THE RELATIONSHIP BETWEEN THE CORPORATE SUSTAINABILITY INDEX (ISE) AND THE FINANCIAL AND MARKET PERFORMANCE OF COMPANIES

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ABSTRACT

The disclosure of non-financial information by companies has become increasingly relevant to the market and stakeholders, underscoring their commitment to sustainability through the Corporate Sustainability Index (*Índice de Sustentabilidade Empresarial* - ISE). In this context, the present study aims to analyze the impact of inclusion in the Corporate Sustainability Index portfolio on companies' financial and market performance, considering their ISE score. The analysis focuses on companies in the electric power sector, which generate social and environmental impacts and demonstrate high adherence to the ISE due to regulatory requirements. The sample consists of 40 Brazilian companies from the electric power sector, 13 of which were included in the ISE portfolio between 2021 and 2023. Descriptive statistics, hypothesis testing, correlation analysis, and panel data regression with random effects were employed as statistical techniques. The research findings indicate that inclusion in the Corporate Sustainability Index does not lead to significant differences in companies' profitability. Although ISE-listed companies presented a higher average Market Value, the ISE score did not exert

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a statistically significant direct impact on market value metrics. This suggests that, in the short term, the benefits of sustainability practices do not result in immediate market appreciation. Moreover, the regression analysis revealed that sustainable practices are associated with lower financial returns. Therefore, inclusion in the ISE does not appear to provide concrete economic advantages based on the variables analyzed in the study.

Keywords: Corporate Sustainability Index. Financial Performance. Market Performance. Electric Power Companies.

A RELAÇÃO DO ÍNDICE DE SUSTENTABILIDADE EMPRESARIAL (ISE) COM O DESEMPENHO FINANCEIRO E DE MERCADO DAS EMPRESAS

RESUMO

A divulgação de informações não financeiras pelas empresas tem se tornado cada vez mais relevante no mercado e para as partes interessadas, o que ressalta o comprometimento com a sustentabilidade por meio do Índice de Sustentabilidade Empresarial (ISE). Nesse sentido, o objetivo do presente estudo é analisar o impacto de pertencer à carteira do Índice de Sustentabilidade Empresarial (ISE) no desempenho financeiro e de mercado das empresas, considerando sua pontuação no *score* ISE. Foram analisadas empresas do setor de energia elétrica, que geram impactos socioambientais e possuem alta adesão ao ISE como resultado do atendimento regulatório. A amostra abrange 40 empresas brasileiras do setor de energia elétrica, sendo 13 integrantes da carteira ISE, entre o período de 2021 a 2023. Como técnica estatística, utilizou-se a estatística descritiva, teste de hipóteses, correlação e regressão de dados em painel com efeitos aleatórios. Os resultados da pesquisa indicam que a inclusão no Índice de Sustentabilidade Empresarial (ISE) não apresenta diferenças significativas na rentabilidade das empresas. Embora as empresas do ISE tenham demonstrado uma média de Valor de Mercado (MV) superior, a pontuação no ISE não teve impacto direto estatisticamente significativo sobre as métricas de valor de mercado, o que sugere que, a curto prazo, os benefícios das práticas de sustentabilidade não resultam em uma valorização imediata no mercado. A análise de regressão indicou que as práticas sustentáveis estão associadas a menores retornos financeiros. Portanto, a presença no ISE não parece oferecer vantagens econômicas concretas de acordo com as variáveis analisadas no estudo.

Palavras-Chave: Índice de Sustentabilidade Empresarial. Desempenho Financeiro. Desempenho de Mercado. Empresas de Energia Elétrica.

1 INTRODUCTION

Debates on sustainable development gained prominence after a conference organized by the United Nations in 1972, during which the environmental consequences of human activity and the need to consider future

generations were discussed. Taking this milestone as an evolutionary process of sustainable awareness, companies began to examine their activities that impact the environment and to invest in sustainable practices (Silva et al., 2024), thereby promoting the integration of economic, social, and environmental development (Favaro & Rover, 2014).

The investment in and dissemination of social and environmental practices became essential to meet stakeholder interests. Such practices may also be associated with lower risk exposure and, consequently, improved financial and market performance (Moutinho & Silva, 2024). However, increased disclosure of socio-environmental information can also reflect a management strategy by companies to enhance their corporate reputation and enhance their image (Silva et al., 2024).

In this regard, environmental disclosure has become a favorable instrument for stakeholders when dealing with companies that disclose little information (Favaro & Rover, 2014). It has also become important for companies seeking legitimacy, as the disclosure of socio-environmental information can signal a management strategy to strengthen corporate reputation and improve corporate image (Silva et al., 2024).

Given the need to develop an instrument for assessing corporate social responsibility, the Corporate Sustainability Index (*Índice de Sustentabilidade Empresarial* - ISE) was created in 2005 by the São Paulo Stock Exchange (*Brasil, Bolsa, Balcão* - B3) with the aim of evaluating the average performance of stock quotations and companies committed to corporate sustainability (Almada et al., 2022). Its purpose is to guide investors in decision-making and encourage companies to adopt sustainable practices, covering social, environmental, and governance aspects (ISE B3).

In recent years, literature has advanced in understanding the relationship between ESG and financial performance. Studies have evaluated the connection between companies' sustainability reporting practices and their financial performance. In the Australian electricity sector, a positive association was observed (Mamun, 2022). In India, positive relationships were found for governance and social factors (Thomas & Bhaumik, 2023). Regarding market performance, Patroni et al. (2023) identified that investing in shares of companies included in the ISE can provide higher returns and lower risk over the long term.

Silva et al. (2024), in analyzing the socio-environmental disclosure of companies listed in the ISE B3 portfolio, emphasized the importance of this type of disclosure for companies included in the 2021/2022 ISE B3 Portfolio. Socio-environmental disclosure provides greater credibility and transparency to investors. Junior (2019) examined the relationship between sustainability report publication and the performance of Brazilian companies listed on B3. The study found that companies disclosing sustainability reports exhibited higher average performance, size, and leverage compared to those that did not publish such reports.

Although an increase has been observed in studies examining the integration of companies into the ISE portfolio, this may reflect recognition of their commitment to sustainability. However, there are still insufficient studies

considering the ISE B3 score in their analyses. In this sense, this research aims to understand the importance of the ISE B3 and its relationship with financial and market performance, using the ISE B3 score for the first time, thus addressing a methodological gap.

The study included publicly traded companies listed on B3 and focused on those in the Public Utility sector and the Electricity subsector between 2021 and 2023. It sought to answer the following research question: What is the relationship between the ISE portfolio and the financial and market performance of electric power companies?

The study is justified by its potential to contribute both theoretically and empirically to the understanding of the relationship between adherence to environmental practices, financial performance, and the creation of corporate market value (MV). This is particularly relevant given that company performance is influenced by the ISE's relationship with stakeholders and by the positive impact of corporate governance practices on value creation (Cintra et al., 2023).

Additionally, the study provides practical contributions by clarifying whether companies' investments in sustainability are merely compliance measures or whether they can effectively contribute to market value and financial performance. The research can guide corporate strategies and public policies regarding the importance of voluntarily adopting sustainable practices, especially in terms of disclosure (e.g., reports). If it is found that companies producing sustainability reports gain market competitive advantages, this may serve as an indication that adoption can be beneficial for other firms.

Research on this topic is increasing, as concerns about social and environmental issues and the integration among society, companies, investors, and other stakeholders have become central to organizations (Uyar et al., 2020) and a key focus of capital markets (García et al., 2023). This trend makes the topic particularly attractive for academia, encouraging improvements in the disclosure of non-financial information.

2 THEORETICAL FRAMEWORK

2.1 Corporate Sustainability Index (*Índice de Sustentabilidade Empresarial* - ISE)

Social responsibility has gained significant importance in academia, media, and corporate sector. In particular, the social and environmental practices adopted by companies have increasingly become one of the central focuses of their strategic operations (Macedo et al., 2012).

The continuous increase in the number of companies committed to sustainability is largely due to consumers' interest in understanding their practices in this field. This trend has led investors to increasingly value the image and environmental commitments of these organizations (Miecoanski & Palavecini, 2017).

With the growing internationalization of economies, opportunities arise to promote prosperity and improve quality of life across various nations through the sharing of knowledge and technology. However, this advancement in

development often leads companies to overlook potential social and environmental risks associated with their activities (Neumayer, 2010).

The intrinsic characteristics of the activities carried out by electric power companies make the sector potentially polluting. These activities can cause significant changes to the environment, affect local communities near their facilities, and influence the distribution of energy to society (Lins et al., 2007). Thus, in 2001 the National Electric Energy Agency (*Agência Nacional de Energia Elétrica* - ANEEL) required companies in the electric sector to disclose social balance reports, making the disclosure of information on social responsibility mandatory and encouraging companies' commitment to the theme (ANEEL, 2006).

The Corporate Sustainability Index of B3 was the fourth global index created to measure the performance of companies with sustainable management practices. The first was the Dow Jones Sustainability Index (DJSI) in 1999, followed by Trading, Sustainability, and Environment for Good (FTSE4Good) in 2001, and the Johannesburg Stock Exchange - Socially Responsible Investment Index (JSE SRI) in 2003. On December 1, 2005, Brazil launched its first theoretical ISE portfolio, consisting of 34 shares from 28 companies recognized for adopting sustainable practices (Marcondes & Bacarji, 2010).

Unlike the first three indices, in which the respective stock exchanges took responsibility for implementing the portfolios, the ISE was a pioneer in directly involving stakeholders' interests at all stages of its development and implementation. This approach aligns with the concept of social responsibility, which involves stakeholder management (Cristófalo et al., 2016).

The perspective of socio-environmental sensitivity suggests that companies should respond to society's expectations regarding environmental and social responsibility. Moreover, companies should anticipate these demands and act proactively, going beyond merely offering quality products and services (Macedo et al., 2012).

The ISE stands out in the sustainability segment of B3, acting as an indicator of the average performance of assets from companies selected for their commitment to sustainability and the high liquidity of their shares (Souza, 2024). According to the author, these companies, with a proven liquidity track record, demonstrate the capacity to generate value for investors. However, Vázquez-Burguete et al. (2024) note that companies that publish sustainability reports tend to have more developed environmental responsibility policies and greater transparency compared to those that do not publish such reports.

By integrating social, environmental, and ethical concerns, not just legal and economic ones, companies strengthen their reputation with society. This strengthening can result in various advantages, including improvements in their financial performance (Santos et al., 2021).

Through sustainability reports, companies disclose their performance and impacts across different areas of sustainability, including environmental, social, and governance aspects (Silva, 2016). These reports help companies become more transparent about the risks and opportunities they face, providing stakeholders with a broader view of their performance beyond purely financial metrics.

Companies have begun to incorporate the communication of their social and environmental initiatives into traditional accounting practices, aiming to meet stakeholder interests. The purpose of this disclosure is to inform stakeholders about environmental performance and the preventive actions taken by organizations (Mota et al., 2013). Consequently, there has been an increase in environmental initiatives undertaken by companies to address sustainability challenges (Mota et al., 2013).

In Brazil, sustainability reporting is optional, allowing organizations to develop their own report formats. However, progress has been made in establishing standards for environmental information disclosure through the adoption of specific indicators developed by dedicated entities (Mota et al., 2013).

Therefore, due to the voluntary nature of environmental, social, and governance practices and the lack of standardized disclosure of this information, Brazilian companies face challenges in aligning with evolving social and environmental expectations across various frameworks and reports (Paranhos et al., 2024). Meanwhile, several global initiatives involving multiple organizations have promoted the standardization of socio-environmental indicators related to the physical and/or financial aspects of companies (Calixto, 2013).

Calixto (2013) conducted a comparative analysis of socio-environmental information disclosed by Latin American companies and found that most publicly traded companies do not include this information in their annual reports or specific documents. However, among those that address the topic, Brazilian companies stand out for placing greater emphasis on socio-environmental issues in their publications. Despite generally maintaining a moderate level of maturity, the sustainability reports of Brazilian companies still require significant improvements, especially in clarity and accuracy, according to Sousa et al. (2024).

Oliveira et al. (2004) argue that companies from all sectors prosper only when adopting principles of ethics, transparency, and social responsibility. The preparation of sustainability reports, involving the measurement and disclosure of organizational performance, is essential for sustainable development and stakeholder engagement (Schaltegger & Burritt, 2010). Mandatory disclosure requirements further strengthen the dissemination of this information.

This impact can be observed by analyzing Brazilian companies listed on the Global Reporting Initiative (GRI) website. In 2010, the electric power sector was the most active in disclosing Social and Environmental Reports for the 2009 fiscal year, in accordance with GRI Guidelines, followed by the financial sector (Morisue et al., 2012). It is important to highlight that sustainability reports may have varying impacts on company performance depending on the sector (Hawaj & Buallay, 2021).

2.2 Influence of Sustainability Reports on Company Performance

Table 1 presents a summary of studies related to the addressed topic.

Table 1
Description of Related Studies

Authors	Objective	Methodology	Variables	Results
Alamdqiyah and Mahroji (2024)	The objective is to explore the relationship between sustainability and good corporate governance (GCG) in the financial performance of energy and basic materials companies listed on the Indonesia Stock Exchange (IDX).	21 companies from the energy and basic materials sectors listed on the IDX from 2020 to 2022. Descriptive statistics, assumption tests (normality, multicollinearity, autocorrelation, heteroscedasticity), and hypothesis tests (joint F-test, partial t-test), using multiple linear regression analysis.	Dependent: sustainability Independent: financial performance measured by return on assets (ROA)	There is a positive and significant relationship between sustainability disclosure and company financial performance. Companies that are more active in disclosing sustainability-related information tend to achieve better financial performance, as this attracts greater stakeholder attention, including investors and customers.
Macedo et al. (2012)	The objective is to analyze and compare the accounting and financial performance of socially and environmentally responsible companies with companies lacking this characteristic.	26 electric energy companies in Brazil, including 6 with social and environmental responsibility and 20 without this feature, between 2005 and 2007. Data Envelopment Analysis (DEA) and the non-parametric Mann-Whitney median test.	Dependent: profitability, profit margin, asset turnover, liquidity, indebtedness and fixed assets Independent: ISE	Responsible socially and environmentally companies demonstrated statistically superior performance during the analysis period. The superiority was confirmed in 2005 and 2006, but in 2007 the difference was no longer statistically significant.
Sousa et al. (2011)	The objective is to examine whether there is a correlation between the ISE and the net income of the companies included in this index.	28 companies across 12 sectors, from 2002 to 2009. Regression and correlation methods.	Dependent: profit Independent: ISE	The results indicated a positive relationship between the variables, suggesting that sustainable practices may positively influence financial results.
Mamun (2022)	The objective is to explore the relationship between sustainability reporting practices of Australian	19 Australian electricity sector companies, between 2018 and 2019.	Dependent: financial performance measured by ROA	Sustainability reporting practices positively influence the financial performance of Australian electricity companies, with disclosures related

Authors	Objective	Methodology	Variables	Results
	electricity companies and their financial performance.	Descriptive statistics and multiple regression.	Independent: sustainability reporting practices	to economic and social performance significantly impacting overall performance.
Marcelino et al. (2023)	The objective is to identify the relationship between the economic-financial performance of companies listed on the Brazil Stock Exchange (B3) Sustainability Index.	12 companies from the energy and oil sectors, including 6 listed on the ISE and 6 not listed, in 2022. Calculation of indicators and comparison of averages.	Dependent: return on investments (ROI), ROA, return on equity (ROE) and Profit Margin Independent: ISE	A positive relationship was found between ISE participation and the indices ROE and ROA. Additionally, a negative relationship was identified between ISE participation and net profit margin and ROI.
Santos et al. (2021)	The objective is to analyze whether the economic and financial performance of companies was influenced by their participation in the B3 ISE.	67 companies across 4 sectors: Utilities, Basic Materials, Industrials, and Telecommunications.	Dependent: ROE and ROA Independent: ISE	A positive relationship was found between participation in the B3 ISE and companies' economic and financial performance. Companies participating in the ISE exhibited higher profitability indicators than those not participating.
Miecoanski and Palavecini (2017)	The objective is to verify whether banks participating in the ISE are more profitable than those that do not participate.	6 banks participating in the ISE and 24 not participating, in 2015. Non-parametric Mann-Whitney test.	Dependent: ROI, ROA, RA, Return on Net Assets and Net Margin Independent: ISE	The results indicated no positive relationship between profitability and ISE participation. Thus, being part of the ISE does not influence performance in the bank subsector.
Moutinho and Silva (2024)	The objective is to analyze the effect of investment in environmental, social, and governance (ESG) factors on the financial performance of Brazilian companies and cumulative abnormal returns during the Covid-19 pandemic.	32 companies comprising both the Ibovespa and ISE portfolios, from March 2020 to April 2021. Event study and multiple linear regression analysis.	Dependent: Cumulative Abnormal Return (CAR), ROA, ROE and Tobin's Q Independent: ISE	Results showed a negative relationship between ESG and CAR, suggesting that merely adopting sustainable practices does not guarantee better shareholder performance. However, a positive and statistically significant relationship between ESG and companies' market value was also identified.

Authors	Objective	Methodology	Variables	Results
Thomas and Bhaumik (2023)	The objective is to investigate the impact of corporate sustainability practices on the performance of India companies.	65 companies listed on the Indian stock exchange, from 2017 to 2021. Multiple and simple regression models.	Dependent: financial performance (ROA) Independent: ESG score	Sustainability practices had a significant positive impact on company performance. Social and governance activities had a significant positive effect, while environmental activities showed an insignificant negative association.
Favaro and Rover (2014)	The objective is to verify which economic and financial indicators are associated with inclusion in the ISE.	200 companies with the highest liquidity from 20 sectors, listed on BM&FBOVESPA between 2005 and 2012. Correspondence analysis, Homogeneity analysis and Chi-square test.	Dependent: ISE Independent: impact, total assets, net operating revenue, net income, ROA, ROE, debt, third-party capital, market value, stock price and issuance of American Depositary Receipt (ADR)	Four indicators were found to be associated with ISE inclusion: assets, market value, revenue, and profit. A positive relationship between performance and company size was also identified.
Junior (2019)	The objective is to analyze the relationship between sustainability report publication and the performance of Brazilian companies listed on B3.	1,889 non-financial companies listed on B3, from 2012 to 2016. Descriptive statistics, t-test for mean differences, and Spearman correlation analysis.	Dependent: performance Independent: publication of sustainability reports, size and leverage	Companies that disclose sustainability reports have higher averages for performance, size, and leverage compared to those that do not disclose. There was also a positive and significant correlation between report publication and performance, size, and leverage.
Hawaj and Buallay (2021)	The objective is to investigate the impact of sustainability disclosure on the operational, financial, and market performance of companies across seven sectors.	3,000 companies from seven sectors in 80 countries, between 2008 and 2017. Regression analysis.	Dependent: ROA, ROE and Tobin's Q Independent: sustainability disclosure	The results demonstrated that the impact of sustainability disclosure on ROA, ROE and Tobin's Q varies across sectors.
Patroni et al. (2023)	The objective is to verify whether companies	15 years (2006-2020).	Dependent: ISE portfolio performance	Investing in ISE listed companies may provide higher returns and lower risk

Authors	Objective	Methodology	Variables	Results
	engaged in sustainable practices demonstrate better performance compared to companies listed on the Ibovespa.	Statistical dispersion analysis, variance and covariance analysis.	Independent: sharpe ratio, Treynor ratio and Modigliani-Modigliani ratio	over the long term. It is feasible to develop investment strategies aligned with socio-environmental practices while maintaining satisfactory long-term returns.
Pereira et al. (2020)	The objective is to analyze the relationship between corporate social performance (CSP) and corporate financial performance (CFP), investigating whether social disclosure acts as a moderating variable.	Companies from 13 B3 sectors that responded to the ISE questionnaire from 2010 to 2013. Panel data regression.	Dependent: CFP Independent: CSP and disclosure	A positive and significant relationship was found in both directions: better financial performance fosters stakeholder practices, and strong stakeholder engagement enhances market value.

Source: Prepared by the authors

Similar to the findings of Patroni et al. (2023), Serra et al. (2017) examined the ISE performance relative to the Ibovespa from November 2005 to November 2015. Until 2010, both indices showed similar returns. However, from 2011 onward, with the quarterly rebalancing of the ISE, its mean and standard deviation surpassed those of the Ibovespa, while also exhibiting lower volatility. Sousa Neto and Correia (2024) reached similar conclusions when analyzing ESG integration and company performance in the ISE in 2022, highlighting more stable growth and lower volatility compared to the Ibovespa since 2005.

Although the literature provides evidence of the relationship between corporate sustainability and financial performance (Junior, 2019; Pereira et al., 2020; Mamun, 2022; Thomas & Bhaumik, 2023), there is a limitation in studies that jointly analyze participation in the ISE and the impact of the ISE score on financial and market performance. Some studies (Favaro & Rover, 2014; Silva et al., 2024) focus on isolated variables without considering how the score itself can influence financial returns and market attractiveness.

This study seeks to fill that gap by investigating how inclusion in the ISE portfolio, combined with the ISE score, affects financial and market performance. The findings contribute to a broader and more focused understanding of the competitive advantages linked to corporate sustainability practices.

Based on the above, the research hypotheses were formulated:

H1: Companies that are part of the ISE exhibit superior financial and market performance compared to those that are not.

H2: Companies that have been part of the ISE for a longer period demonstrate better financial and market performance.

3 METHODOLOGICAL PROCEDURES

The present study aims to analyze the impact of inclusion in the Corporate Sustainability Index portfolio on companies' financial and market performance, considering their ISE score. Specifically, the study seeks to compare the financial and market performance of companies included in the ISE during the analyzed period with those that are not. Additionally, it examines whether companies with higher scores within the ISE exhibit better performance.

The study includes publicly traded companies listed on B3 and focuses on those in the Public Utility sector and the Electric Power subsector, given their high adherence to voluntary disclosures to comply with Resolution 444/2001. Following this resolution, the ANEEL initiated efforts in 2004 to improve these reports. In 2006, the concept of the "Tripod of Sustainability" was introduced, making the inclusion of environmental, social, and economic issues mandatory in the preparation of such reports (Oliveira, 2023).

The electric power sector, besides being economically relevant, is essential to society and subject to regulations that ensure transparency and compliance. It

involves substantial use of natural resource and significantly affects territories (Oliveira, 2023). Moreover, it generates considerable environmental and social impacts through its activities (Fraga et al., 2021).

The period from 2021 to 2023 was considered for the sample. Data from company portfolios were collected annually, covering a period in which B3 published the ISE score ranking. This process resulted in 120 observations from 40 companies, as shown in Table 2.

Table 2
Sample Composition

ISE Companies		Non-ISE Companies			
AES Brasil	Eneva	Aesoperacoes	Ceee-G	Energias BR	Eletropar
Auren	Equatorial	Afluente T	Celesc	Energisa	Rede Energia
Cemig	Light S/A	Alupar	Coelce	Energisa Mt	Renova
CPFL Energia	Neoenergia	Ampla Energ	Comerc	Eqtl Maranhao	Safira Energ
Copel	Serena	Ceb	Cosern	Eqtl Para	Taesa
Engie Brasil	Tran Paulist	Coelba	Elektro	Ger Paranap	Uptick
Eletrobras		Ceee-D	Emae	Celgpar	

Source: Prepared by the authors

For the collection of variables, the Refinitiv Eikon database was used, from which financial and market information of the analyzed companies was extracted. Data related to the sector were collected from the Refinitiv Eikon database and validated using information from the B3 website. The list of companies included in the ISE during the analyzed period was also obtained from the B3 website.

For data analysis, descriptive statistics, hypothesis tests, correlation analysis, and multivariate regression with panel data were applied. To verify whether the data satisfied the main assumptions of regression, the following statistical procedures were used: the Breusch-Pagan test for heteroscedasticity (Breusch & Pagan, 1979); the Variance Inflation Factor (VIF) for multicollinearity (Wooldridge, 2013); the Kolmogorov-Smirnov (Massey Jr, 1951) and Shapiro-Wilk (Shapiro & Wilk, 1965) tests to check the normality of residuals; and Wooldridge's test for autocorrelation in panel data (Wooldridge, 2010).

Robust standard errors (Heteroskedasticity and Autocorrelation Consistent - HAC) were applied to all variables, although they were mainly necessary for the Market-to-Book (MTB) variable, to correct potential heteroscedasticity and autocorrelation issues (Newey & West, 1987). Finally, based on the Chow, Breusch-Pagan, and Hausman tests, the random effects model was chosen, as this specification was deemed most appropriate for the dataset (Hausman, 1978). The econometric model supporting the study was defined through the following multivariate panel data regressions:

$$Performance_{it} = \beta_0 + \beta_1 ISE_{it} + \beta_2 Tam_{it} + \beta_3 AEnd_{it} + \beta_4 CV_{it} + \beta_5 LC_{it} + \beta_6 Prej_{it} + \beta_7 Covid_t + \varepsilon_{it}$$

Where:
Performance: Dependent variables representing performance, varying according to each model (ROA, Return on Invested Capital - ROIC, MTB and MV)
ISE Score: Proxy for ESG performance
Tam: Size
End: Leverage (Debt)
CV: Sales Growth
LC: Current Liquidity
Prej: Loss
Covid: Covid *Dummy* (2021)
Year: 2021 to 2023
e: error

Table 3 presents the dependent, independent, and control variables.

Table 3
Variables used

Variables	Type	Formula	Reference	Expected sign
Score ISE	Independent	Score obtained by the company for the ISE	-	
ROA (Return on Assets)	Dependent	Operating Profit / (Total Assets - Net Income)	Favaro and Rover (2014); Junior (2019); Hawaj and Buallay (2021); Mamun (2022); Alamdqiyah and Mahroji (2024); Thomas and Bhaumik (2023)	+
ROIC (Return on Invested Capital)	Dependent	Net operating profit after taxes (NOPAT) / Invested Capital	Miecoanski and Palavecini (2017); Marcelino et al. (2023)	-
MTB (Market-to-Book)	Dependent	Market value / Shareholders' Equity	Patroni et al. (2023); Chen and Zhao (2004)	+
MV (Market Value)	Dependent	Stock price * Shares Outstanding	Favaro and Rover (2014); Chauhan and Kumar (2018); Pereira et al. (2020)	+
TAM (Size)	Control	Ln (Total Assets)	Favaro and Rover (2014); Junior (2019)	+/-
Endiv (Leverage)	Control	Total Liabilities / Shareholders' Equity	Macedo et al. (2012); Favaro and Rover (2014)	+/-
CresVendas (Sales Growth)	Control	(Revenue em t – Revenue em t – 1) / Revenue em t – 1	Sousa et al. (2011); Favaro ad Rover (2014); Silva et al. (2024)	+/-
LC (Current Liquidity)	Control	Current Assets / Current Liabilities	Macedo et al. (2012); Santos et al. (2021); Marcelino et al. (2023)	-

Prej (Loss)	Control	0,1 (dummy variable representing the period in which there was a loss)	Sousa et al. (2011)	-
Covid	Control	0,1 (dummy variable equal to 1 for the year 2021 - Covid-19 pandemic; 0 otherwise)	Moutinho and Silva (2024)	
ISE1	Independent	0,1 (dummy variable equal to 1 for companies that remained only 1 year in the ISE; 0 otherwise)	-	
ISE3	Independent	0,1 (dummy variable equal to 1 for companies that remained all 3 years in the ISE; 0 otherwise)	-	

Source: Prepared by the authors

The literature highlights that financial indicators such as ROA, ROIC, and Market-to-Book assist in evaluating company profitability and efficiency, as they reflect the ability to generate returns on assets and invested capital, as well as market perception. Additionally, the disclosure of non-financial information, particularly social and environmental practices, also affects the market value, as pointed out by Chauhan and Kumar (2018).

4 ANALYSIS AND DISCUSSION OF RESULTS

4.1 Sample Description

First, descriptive statistics were computed to observe the behavior of the variables analyzed in the research. Through this approach, it was possible to identify the main characteristics of the data, such as means, medians, standard deviations, and frequency distributions, as presented in Table 4.

Table 4
Descriptive Statistics

	N	Mean	Standard deviation	Minimum	Median	Maximum
ROA	105	-0.054	0.816	-5.423	0.061	0.826
ROIC	105	-0.044	0.887	-5.619	0.085	0.836
MTB	90	1.802	1.356	-1.104	1.422	6.877
MV	90	22.597	1.389	19.172	22.654	25.304
Score ISE	32	75.322	9.028	48.07	78.52	84.97
TAM	105	22.84	2.653	10.488	23.382	26.311
Endiv	105	0.641	0.262	0.021	0.697	1.401
CresVendas	105	0.15	0.295	-0.401	0.069	1.299
LC	105	3.175	7.265	0.342	1.29	41.813

Source: Prepared by the authors

Regarding the dependent variables ROA and ROIC, the means were negative, indicating that, on average, companies did not generate positive returns on their assets (ROA) or on invested capital (ROIC). It can also be noted that the standard deviations of both are high, as they exceed the means, indicating the presence of extreme values in the sample.

The variables MTB and MV showed fewer observations due to data unavailability. Both had positive means, indicating that, on average, companies are traded above their book value, reflecting a positive market perception. The standard deviation was moderate, and the median was close to the mean, indicating a balanced distribution. The ISE score variable also had fewer observations as it only considered companies in the ISE portfolio.

The variables Ise score, TAM, Endiv, and CresVendas showed means and medians close to each other with low standard deviations, which also indicates a balanced distribution. For the LC variable, although it had a positive mean, it showed a high standard deviation and a median lower than the mean. This indicates asymmetry in the distribution and the presence of companies with exceptionally high current liquidity.

Additionally, for the dummy variables, Table 5 presents the respective frequencies.

Table 5
Frequencies of Dummy Variables in Percentage

	Yes (1)	Not (0)
ISE1	37.14	62.86
ISE3	22.86	77.14
Covid	33.33	66.67
Loss	11.43	88.57

Source: Prepared by the authors

Table 5 presents the percentage distribution of the dummy variables used in the study, considering companies' classification in the ISE and other related aspects such as the Covid-19 pandemic and financial losses.

For the ISE duration, 37.14% of the companies in the sample remained in the index for at least one year (ISE1), while 62.86% did not remain. For companies that stayed in the index throughout the three years of the analyzed period (ISE3), the proportion is even lower: only 22.86% maintained membership, while 77.14% did not maintain it. These results highlight that most companies in the sample were unable to sustain a consistent presence in the ISE, which may suggest challenges in meeting the sustainability criteria required for ongoing inclusion.

Regarding the period marked by the Covid-19 pandemic, 33.33% of the observations correspond to this timeframe, while 66.67% refer to periods outside the pandemic context. This distribution reflects the proportion of the sample during which the effects of the pandemic could influence financial and market performance, as well as ESG-related issues within the companies.

As for the "Loss" variable, only 11.43% of the companies recorded negative financial results during the analyzed period, while 88.57% reported positive

performance. This suggests that the majority of companies in the sample were able to avoid losses, even amid economic challenges such as those caused by Covid-19.

4.2 Hypothesis Testing Analysis (Means Test)

Subsequently, a hypothesis test was conducted to determine whether there are statistically significant differences between the analyzed groups. Since the objective of this study is to analyze whether inclusion in the ISE portfolio is associated with financial and market performance, only the dependent variables representing distinct dimensions of corporate performance were selected for this test. These variables are ROA, ROIC, MTB, and MV, as shown in Table 3.

First, it is worth noting that two mean tests were carried out: one with companies that were part of the ISE for only one year, and another with companies that remained in the ISE for three consecutive years. The results of the tests were quite similar; therefore, the analysis focused on the test for companies that remained in the ISE during the three consecutive years.

Based on the test, in the "dif" column, the software reports by default the difference between companies in group 0 (Non-ISE companies) and companies in group 1 (ISE companies). However, to better align with the purpose of this study, the signs of the values in this column were inverted, so that the metric represents the difference between companies belonging to the ISE and those that do not belong.

Table 6
Two-Sample t-Test with Equal Variances

Comparison of means				
	Non-ISE Companies	**ISE3 Companies**	**Dif**	**p-Value**
ROA	-0.087	0.056	0.142	0.457
ROIC	-0.078	0.071	0.148	0.474
MTB	1.874	1.604	-0.27	0.406
MV	22.113	23.93	1.818	0.000

Source: Prepared by the authors

The t-test results indicate that, based on the p-value, with the exception of MV, the differences in the means of ROA, ROIC, and MTB between companies that belong to the ISE and those that do not are not statistically significant. For ROA, the mean for companies that do not meet the ISE3 criterion is -0.087, while for those that meet it, it is 0.056. The difference of 0.142 is not statistically significant (p-value = 0.457), suggesting that being in the ISE does not have a significant relationship with companies' return on assets.

Similarly, ROIC shows means of -0.078 and 0.071 for companies that do not or do belong to the ISE, respectively. The difference of 0.148 between the means is also not statistically significant (p-value = 0.474), indicating that belonging to the ISE does not significantly affect return on invested capital. In the case of MTB, the means are 1.874 for companies not in the ISE and 1.604 for those that are. The

difference of -0.27 is not statistically significant (p-value = 0.406), suggesting that belonging to the ISE has no significant association with market valuation relative to the companies' book value.

These findings do not support the idea that companies that publish sustainability reports have higher means in performance, size, and leverage measures compared to those that do not publish these documents, as reported by Junior (2019).

Finally, MV shows a mean of 22.113 for companies not in the ISE and 23.93 for those that are. The difference of 1.818 is statistically significant (p-value = 0), indicating that companies in the ISE tend to have a significantly higher market value on average. This suggests that being on the ISE ranking may be associated with greater market valuation, reflecting a positive perception by investors of companies that adopt sustainable practices, based on the results of this variable.

4.3 Correlation Test Analysis

The Shapiro-Francia normality test was conducted to determine whether the study variables follow a normal distribution. Since the normality test results indicated that none of the variables followed a normal distribution, the most appropriate correlation test was the Spearman rank test.

Correlation analysis was performed to assess the strength and direction of the relationships between the study variables. According to the interpretation criteria proposed by Hinkle et al. (2003), correlation coefficients between 0.90 and 1.00 (or -0.90 to -1.00) are considered very strong; between 0.70 and 0.89 (or -0.70 to -0.89), strong; between 0.50 and 0.69 (or -0.50 to -0.69), moderate; between 0.30 and 0.49 (or -0.30 to -0.49), weak; and between 0.00 and 0.29 (or 0.00 to -0.29), negligible. All analyses considered significance levels of 1%, 5%, and 10%.

Regarding the dummy variables ISE1, ISE3, Covid, and Prej., these variables were analyzed using the Spearman rank test, as this test is non-parametric and ranks the data.

Due to the differing number of observations in the dependent variables, the correlation tests were conducted separately. The MTB and MV variables, with 90 observations, are presented in Table 7, while the ROA and ROIC variables, with 105 observations, are presented in Table 8. This separation ensures consistency of the tests given the limitations of each dataset.

Table 7
Correlation Test (90 observations - MTB and MV)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) MV	1										
(2) MTB	0.18*	1									
(3) Score	0.62***	-0.15	1								
(4) ISE1	0.65***	-0.18*	0.88***	1							
(5) ISE3	0.61***	-0.13	0.91***	0.79***	1						
(6) TAM	0.89***	-0.17	0.67***	0.72***	0.61***	1					
(7) Endiv	0.28***	-0.08	0.05	0.10	-0.03	0.43***	1				
(8) C. Vend.	0.09	0.06	-0.01	0.12	-0.02	0.04	0.05	1			

(9) LC	-0.02	0.31***	-0.01	-0.01	0.04	-0.19*	-0.52 ***	0.00	1	
(10) Prej	-0.30***	-0.36***	-0.11	-0.11	-0.16	-0.18*	0.25**	-0.09	-0.28***	1
(11) Covid	0.02	0.09	-0.09	0.00	0.00	-0.05	0.00	0.41 ***	0.12	0.00	1

Legend: *** p < 0.01; ** p < 0.05; * p < 0.10
Source: Prepared by the authors

The dependent variable MV showed positive and moderate correlations with Score (0.62; p < 0.001), ISE1 (0.65; p < 0.001), and ISE3 (0.61; p < 0.001), suggesting a statistically significant association between ESG practice performance, inclusion in the ISE, and companies' market value. Additionally, a strong and significant correlation was observed with TAM (0.89; p < 0.001), indicating that larger companies tend to have higher market valuation. The positive correlation with Endiv (0.28; p < 0.001), classified as weak, was also statistically significant and may reflect the use of leveraged resources by indebted companies seeking growth. However, these relationships are associative and should not be interpreted as evidence of causality.

Regarding the dependent variable MTB, a weak yet significant correlation was identified with LC (0.31; p < 0.001), which may indicate that companies with higher current liquidity tend to have higher book values. The correlations between MTB and ESG indicators (Score, ISE1, and ISE3) were weak and mostly not significant, except for a weak negative correlation with ISE1 (-0.18; p < 0.10), suggesting limited influence of ESG performance on the companies' book value.

The relationship between LC and Endiv was negative and moderate (-0.52; p < 0.001), indicating that companies with higher indebtedness tend to have lower current liquidity, which could impair their ability to meet short-term obligations.

The variable Prej showed weak negative correlations with MV (-0.30; p < 0.001) and MTB (-0.36; p < 0.001), indicating that financial losses are associated with reductions in both market and book value. The positive correlation with Endiv (0.25; p < 0.01), though weak, suggests that higher debt levels may be linked to a greater propensity to record losses.

Finally, the variable Covid exhibited weak correlations, most of which were not statistically significant. The only exception was a positive correlation with sales growth (0.41; p < 0.001), indicating that the pandemic more visibly affected operational aspects of companies. Although no statistically significant correlations were observed with ESG indicators, it is plausible that the health crisis prompted adjustments in corporate sustainability practices, especially in more affected sectors. This finding underscore the need for further research to explore the indirect effects of the pandemic on ESG performance.

Table 8

Correlation Test (105 observations - ROA and ROIC)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ROA	1										
(2) ROIC	0.92***	1									
(3) Score	-0.22**	-0.28***	1								
(4) ISE1	-0.32***	-0.37***	0.84***	1							
(5) ISE3	-0.05	-0.12	0.88***	0.71***	1						

(6) TAM	-0.23**	-0.24**	0.66***	0.71***	0.59***	1				
(7) Endiv	-0.33***	-0.14	0.05	0.08	-0.02	0.38***	1			
(8) C. Vend.	0.07	0.06	-0.02	0.18*	-0.05	0.08	0.04	1		
(9) LC	0.20**	0.12	-0.04	-0.05	0.01	-0.21**	-0.54***	-0.02	1	
(10) Prej	-0.55***	-0.55***	-0.09	-0.03	-0.20**	-0.22**	0.03	-0.08	-0.05	1
(11) Covid	0.08	0.08	-0.08	0.00	0.00	-0.06	0.00	0.39***	0.13	0.00	1

Legend: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$
Source: Prepared by the authors

The dependent variables ROA and ROIC exhibited a very strong correlation with each other (0.92; $p < 0.001$), suggesting that both capture highly related aspects of corporate profitability. However, this association does not imply causality and should be interpreted as a complementarity between financial metrics from different perspectives.

Regarding ESG performance, the Score showed negative and weak, yet significant, correlations with ROA (-0.22; $p < 0.05$) and ROIC (-0.28; $p < 0.001$). These results may indicate that companies with better evaluations in environmental, social, and governance criteria face, in the short term, lower profitability levels, possibly due to initial investments in sustainable practices.

The variable ISE1, representing companies that remained in the Business Sustainability Index for at least one year, showed moderate negative correlations with ROA (-0.32; $p < 0.001$) and ROIC (-0.37; $p < 0.001$), reinforcing this possible relationship. Conversely, ISE3, representing companies that remained in the ISE for three consecutive years, did not show statistically significant correlations with profitability variables, suggesting that the long-term effects of ESG practices on profitability tend to be neutral or more difficult to detect.

Among the control variables, TAM exhibited weak and significant negative correlations with ROA (-0.23; $p < 0.05$) and ROIC (-0.24; $p < 0.05$), indicating that larger companies tend to have proportionally lower profitability margins. The variable Endiv also showed a negative correlation with ROA (-0.33; $p < 0.001$), indicating that higher debt levels are associated with lower return on assets. Meanwhile, LC presented a positive and weak correlation with ROA (0.20; $p < 0.05$), suggesting that companies with higher current liquidity tend to be slightly more profitable. These associations should be interpreted with caution, as they do not imply causality and may be influenced by other contextual factors.

The variable Prej showed moderate and highly significant negative correlations with both dependent variables (ROA: -0.55; $p < 0.001$; ROIC: -0.55; $p < 0.001$), indicating that financial losses may be associated with reduced corporate profitability.

Regarding the Covid variable, no significant correlations were observed with ROA and ROIC, suggesting that the pandemic did not have a direct association with these profitability measures during the analyzed period. However, a weak positive correlation was noted with sales growth (0.39; $p < 0.001$), indicating that the pandemic's effect was more pronounced in operational indicators. Although the effects on profitability were not evident, it is possible that the pandemic context indirectly influenced financial results, highlighting the need for more in-depth analyses.

Finally, low correlation among the control variables was observed, indicating an absence of multicollinearity. This conclusion was corroborated by the VIF test, presented in the regression tables, whose values remained within the recommended limits, ensuring the stability of the estimates.

4.4 Regression Analysis

Two regression analyses were conducted to test the research hypotheses, according to the equation outlined in the methodology of this study. The first test included all companies (both ISE and Non-ISE), while the second focused exclusively on companies belonging to the ISE, regardless of the duration.

For the linear regression analyses, the Breusch–Pagan/Cook–Weisberg test was performed for all variables to identify whether they were homoscedastic or heteroscedastic. Based on this test, it was found that all variables in the model, except for the MTB variable, exhibited heteroscedasticity. Therefore, all models were estimated using robust standard errors, clustered at the firm level.

Subsequently, the Breusch-Pagan Lagrangian test was also conducted to evaluate the most appropriate model. The results indicated that the random-effects panel model is preferable.

4.4.1 Regression Analysis for All Sample Companies

Table 9 presents the results of the linear regression analysis conducted for the full sample, which includes all companies (both ISE and Non-ISE).

Table 9
Linear Regression Analysis (All Companies)

Variables	ROA	ROIC	MTB	MV
ScoreISE	-0.004**	-0.003**	-0.004*	-0.001
TAM	0.293**	0.300**	0.003	0.860***
CresVendas	0.136	0.158**	0.307*	0.017
Endiv	-0.221	-0.174	-0.473	-1.174***
LC	0.016**	0.011**	0.081***	0.030***
Prej	-0.127*	-0.126**	-0.028	-0.424**
Covid	0.010	0.029	0.172*	0.173***
Constant	-6.557**	-6.763**	1.829	3.277**
Wald-test	48.34	69.43	65.54	465.4
r2_geral	0.608	0.618	0.180	0.834
Breusch-Pagan for heterocedasticidade	0.00	0.00	0.81	0.04
Breusch-Pagan for panel	0.00	0.00	0.00	0.00
VIF Maximum	3.22	3.22	3.08	3.08

Legend: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$
Source: Prepared by the authors

The Wald test results showed high values, suggesting that all regression models are globally significant. The coefficients of determination (R^2) reveal the proportion of variance in the dependent variable explained by the independent variables in each model. The models for ROA, ROIC, and MV showed a good level of fit, with R^2 values of 0.608, 0.618, and 0.834, respectively, indicating that more

than 60% of the variation in profitability measures and over 80% of the variation in market value can be explained by the variables included.

Conversely, the model with MTB as the dependent variable had an R^2 of 0.180, meaning only 18% of the variance in companies' book values was explained by the variables used. Compared to the other models, this indicates a considerably lower explanatory power, suggesting that MTB is influenced by other factors not captured by the included indicators. The negative and significant coefficients of the independent variable ScoreISE on ROA and ROIC indicate that a higher ISE score is associated with lower financial returns. These results partially converge with studies such as Favaro and Rover (2014), which highlight that adherence to sustainability can involve high initial costs, especially in capital-intensive sectors like electricity, thus reducing short-term profitability.

However, they diverge from studies such as Mamun (2022), which identified a positive relationship between sustainable practices and financial performance in Australian energy companies. This disparity may be attributed to differences in regulatory context and market maturity. In Brazil, the voluntary approach to sustainability reporting (Mota et al., 2013) may limit the perceived positive impact of sustainable practices.

The negative and significant relationship between ScoreISE and MTB aligns with the hypothesis that sustainable practices may be perceived as additional costs by the market in the short term (Jothi, 2019). This result may also be related to the perception that investments in sustainability, although strategic, do not generate immediate returns and may be viewed as expenses that impact short-term financial performance. Studies such as Hawaj and Buallay (2021) emphasize that the adoption of sustainability practices varies significantly among sectors and that their impact on corporate performance depends on long-term perspectives, aligned with companies' adaptive capacity and institutional pressures.

Nonetheless, studies such as Patroni et al. (2023) highlight that companies in the ISE may have a more conservative profile and exhibit more attractive long-term performance due to lower risk levels and the potential for higher returns compared to Ibovespa, as evidenced by their performance since inception. The lack of convergence in these results may be related to the specific characteristics of the electric power sector and how stakeholders assess sustainability practices in this context.

Regarding MV, the ScoreISE variable did not show statistical significance, suggesting that the ISE score has no direct impact on companies' market value. This divergence could be attributed to the economic conditions and specific dynamics of the Brazilian power sector during the analyzed period.

The significant positive relationship between TAM and the financial performance indicators, such as ROA, ROIC, and MV, aligns with the literature on the Positive Accounting Theory (Watts & Zimmerman, 1990). This theory suggests that larger companies, due to their greater capacity to generate and allocate resources, are in a better position to implement strategies that optimize their economic and financial performance, even during periods of instability. Additionally, the positive relationship between LC and the indicators ROA, ROIC,

MTB, and MV supports the hypothesis that higher liquidity can enhance investment capacity in projects (Assaf Neto, 2015).

Finally, the significant negative association between Endiv and MV indicates that high levels of debt may be perceived as a risk by the market. According to Chauhan and Kumar (2018), emerging markets such as India value non-financial disclosures for their ability to reduce information asymmetries and capital costs. This transparency is especially relevant for companies with high levels of financial risk, as also reported by Chauhan and Kumar (2018).

The results suggest that, although the ISE score does not demonstrate a direct impact on all financial and market performance metrics, it may indicate short-term costs associated with implementing sustainability practices. However, these costs could be offset in the long term, as argued by Schaltegger and Burritt (2010), especially in a context of greater integration between ESG practices and the value perceived by stakeholders.

4.4.2 Regression Analysis for ISE Companies

A linear regression analysis was subsequently conducted solely with the companies that are part of the ISE portfolio, regardless of the duration, to identify whether being included in this criterion confers better performance.

Table 10
Linear Regression Analysis (ISE Companies)

Variables	ROA	ROIC	MTB	MV
ScoreISE	-0.001	-0.001	0.004	0.003
TAM	-0.007	-0.011	-0.131	0.876***
CresVendas	0.020	0.024	-0.319	0.013
Endiv	-0.314***	-0.345***	4.606*	-0.780
LC	-0.006	-0.006	0.027	-0.027
Prej	-0.169***	-0.218***	-0.943**	-1.196***
Covid	0.006	0.003	0.286	0.106
Constant	0.478	0.633	1.227	2.448
Wald-test	184.6	271.2	2614	435650
r2_geral	0.577	0.533	0.389	0.765
Breusch-Pagan for heterocedasticidade	0.00	0.00	0.01	0.51
Breusch-Pagan for panel	0.00	0.00	0.00	0.00
VIF Maximum	2.65	2.65	2.26	2.26

Legend: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$
Source: Prepared by the authors

The Wald test results again showed high values, suggesting that all regression models are globally significant. The R² values indicate the models' goodness of fit, showing that the models for ROA, ROIC, and MV fit well (with R² of 0.577, 0.533, and 0.765, respectively), while the model for MTB has a moderate fit, with an R² of 0.389. These results indicate that, although the ISE score (ScoreISE) did not show a significant impact in isolation, variables such as leverage, loss, and firm size play important roles in the financial and market performance of companies that are part of B3's ISE.

The coefficients for the ISE score on ROA and ROIC were not significant, suggesting that the ISE score does not have a direct impact on these returns. These findings imply that, for companies already committed to sustainable practices, the financial benefits may not be evident in the short term. Thomas and Bhaumik (2023), in their analysis of Indian companies, observed that sustainability practices – particularly those related to social and governance dimensions – are positively associated with financial performance, whereas environmental practices exhibited a comparatively weaker association.

Conversely, variables such as leverage and losses showed negative and significant impacts on both metrics. The negative coefficient for leverage on ROA and ROIC suggests that highly leveraged companies face difficulties translating resources into operational performance. This aligns with Watts and Zimmerman (1990), who argue that high levels of financial leverage can affect firm performance by restricting managerial decisions through debt contracts and agency costs. These restrictions, in turn, influence both accounting choices and organizational responsiveness.

The MTB variable showed a positive coefficient for the ISE score, though it was not statistically significant. In contrast, leverage showed a positive and significant relationship with MTB. Leverage can be interpreted as an important factor in market valuation, especially when associated with non-financial disclosure strategies that increase transparency and investor confidence. According to Chauhan and Kumar (2018), ESG disclosures reduce informational asymmetries and signal efficient management to the market. This, in turn, can amplify the positive impact of well-allocated financial resources on perceived corporate value.

On the other hand, the significantly negative coefficient for the loss variable reinforces that negative financial results undermine market valuation, corroborating Junior (2019).

For market value, the ISE score did not present statistical significance, indicating that the ISE score does not exert a direct impact on this indicator. Similar results were found by Pereira et al. (2020), who did not find a significant effect of disclosure on the relationship between social performance and market value in ISE companies, suggesting that in already sustainable-established firms, these factors may have only a marginal effect. This contrasts with studies such as Mamun (2022) and Alamdqiyah and Mahroji (2024), which observed positive impacts in different contexts.

However, firm size showed a significant positive association. These findings indicate that larger companies tend to perform better in the market, which can be explained by their capacity to meet stakeholder demands and maintain higher sustainability practices (Pereira et al., 2020). Additionally, company size was identified as a relevant variable in explaining corporate performance, reinforcing the importance of structural characteristics in the context of mature and well-established firms in the Brazilian market (Pereira et al., 2020).

Moreover, the negative and significant impact of losses on MV highlights that negative financial results penalize market valuation. This aligns with Uyar et al.

(2020), emphasizing the importance of consistent financial performance to sustain positive stakeholder perceptions.

Overall, regarding the first model, results indicate that, for companies in the ISE, the effects of sustainable practices on financial and market performance remain subtle. In the second model, the lack of statistical significance for the ISE score may be attributed to the still-developing maturity of the Brazilian markets regarding ESG practices, as argued by Calixto (2013).

Furthermore, the negative results of variables such as leverage and loss highlight the need for stronger financial management to mitigate risks associated with sustainable practices. These findings can assist managers and stakeholders in balancing investments in sustainability with maintaining healthy financial indicators, contributing to greater efficiency in aligning ESG and financial objectives.

4.5 Additional Analyses

Two additional regression models were conducted to further explore aspects of the sample. The first was performed on companies that remained in the ISE for only one year, and the second on companies that remained consistently in the ISE throughout the three years analyzed.

4.5.1 Regression for ISE1 Companies

Table 11 presents the results of the regression analysis for companies that remained in the ISE for only one year (ISE1).

Table 11
Linear Regression Analysis (ISE1 Companies)

Variables	ROA	ROIC	MTB	MV
ISE1	-0.693***	-0.743***	-0.184	0.003
TAM	0.331***	0.345***	-0.036	0.829***
CresVendas	0.194***	0.193***	0.295*	0.014
Endiv	-0.366	-0.303	-0.463	-1.169***
LC	0.015**	0.011***	0.081***	0.030***
Prej	-0.110	-0.128**	-0.067	-0.438**
Covid	0.028	0.047	0.189*	0.177***
Constant	-7.202***	-7.521***	2.706	3.950*
Wald-test	42.34	50.50	64.05	426.9
r2_geral	0.659	0.686	0.183	0.835
Breusch-Pagan for heterocedasticidade	0.00	0.00	0.72	0.04
Breusch-Pagan for panel	0.00	0.00	0.00	0.00
VIF Maximum	3.51	3.51	3.45	3.45

Legend: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$
Source: Prepared by the authors

The regression analysis for ISE1 companies reveals that the ISE1 variable is negatively and significantly associated with ROA and ROIC ($p < 0.01$), indicating

that short-term membership in the index is associated with lower profitability. This finding is consistent with Favaro and Rover (2014), who argue that the initial costs of adopting ESG practices can negatively affect financial performance in the short term.

Company size and sales growth exhibited positive and significant effects on both ROA and ROIC, consistent with Pereira et al. (2020), who note that larger companies have greater capacity to meet stakeholder demands. In the MTB model, ISE1 was not significant, suggesting no direct impact on market value and the market-to-book ratio. However, current liquidity and sales growth positively influenced MTB, aligning with Schaltegger and Burritt (2010), who emphasize the importance of financial solidity in sustaining ESG effects.

For MV, ISE1 was also not significant, while firm size had a significant positive effect, reaffirming its role in shaping value perception. Debt had a negative impact on MV. While Chauhan and Kumar (2018) do not directly address financial risks, they highlight that transparency in non-financial information can reduce asymmetries and strengthen market confidence. Current liquidity and the Covid-19 variable both showed positive and significant effects, underscoring the relevance of contextual factors in valuation.

These findings reinforce Junior (2019), who identified a positive association between sustainability, performance, firm size, and leverage. Overall, the results suggest that a single year of ISE membership is insufficient to generate broad improvements in financial and market performance. As discussed by Calixto (2013), the benefits of sustainable practices typically require long-term commitment. The relevance of variables such as current liquidity and sales growth further highlights the need for solid financial fundamentals to convert ESG strategies into competitive and financial gains.

4.5.2 Regression for ISE3 Companies

The second additional test focused on companies that remained in the ISE portfolio for three consecutive years, to assess whether consistent disclosure and sustained membership translated into superior performance, as shown in Table 12.

Table 12
Linear Regression Analysis (ISE3 Companies)

Variables	ROA	ROIC	MTB	MV
ISE3	-0.583**	-0.617**	-0.006	0.234
TAM	0.304***	0.317***	-0.072	0.796***
CresVendas	0.139*	0.164**	0.298*	0.019
Endiv	-0.302	-0.262	-0.426	-1.134***
LC	0.017**	0.011***	0.080***	0.029***
Prej	-0.176***	-0.162***	-0.062	-0.431**
Covid	0.033	0.048	0.183*	0.170***
Constant	-6.728**	-7.028**	3.462	4.653***
Wald-test	62.97	80.36	66.03	450.5
r2_geral	0.611	0.634	0.173	0.837
Breusch-Pagan for heterocedasticidade	0.00	0.00	0.77	0.04

Breusch-Pagan for panel	0.00	0.00	0.00	0.00
VIF Maximum	2.93	2.93	2.72	2.72

Legend: *** p < 0.01; ** p < 0.05; * p < 0.10
Source: Prepared by the authors

The Wald tests indicate overall model significance, with good fit for ROA, ROIC, and MV. The MTB model showed weaker explanatory power (R² = 0.173). Extended membership in the index was associated with a significant reduction in operating returns, with negative coefficients for ROA and ROIC. This may suggest that sustained ESG engagement does not immediately generate financial benefits. Similarly, Thomas and Bhaumik (2023) found that environmental practices had a negative, though insignificant, association with financial performance, indicating delayed returns. In contrast, Pereira et al. (2020) reported no significant impact of social disclosure on market value, particularly in mature firms, suggesting only marginal financial effects in consolidated contexts.

Company size and sales growth showed positive and significant effects on ROA and ROIC, reinforcing the evidence that larger companies are better positioned to maintain sustainability practices efficiently (Pereira et al., 2023). The organizational structure of such firms facilitate the balance between financial performance and socio-environmental responsibility.

The ISE3 variable was not significant for MTB, suggesting that long-term membership in the index does not directly affect the market value and market-to-book ratio. Nonetheless, current liquidity and sales growth retained positive associations, confirming the centrality of internal financial fundamentals to valuation, as observed in ISE1 companies.

For market value, the variable ISE3 also did not show a significant association. However, company size remained among the most relevant factors, with a positive coefficient, indicating that larger companies continue to be perceived as more valuable even after three years in the ISE. Conversely, leverage demonstrated a significant negative relationship, suggesting that high levels of financial leverage are consistently penalized by the market.

The results for ISE3 companies suggest that prolonged inclusion in the ISE does not guarantee direct positive impacts on performance metrics. This may reflect the time required for ESG initiatives to yield tangible financial value, as well as the limited integration between sustainability and financial performance in Brazil (Calixto, 2013). Internal characteristics, such as firm size and liquidity, remain critical competitive advantages in this context.

In the model for MV, ISE3 was not statistical significant. Conversely, firm size remained an influential factor, positively associated with MV, while leverage demonstrated a significant negative effect, suggesting that high levels of leverage continue to be penalized by the market. These findings reinforce Calixto's (2013) analysis, which indicates that the impact of sustainable practices may require time to translate into tangible value, particularly in emerging markets such as Brazil, where the integration between ESG and financial performance remains limited.

Regarding hypothesis H1, which proposes superior performance for ISE firms, the findings fail reject the null hypothesis for most metrics. The ScoreISE variable

had no significant effect on MV or MTB, although size and liquidity remained relevant. For hypothesis H2, which posits that longer ISE membership leads to better performance, the null hypothesis is also not rejected. Although ISE3 was significant for ROA and ROIC, the negative coefficients indicate that long-term membership is associated with lower operating profitability, likely reflecting the ongoing costs of ESG adoption. By contrast, sales growth and firm size exhibited positive associations with performance, suggesting that sustainability benefits may materialize in the longer term.

5 CONCLUSIONS

This study analyzed the impact of inclusion in the Corporate Sustainability Index portfolio on companies' financial and market performance, considering their ISE score in the electricity sector during 2021-2023. The analysis encompassed 120 observations from 40 companies. Financial and market data were obtained from the Refinitiv Eikon database, and descriptive statistics, hypothesis testing, and panel regression models with random effects were applied to examine the relationship between ISE score and performance indicators (ROA, ROIC, and Market-to-Book).

The results indicate that, although ISE companies adopt sustainability practices, there were no significant differences in profitability (ROA and ROIC) compared to Non-ISE firms. This suggests that short-term membership in the ISE may not yield immediate financial benefits. In addition, firms with higher current liquidity demonstrated superior financial performance, while financial losses were associated with negative outcomes. The weak correlations between ESG performance and market value suggest that sustainability requires upfront investments that do not necessarily translate into short-term profits.

Regarding market value, ISE inclusion did not show a direct or significant association with MTB and MV. Although ISE companies displayed higher average MV than non-members, the ISE score itself lacked statistical significance, implying that market valuation is more closely linked to firm size. Moreover, the significant negative impact of financial losses on market indicators reinforces the notion that poor financial results reduce perceived corporate value.

These findings highlight the need for effective financial management to balance investments in sustainability with maintaining robust financial health. Despite growing recognition of ESG's importance, the results indicate that the benefits of sustainability in the market context are still developing, pointing to the need for greater maturity in the Brazilian market to recognize and value such practices.

In addressing the research question, the study concludes that inclusion in the ISE does exert a direct and significant effect on financial performance, and its influence on market value appears limited, as evidenced by the non-significant results for the ScoreISE variable.

Additional regression analyses showed similar patterns, ROA and ROIC coefficients were negative for both ISE1 and ISE3. However, long-term presence in

the ISE shows no significant association with market value, as the ISE variable was not relevant for MTB and market value in both analyses.

Future research should extend the analysis period, explore sectors beyond energy, and incorporate additional performance indicators. Further investigation into the role of governance, reputation, and stakeholder engagement in shaping the relationship between ISE score and performance would also be valuable. Comparative cross-country analyses under varying regulatory environments and qualitative studies with stakeholders could provide deep considerations.

The primary limitation of this study is its focus on a single sector, the energy sector, and the sample size. Based on the findings, there is a need to evaluate the long-term effects of sustainable practices on companies, considering the potential offset of initial costs.

This research contributes to deepening the understanding of the economic effects of corporate sustainability, highlighting that although firms listed in the ISE tend to have higher market value, the ISE score exerts only a limited statistical influence on financial and market performance. By incorporating the ISE score as an explanatory variable, the study advances the methodological analysis of the relationship between sustainable practices and firms' performance in the electricity sector.

REFERENCES

Alamdqiyah, D., & Mahroji. (2024). Pengaruh Sustainability Reporting dan Good Corporate Governance terhadap Financial Performance. *Al-Kharaj: Jurnal Ekonomi, Keuangan & Bisnis Syariah*, 6(9), 7287–7311. https://doi.org/10.47467/alkharaj.v6i9.4779

Almada, L., Borges, R. S. G., & Ferreira, B. P. (2022). As estratégias da visão baseada em recursos naturais são lucrativas? Um estudo longitudinal do índice de sustentabilidade empresarial brasileiro. *Revista Brasileira de Gestão de Negócios*, 24(3), 533-555. https://doi.org/10.7819/rbgn.v24i3.4185

Assaf Neto, A. (2015). *Estrutura e análise de balanços: Um enfoque econômico-financeiro*. 11. ed. Atlas.

Agência Nacional de Energia Elétrica (ANEEL). (2006). *Manual de Elaboração do Relatório Anual de Responsabilidade Socioambiental das Empresas de Energia Elétrica*. https://www.gov.br/aneel/pt-br/centrais-de-conteudos/manuais-modelos-e-instrucoes/informacoes-economico-financeiras

Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica*, 47(5), 1287–1294. https://doi.org/10.2307/1911963

Calixto, L. (2013). A divulgação de relatórios de sustentabilidade na América Latina: um estudo comparativo. *Revista de Administração*, 48(4), 828-842. https://doi.org/10.5700/rausp1124

Chauhan, Y., & Kumar, S. B. (2018). Do investors value the non-financial disclosure in emerging markets? *Emerging Markets Review*, 37, 32-46. https://doi.org/10.1016/j.ememar.2018.05.001

Chen, L., & Zhao, X. (2006). On the relation between the market-to-book ratio, growth opportunity, and leverage ratio. *Finance Research* Letters, 3(4), 253-266. https://doi.org/10.1016/j.frl.2006.06.003

Cintra, R., Ribeiro, I., Fava, H. de L., & Costa, B. (2023). Stakeholder management: Evidence on the performance of publicly traded companies. *Revista de Administração da UFSM*,16(2). https://doi.org/10.5902/1983465971638

Cristófalo, R. G., Akaki, A. S., Abe, T. C., Morano, R. S., & Miraglia, S. G. E. K. (2016). Sustentabilidade e o mercado financeiro: Estudo do desempenho de empresas que compõem o índice de sustentabilidade empresarial (ISE). *REGE - Revista de Gestão*, 23(4), 286-297. https://doi.org/10.1016/j.rege.2016.09.001

Favaro, L. C., & Rover, S. (2014) Índice de Sustentabilidade Empresarial (ISE): A associação entre os indicadores econômico-financeiros e as empresas que compõem a carteira. *Contabilometria - Brazilian Journal of Quantitative Methods Applied to Accounting*, 1(1), 39-55. https://revistas.fucamp.edu.br/index.php/contabilometria/article/view/440

Fraga, M. O., Oliveira, E. R., Santos, G. C., & Ferreira, R. A. (2021). Índice de sustentabilidade empresarial e desempenho econômico-financeiro: Estudo do setor brasileiro de energia elétrica. *RACEF – Revista de Administração, Contabilidade e Economia da Fundace*. 12(3), 245-261. https://doi.org/10.13059/racef.v12i3.881

Garcia, B., Lebreton, M., Bourgeois-Gironde, S., & Palminteri, S. (2023). Experiential values are underweighted in decisions involving symbolic options. *Nature Human Behaviour*, 7, 611–626. https://doi.org/10.1038/s41562-022-01496-3

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251–1271. https://doi.org/10.2307/1913827

Hawaj, A. Y., & Buallay, A. M. (2021). A worldwide sectorial analysis of sustainability reporting and its impact on firm performance. *Journal of Sustainable Finance & Investment*, 12(1), 62-86. https://doi.org/10.1080/20430795.2021.1903792

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for the behavioral sciences*. 5. ed. Houghton Mifflin.

Jothi, M. (2010). CSR... in the era of global economic meltdown. *Global Management Review*, 4(4).

Junior, D. M. B. (2019). Relatório de sustentabilidade e desempenho das firmas brasileiras de capital aberto. *Revista Catarinense da Ciência Contábil*, *18*, 1-13. https://doi.org/10.16930/2237-766220192779

Lins, C., Ouchi, H. C., & Steger, U. (2007). Sustentabilidade corporativa: Energia elétrica. *Relatório da Fundação Brasileira para o Desenvolvimento Sustentável.*

Macedo, M. A. da S., Corrar, L. J., Siqueira, J. R. M. (2012). Análise comparativa do desempenho contábil-financeiro de empresas socioambientalmente responsáveis no Brasil. *BASE - Revista de Administração e Contabilidade da UNISINOS,* 9(1), 13-26. https://www.redalyc.org/articulo.oa?id=337228649002

Mamun, M. (2022). Sustainability reporting and financial performance: evidence from Australia's electricity companies. *Corporate Governance and Sustainability Review,* 6(1). http://dx.doi.org/10.22495/cgsrv6i1p2

Marcelino, J. A., Santos, B. M. dos, & Costa, D. C. (2023). Comparação do desempenho econômico-financeiro de empresas listadas na B3 participantes do Índice de Sustentabilidade Empresarial (ISE) e não participantes no segundo semestre de 2022. *Revista Foco*, 16(12). https://doi.org/10.54751/revistafoco.v16n12-056

Marcondes, A. W., & Bacarji, C. D. (2010). *ISE – Sustentabilidade no mercado de capitais*. *Report Editora*. https://hdl.handle.net/10438/15424

Massey Jr, F. J. (1951). The Kolmogorov-Smirnov test for goodness of fit. *Journal of the American Statistical Association*, 46(253), 68–78. https://doi.org/10.1080/01621459.1951.10500769

Miecoanski, F. G, & Palavecini, A. C. (2017). Rentabilidade e sustentabilidade empresarial dos bancos que negociam ações na BM&FBovespa. *Revista de Gestão, Finanças e Contabilidade*, 7(3), 76-85. https://doi.org/10.18028/rgfc.v7i3.3460

Morisue, H. M. M., Ribeiro, M. de S., & Penteado, I. A. de M. (2012). A evolução dos relatórios de sustentabilidade de empresas brasileiras do setor de energia elétrica. *Contabilidade Vista & Revista*, 23(1), 165-196. https://revistas.face.ufmg.br/index.php/contabilidadevistaerevista/article/view/1780

Mota, M. de O., Mazza, A. C. A., & Oliveira, F. C. de. (2013). Uma análise dos relatórios de sustentabilidade no âmbito ambiental do Brasil: Sustentabilidade ou camuflagem? *BASE – Revista de Administração e Contabilidade da UNISINOS*, 10(1), 69-80. https://doi.org/10.4013/base.2013.101.06

Moutinho, R., & Silva, R. L. M. da. (2024). Investimentos ESG na pandemia da Covid-19: houve desempenhos financeiros e acionários superiores?. *Revista*

Catarinense da Ciência Contábil, 23. https://doi.org/10.16930/2237-766220243430

Neumayer, E. (2010). *Human development and sustainability*. United Nations Development Programme. https://hdr.undp.org/content/human-development-and-sustainability

Newey, W. K., & West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, 55(3), 703–708. https://doi.org/10.2307/1913610

Oliveira, I. G. S. (2023). Governance and sustainability in Brazilian electricity companies. *Revista de Negócios*, 28(3), 56-73. https://doi.org/10.7867/1980-4431.2023v28n3p56-73

Oliveira, M. C., Daher, W. M., Ribeiro, M. S., & Sampaio, M. S. A. (2004). Análise das ações de responsabilidade social empresarial divulgadas nas demonstrações contábeis das distribuidoras de energia do Grupo Empresarial Guaraniana S. A. segundo modelo analítico de Hopkins. *Anais do 4° Congresso USP de Contabilidade e Controladoria*. https://congressousp.fipecafi.org/anais/artigos42004/183.pdf

Paranhos, M. A. H. L., Nääs, I. D. A., & Neto, P. L. D. O. C. (2024). Evolution and challenges of environmental, social, and governance practices: An analysis of the Brazilian stock exchange's corporate sustainability index. *Sustainability*, 16(15). https://doi.org/10.3390/su16156531

Patroni, N., Junior, T. P., Antônio, R. M., & Stanzani, L. M. L. (2023). Sustentabilidade no mercado de capitais: Um estudo sobre o desempenho do ISE no mercado acionário brasileiro. *REUNIR - Revista de Administração, Contabilidade e Sustentabilidade*, *13*(3), 34–51. https://doi.org/10.18696/reunir.v13i3.1416

Pereira, A. F. A., Stocker, F., Mascena, K. M. C. D., & Boaventura, J. M. G. (2020). Desempenho social e desempenho financeiro em empresas brasileiras: análise da influência do disclosure. *BBR - Brazilian Business Review*, 17(5), 540-558. https://doi.org/10.15728/bbr.2020.17.5.4

Santos, M. I. da C., Filho, P. A. M. L., Santos, M. L. da C. (2021). Sustentabilidade e desempenho econômico-financeiro: Análise de aderência ao Índice de Sustentabilidade Empresarial (ISE). *RACEF – Revista de Administração, Contabilidade e Economia da Fundace*, 12(3), 39-55. https://doi.org/10.13059/racef.v12i3.737

Schaltegger, S., & Burritt, R. L. (2010). Sustainability accounting for companies: Catchphrase or decision support for business leaders? *Journal of World Business*, 45(4), 375-384. https://doi.org/10.1016/j.jwb.2009.08.002

Serra, R. G., Felsberg, A. V., & Fávero, L. P. (2017). Dez anos do ISE: Uma análise do risco-retorno. *REUNIR - Revista de Administração, Contabilidade e Sustentabilidade*, 7(2). https://doi.org/10.18696/reunir.v7i2.525

Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3/4), 591–611. https://www.jstor.org/stable/2333709

Silva, G. A. da, Santos, A. M. dos, & Silva, M. do R. (2024). Uma análise do disclosure socioambiental das empresas listadas da carteira do ISE da B3 SA. *Revista Interfaces: Saúde, Humanas e Tecnologia*, *12*(1), 3775-3784. https://doi.org/10.16891/2317-434X.v12.e1.a2024.pp3775-3784

Silva, L. N. P. D. (2016). *Análise das informações ambientais evidenciadas nos relatórios de sustentabilidade sob o enfoque da Global Reporting Initiative (GRI)* [Dissertação de Mestrado, Universidade do Estado do Rio de Janeiro]. Repositório Institucional UERJ. http://www.bdtd.uerj.br/handle/1/8190

Sousa, F. A. de, Albuquerque, L. S., Rêgo, T. F., & Rodrigues, M. A. (2011). Responsabilidade social empresarial: Uma análise sobre a correlação entre a variação do Índice de Sustentabilidade Empresarial (ISE) e o lucro das empresas socialmente responsáveis que compõem esse índice. *REUNIR - Revista de Administração, Contabilidade e Sustentabilidade*, 1(1), 52-68. https://doi.org/10.18696/reunir.v1i1.15

Sousa, I. de, Sigahi, T., Rampasso, I., Pinto, J. de S., Zanon, L., Filho, W., & Anholon, R. (2024). Análise da qualidade dos relatórios de sustentabilidade publicados por empresas brasileiras: Uma abordagem analítica de hierarquia process-grey clustering. *Responsabilidade Social Corporativa e Gestão Ambiental*, 31(5), 4298–4314. https://doi.org/10.1002/csr.2804

Sousa Neto, J. A. de, & Correia, M. B. (2024). Integração de Políticas ESG nas Empresas Brasileiras Listadas na B3: Uma análise econômico-financeira das empresas avaliadas no índice ISE B3 2022. *Revista Controladoria e Gestão*, *5*(1), 1114-1136. https://ufs.emnuvens.com.br/rcg/article/view/20198

Souza, N. I. (2024). *Liquidez, endividamento e rentabilidade das empresas listadas no Índice de Sustentabilidade Empresarial ISE B3* [Trabalho de Conclusão de Curso, Instituto Federal do Espírito Santo]. Repositório Institucional IFES. https://repositorio.ifes.edu.br/handle/123456789/4570

Thomas, A. E., & Bhaumik, A. (2023). Sustainability practices and firm performance: Evidence from listed companies in India. *International Journal of Professional Business Review*, 8(10). https://doi.org/10.26668/businessreview/2023.v8i10.3606

Uyar, A., Karaman, A. S., & Kilic, M. (2020). Is corporate social responsibility reporting a tool of signaling or greenwashing? Evidence from the worldwide logistics

sector. *Journal of Cleaner Production*, 253. https://doi.org/10.1016/j.jclepro.2020.119997

Vázquez-Burguete, J. L., Licandro, O., Ortigueira-Sánchez, L. C., & Correa, P. (2024). Do enterprises that publish sustainability reports have a better developed environmental responsibility and are they more transparent? *Sustainability*, 16(14). https://doi.org/10.3390/su16145866

Watts, R. L., & Zimmerman, J. L. (1990). Positive accounting theory: A ten-year perspective. *Accounting Review*, 65(1), 131-156. https://www.jstor.org/stable/247880

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. 2. ed. MIT Press.

Wooldridge, J. M. (2013). *Teoria e prática da econometria*. Cengage Learning.