRHub, 2021). Table 1 summarizes the data, its sources, the calculated variables, and previous studies that used them in similar research.

To represent financial performance, Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS) were used. The ROA variable was obtained by dividing net income by the total assets of the companies in the sample. As an indicator that reflects how profitable a company is relative to its total assets, companies with higher ROA are generally more highly valued by the market. The ROE variable is obtained by dividing net income by the

net equity of the analyzed companies. Thus, it is a profitability indicator used to show how efficiently an organization generates profit using its resources (Ramić, 2019). EPS is defined as the ratio of net income to the number of shares issued. According to Campos and Scherer (2001), it is a ratio constantly used by investors to measure corporate profitability. According to Degenhart et al. (2018), the higher the EPS, the greater the social benefits, as it reflects how profitable a company's investment can be.

Tabel 1 - Description of dependent and independent variables

Type	Variables	Calculation	Source	Previous studies	Expected
ESG	Overall ESG Indicator (ESG)		CRSHub	Asimakopoulos, P., Asimakopoulos, S., and Li (2021); Albitar et al. (2019); Aouadi and Marsat (2018); Aboud and Diab (2018); Cantino, Devalle, and Fiandrino (2017); Rahayu and Sanjaya (2024).	Positive
ESG	Environmental (ENV)		CRSHub	Campos-Rasera, Passos, and Colauto (2021); Cantino, Devalle, and Fiandrino (2017); Fahad and Bushu (2021); Gillan et al. (2021); Medeiros and Santos (2019).	Positive
ESG	Social (SOC)	community + employees/2	CRSHub	Campos-Rasera, Passos, and Colauto, (2021); Cantino, Devalle, and Fiandrino, (2017); Chen, Hung, and Wang (2017); Fahad and Bushu (2021); Medeiros and Santos (2019).	Positive
ESG	Governance (GOV)		CRSHub	Campos-Rasera, Passos, and Colauto, (2021); Cantino, Devalle, and Fiandrino, (2017); Mendonça, Martins, and Terra (2019).	Positive
Financial	Return on Assets (ROA)	Net Net/Assets Total	CVM	Soares et al. (2020); Garcia and Arango (2020); Alexandrino (2020); Ramić (2019); Taliento et al. (2019); Degenhart et al. (2018); Garcia et al. (2017); Velte (2017).	Positive
Financial	Return on Equity (ROE)	Net Income / Equity	CVM	Alexandrino (2020), Taliento et al. (2019); Ramić (2019); Degenhart et al. (2018).	Positive
Financial	Earnings per Share (EPS)	Net Net Income/Number of Shares	CVM	Alexandrino (2020); Degenhart, Vogt, and Hein (2018); Campos and Scherer (2001).	Positive
Control	Size (TAM)	Natural Log of Total Assets	CVM	Garcia and Arango (2020); Soares et al. (2020); Ramić (2019); Taliento et al. (2019); Degenhart et al. (2018).	Positive

Control	Financial Financial (G)	Total Total/Total Assets	CVM	Alexandrino (2020); Garcia and Arango (2020); Soares et al. (2020); Ramić (2019); Taliento et al. (2019); Garcia et al. (2017).	Negative
Control	Sector (SET)	Sensitive (0) Sector No Sensitive (1)	CRSHub	Garcia and Arango (2020); Alexandrino (2020); Yoon et al. (2018); Garcia et al. (2017); Kilian and Hennigs (2014).	Positive

Source: Survey Data (2026).

CRSHub's ESG classification is divided into four categories: Community, Employees, Environmental, and Governance. To represent ESG performance, the general indicators for each category were used, calculated by CRSHub as a score ranging from 0 to 100: Environmental (ENV), Social (SOC), and Governance (GOV). To calculate SOC, in accordance with the literature, it was necessary to average the Community and Employees indicators. The general ESG rating indicator was also used (CRSHub, 2021).

The models estimated in this study also included control variables that, according to the literature, can influence companies' financial performance. Size (TAM) is used in academic studies as a control variable, measured by the natural logarithm of the organization's total assets, which can influence the company's financial return. Leverage (ALA) relates to financial risk and can have a positive impact on companies' results (Ramić, 2019).

The Sector (SET) variable is a dummy variable constant over time, used to control for the sector to which the company belongs. Companies belonging to sectors considered sensitive were assigned a value of 0, and a value of 1 for the others. Garcia et al. (2017) argue that sensitive sectors have superior ESG performance compared to other companies. In this context, Cai, Jo, and Pan (2012) classify sensitive or controversial sectors as those involved in the production of alcohol, tobacco, and gambling, as well as industries dealing with emerging environmental, social, or ethical issues, such as defense-related weapons, nuclear products, oil, and biotechnology. Richardson and Welker (2001) add other sectors as sensitive: the energy industries (oil and gas), chemicals, pulp and paper production, mining, and steel. In this study, sensitive sectors include the Mining, Steel and Metallurgy, Oil and Gas, Textile, Pulp and Paper, and Chemical and Petrochemical industries, accounting for a total of 35% of the sample.

3.2 Specification and Estimation of the Econometric Model

To test the research hypotheses, the multiple linear regression method was adopted using balanced panel data. The panel data methodology was chosen for its ability to track the same set of firms over time (Wooldridge, 2010). Furthermore, panel models offer several advantages over cross-sectional and time-series models, such as an increased number of degrees of freedom, control of unobserved heterogeneity, the use of a larger number of observations, and reduced multicollinearity among variables. Furthermore, it is one of the most widely used methods in research on this topic (Hill, Griffiths, & Judge, 2012).

For each research hypothesis, an econometric model was estimated, considering the variables defined in Figure 1. Equations 1, 2, 3, 4, 5, and 6 use the financial performance indicators ROA, EPS, and ROE as dependent variables, and the ESG indicators (ENV, SOC, and GOV) as independent variables. Equation 7 considers overall ESG as an independent variable:

$$ROA_{it} = \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 GOV_{it} + \beta_4 TAM_{it} + \beta_5 ALA_{it} + \beta_6 SET_i + \varepsilon_{\{it\}} \quad (1)$$

$$LPA_{it} = \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 GOV_{it} + \beta_4 TAM_{it} + \beta_5 ALA_{it} + \beta_6 SET_i + \varepsilon_{\{it\}} \quad (2)$$

$$ROE_{it} = \beta_0 + \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 GOV_{it} + \beta_4 TAM_{it} + \beta_5 ALA_{it} + \beta_6 SET_i + \varepsilon_{\{it\}} \quad (3)$$

$$ROA_{it} = \beta_1 ESG_{it} + \beta_2 TAM_{it} + \beta_3 ALA_{it} + \beta_4 SET_i + \varepsilon_{\{it\}} \quad (4)$$

$$LPA_{it} = \beta_1 ESG_{it} + \beta_2 TAM_{it} + \beta_3 ALA_{it} + \beta_4 SET_i + \varepsilon_{\{it\}} \quad (5)$$

$$ROE_{it} = \beta_1 ESG_{it} + \beta_2 TAM_{it} + \beta_3 ALA_{it} + \beta_4 SET_i + \varepsilon_{\{it\}} \quad (6)$$

Where: $i = 1, 2, \dots, 60$; $t = 1, 2, \dots, 9$; β_0 = linear coefficient or y-intercept of the regression line; β_1 = regression intercept; ROA_{it} = return on assets for firm i at time t ; LPA_{it} = earnings per share for firm i at time t ; ROE_{it} = return on equity; ENV_{it} = Environmental score of firm i at time t ; SOC_{it} = Social score of firm i at time t ; GOV_{it} = Governance score of firm i at time t ; TAM_{it} = Size of firm i at time t ; ALA_{it} = Financial leverage of firm i at time t ; SET_i = Sector of firm i ; ε_{it} = regression error term.

Equation 7 seeks to identify the inverse relationship, that is, whether ESG performance (dependent variable) is influenced by companies' financial performance, measured by EPS, ROA, and ROE:

$$ESG_{it} = \beta_1 LPA_{it} + \beta_2 ROA_{it} + \beta_3 ROE_{it} + \beta_4 TAM_{it} + \beta_5 ALA_{it} + \beta_6 SET_i + \varepsilon_{\{it\}} \quad (7)$$

Robustness tests were conducted, including tests for multicollinearity (VIF), heteroscedasticity (Breusch-Pagan), and serial autocorrelation (Wooldridge, 2010), ensuring the validity of the estimates. The seven equations were estimated using the feasible generalized least squares (FGLS) method. FGLS is more efficient than ordinary least squares (OLS) in the presence of heteroscedasticity, autocorrelation, and cross-sectional dependence in the series (Parks, 1967; Bai, Choi & Liao, 2021). The assumption of normality was not considered essential, since the objective does not involve forecasting (Gujarati & Porter, 2011).

Previous studies have used fixed-effects models to analyze the relationship between ESG and financial performance (Velte, 2017; Eccles et al., 2014). In panel data, the choice between pooled, fixed-effects, or random-effects models is guided by tests such as Chow, Breusch-Pagan, and Hausman (Wooldridge, 2010). The fixed-effects model assumes firm-specific intercepts, controlling for firm-specific heterogeneity, while keeping the coefficients of the independent variables constant (Gujarati & Porter, 2011).

To test whether the fixed-effects model is indeed appropriate for the data, the Hausman test was performed for each of the models described in Equations 1, 2, 3, 4, 5, 6, and 7, where the null hypothesis assumes that a random-effects model is the most appropriate (Greene, 2012). The test statistic yielded a p-value $< 2.2e-16$ for Equation 1; p-value = 0.0105 for Equation 2; p-value = 0.004072 for Equation 3; p-value = $5.779e-08$ for Equation 4; p-value = $1.388e-08$ for Equation 5; p-value = 0.05999 for Equation 6; and p-value = 0.008786 for Equation 7. Therefore, rejection of the null hypothesis at the 0.05 significance level indicates that the fixed-effects model is the best fit for Equations 1, 2, 3, 4, 5, and 7; and the random-effects model for Equation 6.

4 Presentation and Discussion of Results

This section presents the statistical measures of the data collected from the sample for the period from 2012 to 2019, as shown in Table 1. Next, the correlation presented in Table 2 was tested. Finally, the analysis and discussion of the results obtained through panel data regressions are presented.

It was found that the average ESG indicator for the companies in the sample was 54.93, which is above average, considering that the score ranges from 0 to 100. It should also be noted that this indicator is based on information published and made available by the entities themselves, and given that the effort to introduce sustainable development practices into business still faces resistance at the institutional level, as reported in the analyzed literature (Orellano & Quiota, 2011; Garcia & Arango, 2020; Possebon et al., 2024). Thus, these results may indicate progress regarding sustainable practices by organizations.

Table 2 - Descriptive statistics for the study variables – 2012 to 2019

Variable	Mean	Median	Minimum	Maximum	Standard Deviation	Count	Standard error
ESG	54.9396	55	36	70	5.172	480	0.2361
ENV	57.5583	58	30	73	7.5068	480	0.3426
SOC	56.6489	57	34.5	78.5	6.3078	480	0.2879
GOV	48.6562	48.5	34	68	5.4689	480	0.2496
EPS	0.3338	0.7445	-161.9455	63.641	9.8997	480	0.4518
ROA	0.0023	0.0363	-12.4058	2.2172	0.5962	480	0.0272
ROE	0.1066	0.0995	-5.4437	6.8499	0.5766	480	0.0263
TAM	39.8002	39.8227	34.7432	43.6722	1.2897	480	0.0587
ALA	0.6551	0.3109	-0.5147	49.2515	2.9008	480	0.1324
SEP	0.65	1	0	1	0.4774	480	0.0218

Source: Survey Data (2026).

Among the ESG component variables, GOV had the lowest mean, at 48.65, a median of 48.5, a minimum of 34, and a maximum of 68, indicating a low level of governance for the companies studied, which may suggest an environment more conducive to corrupt practices (Koprowski, Krein, Mazzioni & Magro, 2021). In line with the ranking compiled by Transparency International based on the Corruption Perceptions Index, in 2024 Brazil ranked 107th out of 180 countries, with a score of 34/100 (Transparency International, 2024). It is also important to note that the medians of the ESG, ENV, SOC, GOV, and TAM indicators were similar to their mean values (, indicating that the data for the sample variables are proportional.

The TAM control variable for the companies analyzed did not show significant data dispersion because it was transformed using the natural logarithm of total assets, taking into account differences in the size of the entities in the sample, and has a mean of 39.80. Regarding financial leverage, it was found that, on average, the companies studied have a total debt-to-total-assets ratio of 0.65 and exhibit a low standard deviation, indicating less data dispersion.

The correlation matrix (Table 3) uses Pearson's correlation coefficient, which measures the degree of linear association between two random variables, ranging from 0 to 1. As can be observed, there is a high correlation between the ENV, SOC, and GOV variables and the overall ESG rating. This result was expected, given that ENV, SOC, and GOV are components of the overall ESG; therefore, to avoid multicollinearity issues, we chose not to include the ESG variable and its components in the same regression.

The financial variables LPA and ROA also show a positive and statistically significant relationship with ESG at the 10% significance level. Among the control variables, TAM was the only one to show a positive and statistically significant relationship with the ESG variables. The statistically significant relationship between the variables to be used as dependents—ROA, LPA, and ESG—and the SOC and GOV variables justifies conducting regression analyses to investigate and test the research hypotheses.

Table 3 – Pearson's Correlation

	ESG	ENV	SOC	GOV	EPS	ROA	ROE	TAM	ALA	SET
ESG	1									
ENV	0.7535***	1								
SOC	0.8591***	0.3824**	1							
GOV	0.7326***	0.4423***	0.5009**	1						
LPA	0.0893*	0.0065	0.0948556	0.1048**	1					
ROA	0.0808*	0.0574	0.0779*	0.0419	0.1180**	1				
ROE	-0.0219	-0.0542	-0.009	0.0145	0.0192	-0.4306*	1			
TAM	0.0209	0.1311*	-0.0116	-0.1133	0.077	0.1244**	-0.1178	1		
ALA	-0.0271	-0.0165	-0.034	-0.0069	-0.0557	-0.0907	0.1263*	-0.1639	1	
SEP	0.0058	-0.0951	0.0406	0.0881	-0.0818	0.0475	-0.0581	-0.1495	-0.0727	1

Note: *** significant at 1%; ** significant at 5%; * significant at 10%. **Source:** Survey Data (2026).

Table 4 presents the results of the regressions that sought to identify the effects of environmental, social, and governance practices on companies' financial performance. In the first regression, considering the dependent variable EPS, a negative relationship is observed between financial performance and companies' environmental practices at the 5% significance level, although the estimated coefficient is of low magnitude. A similar result was found by Soares et al. (2020) for Brazilian and Canadian firms, showing a negative relationship between ease of access to capital markets and investment in socio-environmental practices.

From a theoretical perspective, this result can be interpreted in light of stockholder theory, given that environmental investments, while relevant to long-term value creation, tend to generate costs in the short term without immediate financial returns (DeAngelo, 2025). It is worth noting that the implementation of sustainable actions by the company represents a financial expenditure that may not translate into immediate returns, requiring a longer time frame to be observed (Feng et al., 2025). As for the lack of a statistically significant relationship between the SOC variable and EPS, this can be understood due to an environment with little social pressure directed at companies. In emerging economies, this effect may be even more pronounced due to lower levels of institutional pressure, regulatory incentives, and market maturity regarding sustainable practices (Crisóstomo et al., 2014; Garcia & Arango, 2020). Thus, a trade-off between financial performance and sustainability is observed in the short term, which helps explain the negative sign found for the environmental variable.

The GOV variable yielded a positive and statistically significant result at the 5% level, indicating that better governance practices are associated with higher earnings per share. This result suggests that governance is the ESG pillar most directly related to value creation in the Brazilian context, possibly by reducing information asymmetry and strengthening investor confidence, as predicted by Stakeholder Theory (Freeman & McVea, 2001). A similar result was found by Alslaibi and Abdelkarim (2024) and Paranita et al. (2025). Regarding the control variables, TAM showed a positive and statistically significant relationship, while the others did not show statistical significance.

Regarding the dependent variable ROA, no statistically significant relationships were found, a result consistent with Garcia et al. (2017) for emerging countries. However, this finding diverges from international evidence, such as Velte (2017), who identified a positive relationship between ESG and financial performance. This divergence reinforces the argument

that the impact of ESG is conditioned by the institutional context, being less evident in emerging economies.

Table 4– Regressions with panel data: Financial performance indicators as dependent variables

Dependent variable ROA			Dependent variable ROA			Dependent variable ROE		
Ind. Var.	Coefficient	p-value	Ind. Var.	Coefficient	p-value	Var. Ind.	Coefficient	p-value
						β_0	1.9959 (0.9010)	0.0267*
ENV	-0.2541 (0.0795)	0.0015 **	ENV	-0.0039 (0.0050)	0.4324	ENV	-0.0049 (0.0040)	0.2259
SOC	0.0308 (0.1073)	0.7747	SOC	-0.0012 (0.0068)	0.8492	SOC	0.0002 (0.0048)	0.9708
GOV	0.3059 (0.1444)	0.0348 *	GOV	0.0062 (0.0091)	0.4985	GOV	0.0040 (0.0059)	0.4990
TAM	4.0630 (1.1809)	0.0006 ***	TAM	0.0741 (0.0745)	0.3204	TAM	-0.0443 (0.0212)	0.0368*
ALA	-0.2482 (0.1632)	0.1298	ALA	0.0107 (0.0103)	0.2991	ALA	-0.0904 (0.0561)	0.10684
						SET	-0.0904 (0.0561)	0.10684
R ² =0.052863			R ² =0.0070919			R ² =0.033177		

Note: ***significant at 1%; **significant at 5%; *significant at 10%. **Source:** Survey Data (2026).

Considering the dependent variable ROE, no statistically significant relationships were identified either, which also contradicts the stakeholders' view; with the exception of the control variable TAM, which showed a negative relationship. This diverges from the findings of Taliento et al. (2019), who found in their study that the environmental indicator positively impacted the ROE of European companies. This result suggests that larger companies may exhibit lower return on equity, possibly due to lower marginal capital efficiency. The lack of significance for the ESG variables reinforces the idea that the effects of these practices may not manifest immediately in financial performance.

Table 5 – Regressions with panel data: Financial performance indicators as dependent variables

Dependent variable LPA			Dependent variable ROA			Dependent variable ROE		
Ind. Var.	Coefficient	p-value	Ind. Var.	Coefficient	p-value	Ind. Var.	Coefficient	p-value
ESG	-0.0832 (0.1325)	0.5303	ESG	-0.0010 (0.1325)	0.8093	ESG	-0.0178 (0.0081)	0.0287*
TAM	3.6664 (1.1540)	0.0016 **	TAM	0.0083 (0.0725)	0.3141	TAM	-0.1003 (0.0707)	0.1566
ALA	-0.2416 (0.1649)	0.1436	ALA	0.0107 (0.0103)	0.2966	ALA	0.0158 (0.0101)	0.1179
R ² = 0.028086			R ² = 0.028086			R ² = 0.021147		

Note: ***significant at the 1% level; **significant at the 5% level; *significant at the 10% level. **Source:** Survey Data (2026).

When considering the aggregate ESG indicator (Table 6), no statistically significant relationships were found with EPS and ROA. However, a negative and significant relationship was identified between ESG and ROE, indicating that higher levels of ESG practices are associated with lower return on equity. This result reinforces the hypothesis of a short-term trade-off, especially in emerging markets, where financial and institutional constraints may limit companies' ability to balance financial performance and investments in sustainability (Rodrigo et al., 2016; Garcia & Orsato, 2020).

Finally, Table 5 highlights the inverse relationship, indicating that financial performance, represented by ROE, has a negative effect on ESG. This result corroborates the findings of Garcia et al. (2017) and Rodrigo et al. (2016), suggesting that companies with better financial performance may prioritize maximizing returns to shareholders at the expense of investments in sustainable practices, in line with the Stockholders' Theory (Friedman, 1970). Drempetic et al. (2020) point out that firm size has a positive effect on the ESG and Environmental sustainability ratings provided by Thomson Reuters, possibly leading to a bias in favor of large-cap firms if we apply ESG integration or a class-improvement approach to risk management. This could not be measured in this study.

Table 6 – Regression results with panel data: ESG as the dependent variable

Dependent variable: ESG			
Independent variable	Coefficient	Std. Error	p-value
LPA	-0.0082689	0.0181340	0.64864
ROA	-0.4241161	0.3253880	0.19316
ROE	-0.8331316	0.3271792	0.01124 *
TAM	0.5000679	0.4295248	0.24500
ALA	0.1003848	0.0610791	0.10103
R² = 0.025218			

Note: ***significant at 1%; **significant at 5%; *significant at 10%. **Source:** Survey Data (2026).

Regarding the SET control variable, the literature indicates that companies in environmentally sensitive industries face a greater impact from SET assessment practices and may exhibit better ESG performance (Yoon et al., 2018). However, it was not possible to measure its relationship with the dependent variable ESG. Because it is a dummy control variable, which classifies companies as belonging or not to sectors considered sensitive, its values are constant over time (the sector in which the company is classified does not vary), and therefore the fixed-effects panel model is unable to estimate its effects on the dependent variable ESG. In Equation 6, which was estimated using random effects, it was also not possible to identify a statistically significant relationship.

Additionally, the low R² values observed in the models indicate that firms' financial performance is influenced by a broad set of factors not captured by the variables included in the model. In studies using panel data, especially in the field of corporate finance, it is common to obtain low coefficients of determination without this compromising the validity of the estimators (Wooldridge, 2010). Thus, the low R² reflects the complexity of the phenomenon analyzed, not the inadequacy of the estimated models.

Regarding the research hypotheses (Table 7), only Hypothesis 3 was not rejected, indicating a positive relationship between corporate governance and financial performance. This is consistent with Paranita et al. (2025) and Garcia and Arango (2020), especially in the Latin American context. This result reinforces the importance of governance practices associated with transparency and the strengthening of relationships with stakeholders.

Table 7 – Summary of Hypotheses

Hypothesis	Description	Result
Hypothesis 1	Environmental practices positively influence companies' financial performance	Not confirmed
Hypothesis 2	Social practices positively influence companies' financial performance	Not confirmed
Hypothesis 3	Good corporate governance practices positively influence companies' financial performance	Confirmed
Hypothesis 4	A company's financial performance positively influences its ESG practices	Not confirmed

Source: Survey Data (2026).

Hypotheses 1, 2, and 4 were not confirmed. Hypothesis 1 showed a negative relationship between environmental practices and financial performance, in line with Crisóstomo et al. (2014). Hypothesis 2 was not statistically significant, indicating that social practices do not translate into financial gains in the short term in the Brazilian context, possibly due to implementation costs and time lags. In turn, Hypothesis 4 revealed a negative relationship between financial performance (ROA and ROE) and ESG, corroborating Rodrigo et al. (2016) for Latin American countries, but diverging from other contexts (Alslaibi & Abdelkarim, 2024). Taken together, the results underscore the complexity of the relationship between ESG and financial performance, which is conditioned by the institutional environment.

Additionally, the negative relationship between financial performance and ESG (H4) may reflect the existence of short-term trade-offs, especially in emerging economies, where institutional and financial constraints limit companies' ability to reconcile performance and sustainability (Rodrigo et al., 2016; Garcia & Orsato, 2020). In this context, the literature suggests that the effectiveness of ESG practices depends on the quality of the institutional environment and the alignment between economic incentives and socio-environmental objectives (Friede et al., 2015; Aouadi & Marsat, 2018).

5 Final Considerations

This study investigated the relationships between Environmental, Social, and Governance (ESG) performance and the financial performance of companies. Using secondary data, indicators of sustainable practices based on the CSRHub classification and financial metrics were applied to a sample of 60 companies listed on B3 from 2012 to 2019. The time frame up to 2019 was chosen to avoid the interference of the effects of the COVID-19 pandemic on ESG practices, in line with the strategy adopted by Roger (2024). To achieve the objective, multiple linear regression with panel data was employed, estimating seven econometric models.

The results indicate that social practices do not appear to be determinants of financial performance, as measured by ROA, ROE, and EPS, in line with previous evidence (DeAngelo, 2025). This finding supports the argument put forth by Crisóstomo et al. (2014), according to which social pressure on companies remains limited in the Brazilian context. In contrast, the

governance dimension showed a positive and statistically significant relationship with financial performance, especially regarding EPS, suggesting that better governance practices are associated with value creation. This result can be explained by reduced information asymmetry, greater transparency, and strengthened investor confidence—central elements in stakeholder theory.

On the other hand, the environmental dimension showed a negative relationship with financial performance, also measured by EPS, a result consistent with Garcia and Arango (2020) for Latin American companies. Although seemingly contradictory, this result can be interpreted as reflecting a short-term trade-off, since environmental investments involve high initial costs and deferred financial returns (Velte, 2017; Feng et al., 2025). In emerging economies, this effect tends to be more pronounced, given lower institutional maturity and limited regulatory pressure. Similar evidence is observed in studies on ESG funds, which indicate that such investments do not always yield superior returns in the short term, due to liquidity constraints and potential greenwashing practices (Badía, Cortez, & Ferruz, 2020; Casartelli et al., 2026; Fish, Kim, & Venkatraman, 2019; Naqvi et al., 2021).

In the model that tested the inverse relationship, negative and statistically significant effects of financial performance (ROE) on the overall ESG indicator were identified, indicating that more profitable companies tend, in the short term, to exhibit lower engagement in sustainable practices. This result is consistent with evidence from emerging markets (Rodrigo et al., 2016; Garcia et al., 2017) and can be interpreted in light of stockholder theory, in which maximizing returns to shareholders may limit investments in sustainability.

Although the results contribute to the literature by analyzing ESG indicators jointly and disaggregated in the Brazilian context, the study has limitations related to sample size and the restriction of financial variables, resulting from limited access to more comprehensive databases. In this regard, future research could broaden the empirical scope by incorporating a larger number of firms, different financial and non- indicators, and alternative methodological approaches, such as the use of unbalanced panels and dynamic models.

Additionally, the choice of a balanced panel, although methodologically justifiable, may introduce survival bias by considering only firms with available information throughout the entire analyzed period. As a result, delisted firms or those with operational discontinuity are excluded, which may compromise the representativeness of the sample and skew the results. As highlighted by Wooldridge (2010), the exclusion of these observations can affect the external validity of the analyses, whereas Fama and French (2004) argue that such bias tends to overestimate the average performance of firms. Nevertheless, we opted to use a balanced panel due to its advantages in terms of consistency and intertemporal comparability, which enhance the robustness of the econometric estimates. Thus, the results should be interpreted in light of these limitations.

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