


## Article

# ESG Dimensions and Corporate Value: Insights for Sustainable Investments

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**Abstract:** This study adopts an integrated approach to analyze the environmental, social, and governance (ESG) dimensions and their relationship with corporate value in terms of two separate hypotheses: financial performance and market value. While previous studies in the literature have researched ESG from an overall aspect, this study stands out by simultaneously considering all three dimensions individually, providing a holistic and detailed view of their combined impact on corporate value to obtain insights for sustainable investments. Another contribution to the literature is the best practices associated with dialogue with stakeholders, as this study significantly contributes to the ongoing debate regarding sustainable investments. It is very important to demonstrate the relationship between ESG dimensions and corporate value based on empirical evidence. Thus, this study fills a gap in the literature and offers a basis for future research on sustainable investments from a multidimensional perspective of ESG. A relevant contribution is a dataset that includes detailed information about ESG dimensions for 100 publicly listed companies on the B3 stock market in Brazil. This comprehensive research allows for a robust generalization of the results and proposes insights that can be applied in a variety of contexts, increasing the relevance and practical applicability of this paper.

**Keywords:** ESG dimensions; corporate value; sustainable investments



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## 1. Introduction

In this study, we aim to address the growing demands for sustainable investments, which is justified based on the study of [1], who argued that “purpose-driven firms demonstrate that acting for the common good increases profitability (and social well-being)”. Moreover, the theoretical framework of this study facilitates an exploration of the relationships between a company’s market value, financial performance, and adherence to ESG dimensions [2]. This approach is critical, given the significant impact that sustainability has on investor behavior and decision making.

The empirical analysis aims to reveal how sustainability practices influence company valuations and financial outcomes, providing a robust basis for understanding the associated dynamics. This insight is particularly relevant in the context of the B3 Brazilian

stock market, which is known for its competitive environment and stringent assessment of company strategies. The stock market's focus on sustainability allows investors to evaluate companies not only based on financial metrics but also on their commitment to ESG principles.

By integrating empirical insights with our theoretical framework, we offer a comprehensive assessment of how sustainable practices affect market value and financial performance. This enables investors to make more informed investment decisions that align with sustainability principles, promoting long-term value creation and ethical investments. This research contributes to an understanding of the strategies of corporations on the B3 Brazilian stock market and the awareness that investors have of the ESG dimensions they adopt.

In a highly competitive market such as the B3 stock market, where investors seek to optimize their portfolios with sustainable investments, this research provides crucial guidance. It underscores the importance of sustainability in driving financial performance and market valuation, thereby supporting informed and responsible investment choices. The findings of this study contribute to a deeper understanding of the interplay between market value, financial performance, and ESG adherence, emphasizing the strategic importance of sustainability in the investment landscape.

The impacts of changes in ESG dimensions have been of great concern for companies around the world [3–7]. As these changes have occurred rapidly over the past decade, governments in various countries are trying to keep control of these changes, including the development of rules to protect the environment [8], control social problems, and ensure that governance rules will be followed [9]. Companies, in general, are also seeking compliance with ESG policies [10], having understood that the financial market is also concerned with this issue and that non-financial data should be disclosed [11]. Embedded in a globalized society, organizations have adopted a post-modern vision focused on social, environmental, and sustainable actions [12].

Many social discussions and agendas have been raised by the United Nations (UN), and the possibility of generating a disruptive mindset in the financial market has arisen [3], considering issues such as inclusion and social issues, governance, and environmental concerns [4], which are becoming important criteria for potential investors. The disclosure of non-financial issues has added value to stakeholders, who are willing to pay for a new competitive environment and has driven a change in organizational mindsets [13]. Stakeholders encompass all involved parties [14], including shareholders, suppliers, employees, society, and regulatory bodies [15].

The importance of creating the long-term perception of environmental, social, and governance (ESG) relationships with consumers and the financial market has been recognized [16]. However, those in management should be careful to understand that shareholder investments are also related to a company's financial performance. If the value performance is lacking, and the creation of value is not ensured, the company will not be interesting to the financial market. Thus, investing in sustainable development practices incurs costs, sometimes reducing P&L and, consequently, may also reduce cashflow, affecting the organization's value. Considering that the capital market evaluates companies mainly in terms of their cash flow generation, such a company may become unattractive to investors [17]. The negative relationship between sustainable development and financial development is linked to social investments that increase costs for entities, thereby reducing profits and shareholder wealth [18].

Considering this scenario, society has been experiencing the consequences of excessive activities and the uncontrolled use of resources, prompting reflection on sustainable practices [19–21]. According to [22], consumers are affected by ESG products. In this way, some organizations have been pressured by institutional investors [23–26]. Corporate attention to environmental issues has become a facilitator for market entry, product sales, capital acquisition, and retention of qualified labor [27]. Considering that companies must consider the relevant impacts on their share value, this study aims to identify the relationships

between the value, financial performance, and ESG in each of its dimensions (governance, social, and environmental) of companies listed on the B3 Brazilian stock market.

Some studies, such as that by [28], have reported that the Dow Jones Sustainability Index [29] indicates that the greater a company's social concern, the better it tends to perform, generating growth and ensuring a better return for its shareholders. This facilitates investment capture and helps to improve consumer perception of the brand.

A linear regression and a panel analysis were conducted using data available from companies listed on the B3 Brazilian stock market [30] and financial data from the Economatica platform. The dimensions used included governance, carbon emissions, great place to work, and sustainability indices, all of which were provided by the Brazilian stock market classification platform (B3).

In this way, the key contribution of this study is an analysis focused on whether any of these dimensions affects the value (either positively or negatively) of companies in the Brazilian context, considering that Brazil is one of the largest countries in the world (220 million inhabitants), with a capital market (B3) volume of USD 900 billion, comprising 21 million active companies (small, medium, and large).

Research has indicated that one ESG dimension may have different perceptions from others in the financial market. ESG is generally used to measure how engaged companies are in minimizing their impacts and conducting sustainable management in environmental, social, and governance aspects [31]; however, these three dimensions are often considered together. The separation of each dimension can lead to a more effective analysis, considering that companies in different countries may have different agendas, and that investors may differ from one country to another.

Brazil is also a country with many social problems, rich environmental and natural resources, and strict anti-corruption laws that punish companies while the government faces structural corruption, leading to high latent risk. Empirical evidence has pointed out that investors are sensitive to these problems and the agenda typically observed in developed countries may not be the same as that faced by Brazilian investors. This contribution may gain the attention of researchers in the ESG field, such that the environment should be considered in the analysis.

This study is structured into five sections, starting with this introduction. The second section presents the theoretical framework and hypotheses, introducing fundamental concepts for understanding the topic. Next, the methodological procedures are addressed, detailing the methods used. The analysis based on the collected data is provided in the fourth section, and the final remarks that conclude the study are presented in fifth section.

## 2. Theoretical Framework

According to [32], ESG emerged within the capital market. This concept, which is still not fully understood by many companies, encompasses environmental, social, and governance factors for measuring the sustainability and the impact of investment in a business or organization. Generally used by investors, it involves analyses of company behaviors in order to determine their future performance and, hence, their value [33].

Indeed, the market value, which represents the current value of a company, can be expressed as its value on the stock market [34]. This indicator is calculated by multiplying the company's stock price by its total number of outstanding shares supplied from a specific stock exchange [35]. Thus, the market value reflects the collective perception of investors regarding a company's prospects and is assessed according to its performance and risk management [36]. Mitigation is very important to explain the sustainable strategy of the company, as it reflects the expectations and perceptions (positive or negative) of investors [37] and the external impact on the company; furthermore, it is influenced by macroeconomic factors and sustainable market tendencies [38].

Another aspect that is important is the assessment of results achieved by the company and, consequently, the internal impact on the company [39]. Thus, the ability of a company to achieve its commercial objectives is typically measured through its financial results,

obtained from the income statement of the company [40]. There are several indicators that can be used for this purpose, such as revenue, expenses, and net result [41]. Furthermore, if a company develops sustainable practices, its financial performance can be assessed through financial measures [42] such as sales, level of customer satisfaction, commitment to the smooth operation of the company, and level of employee engagement, as expressed through annual reports [43].

In terms of the impact of ESG on the performance of a company, [44] studied the relationship between ESG and economic–financial performance with the aim of concluding whether it is worthwhile to be green. This author used variables such as performance and cash and concluded that both had positive statistical results when associated with ESG. However, this result was found in companies from developed countries while, in relation to emerging countries, the lack of a statistically significant relationship between ESG and financial performance has been reported in many studies [45]. This study also addressed companies in controversial sectors, which showed better ESG performance compared to others. The activities of these companies have a significant environmental impact and, for this reason, the author believes that there is greater investment into actions that minimize these impacts. [46] analyzed the financial performance of ESG investments in emerging and developed countries, with the aim of verifying whether investments in shares of companies classified as environmental, social, and governance (ESG) have superior financial performance compared to others. The results confirmed the hypothesis and concluded that investments in companies adhering to ESG conduct have higher financial returns than other companies. There was also support for the conclusion of the second hypothesis—that the benefits of investments in ESG companies are greater in emerging countries than in developed countries [47].

ESG is one of the methods used to assess whether to invest in a particular company. According to [48], Google searches for ESG have increased exponentially in the past three years, with the COVID-19 pandemic further exacerbating social issues.

In a brief historical overview, some environmental milestones stand out among many. Ref. [49] reported that, although global warming has been studied for decades, it was not until 2015 that a significant initiative occurred, namely, the Paris Agreement, in which companies pledged to seek solutions to climate change. They also highlighted the Rio + 20 Conference in 2012, where mainly governmental organizations proposed sustainable measures within the management of public policy. Another relevant global initiative is the 2030 Agenda for Sustainable Development created by the United Nations, which contains 17 sustainable development goals [50].

From an industrial point of view, according to [51], the industrial revolution marked an increase in goods and consumption. The excessive use of natural resources, pollution, environmental degradation, and natural disasters caused unease in society, prompting demand for the adoption of sustainable practices [52,53].

It is also a difficult matter for a company to be entirely sustainable due to the need to extract natural resources, as this can generate waste and pollutants. It might be possible to develop technologies that minimize the impact caused and achieve production that is less environmentally aggressive [51]. Concerning this matter, ref. [54] asserted that cleaner products are more competitive, more accepted by the population, and face fewer threats from non-tariff trade barriers. Ref. [55] recognized that “the concept of a sustainable society encompasses environmental preservation, social, economic, and cultural sustainability”. The integration of these dimensions can help governments and companies to form new markets, promote economic development, and improve international relations based on an ESG agenda, especially in emerging countries such as Brazil.

To reduce environmental impacts and engage in discussions related to the topic, since 1972, the United Nations has held various conferences. One of the most important conferences held by the organization was the Kyoto Protocol, conducted in 1997 in Kyoto, Japan. The treaty was signed between several countries, which aimed to reduce greenhouse gas emissions into the atmosphere. Faced with this new environmental perspective, countries,

industries, and companies were obliged to adopt a different position and open their eyes to preservation and sustainability [56,57].

As society expands and awareness of the social values resulting from historical and economic evolution strengthens [58], organizations have needed to develop a new administrative approach. The role of the company is no longer limited to generating profit and paying taxes but now includes promoting the development and well-being of society, which benefits from responsible organizational conduct. The population demands that companies act ethically and transparently in all contexts, both internally and externally [12]. Therefore, companies also benefit, as those who adopt social practices build a good image for the public and increase consumer satisfaction. According to [59], the shift from shareholder capitalism to stakeholder capitalism has encouraged companies to engage with all involved parties and to contribute positively to the society in which they operate. In addition, opportunities and challenges arising from demographic changes, such as population aging, emerging habits, and urbanization, must be identified.

Ref. [60] suggested that the company should first develop its responsible global strategy, that is, combine strategic management with responsible management, and then align it with functional management. Ref. [61] studied how company strategies relate to society and vice versa. They demonstrated that associating corporate and social strategies maximizes value co-creation. Moreover, they also covered the relationships between society, governments, and NGOs; this concept was named the shared value. Ref. [61] defined it as “policies and operational practices that increase a company’s competitiveness while promoting the economic and social conditions of the communities in which it operates”.

Contrary to the outdated and unsustainable thinking that disregards social and environmental issues and is still present in some companies, this concept identifies that adjusting for social and economic needs generates positive results for businesses. While the mentality of “social responsibility” emphasizes the social dimension, the idea of shared value goes beyond this, as it places social issues at the core of its strategy [62,63].

A company needs a successful productive community, not only to create demand for its products but also to provide essential public asset management and a supportive environment [64]. A community needs successful businesses to provide jobs and wealth generation opportunities for its citizens [61].

Relating the above literature and to respond to the research question on the relationship between corporate value and adherence to ESG, the following hypotheses were formulated:

**Hypothesis 1a (H1a).** *There is a positive relationship between ESG and market value.*

**Hypothesis 1b (H1b).** *There is a positive relationship between ESG and financial performance.*

### 3. Method

The method of this study [65] is based on the population of publicly listed companies on the Brazilian stock market [66]. Thus, we used a list of the 100 most liquid companies on the B3. Once these companies had been collected, based on their trade shares over a period of 5 years (2017 to 2021), we analyzed the database and eliminated all of the companies with missing data during the period of 5 years. At the end of the depuration process, data for a total of 93 publicly listed companies collected from the Economatica database system for the period 2017–2021 were obtained, constructing a dataset of 465 observations for 5 years. We observed that 81 companies were linked to at least one ESG-related index, while 12 companies had no connection to ESG. The companies used were only those that had complete data available for all 5 years. After data collection, Stata software, version 15, was used to perform linear time-series regression and panel data regression, with random and fixed models [67,68]. The Hausmann test was performed, which indicated that the random test yielded the best results for the collected data [69].

There are several indicators that can be used to assess financial performance, such as revenue, expenses, and net result. Furthermore, if a company develops sustainable

practices [70], its financial performance can be assessed through financial measures [42], such as sales, level of consumer satisfaction [71], expenses associated with the commitment to the smooth operation of the company, and the level of employee engagement [58], as expressed in the company's annual report [43].

This study presents financial performance as one of the innovative contributions, as it enables additional explanations due to the use of an advanced quantitative methodology, combining data analysis techniques with robust econometric methods. Specifically, we utilize several econometric models, such as panel data analysis and generalized method of moments (GMM) estimation techniques, which were less commonly observed in the literature review and provide more accurate and reliable estimates to draw conclusions on the impacts of ESG. In particular, this study defends the viewpoint of [72–75] that “a proactive approach to environmental issues enhances consumer loyalty and financial performance”.

### 3.1. Dependent Variables

The dependent variables, based on the study by [76], involve two approaches: market value and financial performance. According to the literature reviews published by [44,77–84], these are represented by accounting variables, including market value (MV) and earnings before interest, taxes, depreciation, and amortization (EBITDA).

- Market value/total assets (MV\_TA): Measured as the total amount of shares at the last date presented in each year, and calculated as amount of shares  $\times$  price per share. Market value refers to the exchange price of a company's assets, resulting from the value of its earnings or potential future benefits (Falcini, 1995). The authors did not use the market value divided by the replacement cost of its assets, which is used to determine whether a company is overpriced or underpriced [11,85], as this is not the objective of the variable in this research.
- EBITDA: A performance cash-based indicator used to measure a company's operational capability to produce cash in each period. It is important to note that EBITDA does not represent actual cash availability; instead, it is an indicator of the potential to generate cash from a company's operations, where sales revenue may not have been fully paid within the analyzed period [86].

For this study, we use EBITDA divided by total assets (EBITDA/TA), which enables the comparison of results between different companies as it does not involve investment and financing decisions. In addition, it eliminates tax requirements and a significant portion of accounting principles, aiding in the comparison between companies from different sectors [87–89].

Table 1 shows the list of dependent variables utilized in this study.

**Table 1.** Dependent variables used for hypothesis testing.

Dependent Variable	Proxy	Measurement	Previous Studies
Market Value (market indicators)	MarketValue_TA	Number of shares issued $\times$ price per share	[90]
Financial Performance (accounting indicator)	EBITDA_TA	Result of the period + depreciation and amortization + financial expenses + income tax	[91]

These were taken as the dependent variables of this study, based on the theoretical framework considering ESG, performance, and market value.

### 3.2. Independent Variables

We used four independent variables to perform our study: ESG (environmental, social, and governance), including compliance with all three dimensions and compliance in each of

the governance, environmental, and social dimensions separately. Each individual variable is described below.

ESG (environmental, social, and governance)

We used ESG compliance as the Corporate Sustainability Index (ISE), which is used for the measurement of companies that have demands for sustainable development in the context of contemporary society and aims to stimulate the ethical responsibility of companies. The objective of ISE B3 is to serve as an indicator of the average performance of the asset prices of companies selected for their recognized commitment to corporate sustainability [30]. This index is provided by the B3 stock market in Brazil and listed on their website). We used each classification by year in the sample for this database [30].

Governance dimension

The governance dimension measures the influence of governance on the value and financial performance of a company [92,93]. To identify the governance dimension, the Economatica database was used, in which it is provided as a dummy variable (where “1” means that the company belongs to a certain level and “0” means that it does not belong to that level).

Below are the criteria for each level:

- Traditional: Consists of companies that qualify as a public limited company (S.A.), but only comply with basic obligations and do not have a corporate governance model. However, they can trade both ordinary and preferred shares and have a board of directors composed of at least three members.
- Level 1: Consists of companies that have board of directors with at least three members (according to legislation), a public calendar of corporate events, and a minimum percentage of shares in circulation (25% in free circulation).
- Level 2: Consists of companies with all level 1 requirements, including a board of directors with a minimum of 5 members, of which at least 20% must be independent with a unified term of up to 2 years; financial statements translated into English; and tag-along of 100% for both natural persons and legal entities.
- New Market: Consists of companies with all level 2 requirements, in which 100% of shares must be ordinary; a Free Float of 25% or 15%, if the average daily trading volume (ADTV) is higher than 25 million/day; and a board of directors with a minimum of three members (as per legislation), of which at least 2 or 20% (whichever is greater) must be independent, with a unified term of up to 2 years.

For the performed study, we considered that a company complied with the level of governance only if they are considered to be in the new market (strongest one) level classification. The other companies (i.e., those that are not included in the new market level) were not considered to have compliance with a good level of governance. The index is available from the [94] and is collected annually for each company.

Environmental dimension

The data indicating whether a company complied with the environmental dimension was the B3 Carbon Efficient Index (ICO2 B3), provided by companies committed to the transparency of their carbon emissions and preparing to lower such emissions. This index is a B3 index, which can be accessed from the B3 website [95] and is collected annually for each company.

Social dimension

The authors considered that a company has compliance with the social dimension if they were included in the Great Place to Work Index (GPTWI) in the B3 classification. This index is available from the B3 website [96] and is collected annually for each company.

### 3.3. Control Variables

Based on the research of [97] and [44], the following control variables were deemed relevant to the situation considered in this work.

Leverage (Lev): The leverage variable, which has been used by various authors [98–101], can have a significant impact on a company's decision-making process. This index is calculated using debt over total assets to monitor the company's degree of indebtedness.

SIZE (Size): The size of a company is frequently used as a determinant variable in academic studies focused on ESG. According to [102,103], larger companies are more likely to present more sustainable behaviors. This variable is calculated using  $\text{LNAT}_i$ , with  $t$  denoting the natural logarithm of company  $i$ 's total assets in year  $i$ .

Sales Growth (SalesGw): This variable indicates increased financing due to the need for growth [104]. It is calculated through dividing the net sales revenue for a given year by the net sales revenue of the previous year, and the result should be multiplied by 100.

EBITDA (EBITDA/TA): The measurement for cash flow generation is important to use in a model of market valuation, as better financial performance could influence the market value of a company. According to [105], EBITDA should be used as a control variable when determining the market value.

Sector (Sector): The economic activity sectors of the selected companies were chosen from those available in the Economatica system. A company's activity is identified using a dummy variable according to the industry sector (1 = operates in the sector, 0 = does not operate in the sector).

Growth Opportunity (GwOp): The growth opportunity of a company should be one of the reasons for an increase in borrowing by the company, which increases its value [93,106,107]. Ref. [108] used an alternative proxy for growth opportunity, where  $\text{VAT}_{i,t}$  is the variation of company  $i$ 's total assets in year  $t$ , and  $\text{AT}_{i,t-1}$  is company  $i$ 's total assets in year  $t-1$ .

Year (YEAR): The year variable ranges from 2017 to 2021. The first year of research was 2017, representing three years before the beginning of the COVID-19 pandemic, and the final year was 2021, representing the end of the pandemic. We wished to observe and control whether the pandemic had any influence on the performance in sustainable indices, and whether it had any influence in market value and EBITDA over this period; therefore, we controlled the results by year.

### 3.4. Econometric Model

To test the hypotheses, the following econometric model was used. It is important to highlight that ESG was comprehensively reflected through all of the independent variables: ESG (all together) and governance, environmental, and social dimensions (separately).

$$\text{Market Value} = \beta_0 + \beta_1\text{ESG} + \beta_2\text{LEV} + \beta_3\text{SIZE} + \beta_4\text{SALESGW} + \beta_5\text{EBITDA} + \beta_6\text{SECTOR} + \beta_7\text{GwOp} + \beta_8\text{YEAR} + \varepsilon$$

And

$$\text{EBITDA} = \beta_0 + \beta_1\text{ESG} + \beta_2\text{LEV} + \beta_3\text{SIZE} + \beta_4\text{SALESGW} + \beta_5\text{SECTOR} + \beta_6\text{GwOp} + \beta_7\text{YEAR} + \varepsilon$$

We conducted robustness tests on the sample in order to ensure the validity and reliability of the linear regression analysis. These tests are essential in verifying that the obtained results are not only accurate but are also consistent with respect to statistical requirements [67,68]. Through performing robustness checks, we identified whether the observed relationships held true across different models and subsets of the variables.

The robustness tests revealed some variations in the outcomes (see The last four tables), leading to the identification of significant relationships that were not initially apparent. This highlights the importance of such tests, as they help to uncover underlying patterns that may be obscured by specific characteristics or sample peculiarities of the data.

In presenting these differences, we provide a comprehensive comparison between the initial results and those obtained after the robustness tests. This comparative analysis demonstrates how certain relationships changed in significance, thereby offering a more nuanced understanding of the data.

The adjustments made through robustness testing served to enhance the credibility of our findings and allowed us to refine our interpretations and conclusions, ensuring that



they were supported by robust evidence. Ultimately, incorporating robustness tests into our analysis strengthened the overall rigor and reliability of our research, providing more substantial and trustworthy insights into the examined relationships.

## 4. Analysis and Discussion

### 4.1. Descriptive Statistics

The sample of the research included the data of 93 companies over 5 years, for a total of 465 observations. Furthermore, we aimed to prove that the study of the Brazil stock market contributes new insights to the scientific literature, and can improve research into sustainability-based investments. Indeed, the Brazilian context is diverse and dynamic, offering a rich basis for understanding broader theoretical implications, with the B3 stock market [30] having more than 450 listed companies in the years 2017 and 2018 [109–113], 425 listed companies in the year 2019 [110], 393 listed companies in the year 2020 [111], and 446 listed companies in the year 2021 [113]. Examining this specific reality, this study covers the unique reality similar to that in other contexts, such as the New York Stock Exchange [114,115], with approximately 2400 listed companies in the year 2017 [116], 2300 listed companies in the year 2018 [117], 2200 listed companies in the year 2019 [118], 2363 listed companies in the year 2020 [119], and 2300 listed companies in the year 2021 [120]. The evolution of both markets presented the same trend, reflecting the impact of the COVID-19 pandemic. These different realities provide a robust foundation for developing new theoretical perspectives or even refining existing ones, thereby contributing to the global body of knowledge. The main descriptive statistics of the set variables used in this research are presented in Table 2.

**Table 2.** Descriptive statistics of the variables.

Variable	Mean	Std. Err.	95% Conf.	Interval
Lev	0.311	0.011	0.290	0.333
Size	16.808	0.077	16.658	16.959
SalesGw	21.435	2.332	16.848	26.022
GwOp	28.074	3.727	20.742	35.405
EBITDA/TA	0.306	0.017	0.273	0.338
MV/TA	1.043	0.062	0.922	1.164

Based on the analysis of Table 2, it can be seen that there was a mean leverage of 31.1% in the companies, with a standard deviation of 1.1%, indicating that the companies presented similar leverage values. The mean size of companies was 16.80, with a standard deviation of 7.7%, with the resulting range also indicating that the companies in the sample were of similar size. The sales grow variable presented a mean of 21.4% and standard deviation of 2.3%, showing that the companies were in different stages of growing their sales. The growth opportunities variable had a mean of 28.0% and standard deviation of 3.7%, indicating that all companies had opportunity to grow. The mean EBITDA/TA was 30.6% with a standard deviation of 1.7%, showing that all companies presented positive results. Finally, the market value/total assets variable presented a mean of 1.0% with a standard deviation of 0.06%; as such, this variable presented higher variation in the sample, which can be explained as it is a measure of financial market performance.

Regarding the governance dimension, the majority of companies in the sample were concentrated between new market and level 2 governance, indicating that they had a higher level of governance (as per the B3 classification). Table 3 presents the governance dimension results for the sample.

**Table 3.** Governance dimension: observations and percentages.

Governance Dimension	Observations	%
Traditional	20	4.30
Level 1	65	13.98
Level 2	60	12.90
New Market	320	68.82
Total	465	100.00

Regarding the economic dimension, presented at Table 4, the companies in the sample were placed in various different economic sectors, including communications (2.15%), information technology (4.30%), petroleum and gas (6.45%), health (6.45%), industrial (8.60%), automotive and manufacturing (10.75%), and raw materials (11.8%). The most important economic sectors in the sample were food and beverage and financial services, each with 85 observations, thus representing a vast part of business development in Brazil, in accordance with the economic statistical data of Brazilian national statistics [121].

**Table 4.** Economic dimension: observations and percentage.

Economic Dimension	Observations	%
Food and Beverage	85	18.28
Financial	85	18.28
Public utilities	60	12.90
Raw Materials	55	11.83
Automotive and Manufacturing	50	10.75
Industry	40	8.60
Petroleum and Gas	30	6.45
Health	30	6.45
Information Technology	20	4.30
Communication	10	2.15
Total	465	100.00

Table 5 presents the level of compliance with the used indices. Compliance with the total dimension of ESG involved classification of a company, in terms of the Brazilian B3 Sustainability Index, as generally compliant with ESG policies. However, we also tested compliance in each dimension—namely, corporate governance, social, and environmental compliance—in order to determine whether there were any difference in performance between the companies in other indices. As can be seen from the table, not all companies were compliant in terms of the ESG indices, especially in the social dimension, while most of the companies are compliant with governance policies.

**Table 5.** Compliance in each dimension: observations.

Compliance	Observations
ESG	195
Environmental	310
Social	130
Governance	380

In general, it is possible to observe that the analyzed sample was generally compliant with the governance and environmental indices, while fewer were compliant with ESG and social indices. The list of all companies and indices used in this study is available on the Zenodo platform [122] in order to be publicly available for further testing.

#### 4.2. Linear Regression

Next, we conducted simple linear regression (OLS) to identify whether there existed any relationships between the dependent and independent variables. In particular, linear regression was performed between the dependent variable of market value and the environmental, social, and governance dimensions to identify the relationships between them.

In the literature [123,124], multicollinearity issues were assessed with the Variance Inflation Factor (VIF), a diagnostic tool used to detect multicollinearity in regression models. Multicollinearity occurs when independent variables in a regression model are highly correlated ( $VIF > 5.0$ ), which leads to unreliable estimates of regression coefficients. Therefore, the VIF was calculated in order to test for collinearity in the model. The mean VIF was 2.80, and the VIF values between variables were all less than 5. This meant that the variables in the model did not present collinearity [67,68].

Table 6 presents the linear regression (OLS) results between market value and the governance (using only the New\_market samples, considering that these companies had the highest level of governance), ESG, social, and environmental indices. The results in Table 6 reveal a negative but non-significant relationship between governance and market value in the sample. However, there were a positive and significant relationships between the ESG index and market value, and the social index and market value, as well as a positive relationship between the environmental index and market value for the companies in the sample. Therefore, hypothesis H1a was not rejected, considering that the market value was found to be related to the ESG indices (except for the dimension of corporate Governance).

**Table 6.** OLS with market value using governance, social, environmental, and ESG indices.

	Market Value	Market Value	Market Value	Market Value
Variables	ESG Index	Governance	Environmental	Social
ESG_Index	0.244 ** (0.111)			
Lev	−1.934 *** (0.283)	−1.858 *** (0.283)	−1.962 *** (0.285)	−1.742 *** (0.282)
Size	0.0449 (0.0509)	0.0561 (0.0511)	0.0289 (0.0524)	0.0450 (0.0505)
SalesGw	0.000630 (0.00152)	0.000577 (0.00153)	0.000512 (0.00152)	0.000345 (0.00151)
Sec_PetroGas	−0.763 ** (0.355)	−0.728 ** (0.357)	−0.805 ** (0.356)	−0.305 (0.381)
Sec_Ciclic	−0.0556 (0.287)	−0.00352 (0.288)	−0.0589 (0.287)	0.261 (0.299)
Sec_Non_Ciclic	−0.667 ** (0.338)	−0.631 * (0.340)	−0.727 ** (0.340)	−0.295 (0.355)
Sec_Industry	0.103 (0.336)	0.192 (0.336)	0.0336 (0.342)	0.550 (0.352)
Sec_Financial	−0.952 *** (0.354)	−0.903 ** (0.357)	−1.042 *** (0.360)	−0.529 (0.371)

Table 6. Cont.

	Market Value	Market Value	Market Value	Market Value
Variables	ESG Index	Governance	Environmental	Social
Sec_Basic_Mat	−0.828 ** (0.352)	−0.833 ** (0.362)	−0.851 ** (0.353)	−0.405 (0.374)
Sec_Public_Utili	−0.818 ** (0.336)	−0.771 ** (0.339)	−0.836 ** (0.337)	−0.429 (0.351)
Sec_Communic	−1.301 *** (0.470)	−1.119 ** (0.466)	−1.267 *** (0.468)	−0.826 * (0.468)
Sec_Health	0.647 * (0.329)	0.707 ** (0.331)	0.630 * (0.330)	0.972 *** (0.340)
Sec_IT	-	-	-	-
Y_2017	-	-	-	-
Y_2018	0.104 (0.151)	0.112 (0.152)	0.0912 (0.152)	0.103 (0.151)
Y_2019	0.321 ** (0.149)	0.325 ** (0.150)	0.311 ** (0.149)	0.317 ** (0.148)
Y_2020	0.514 *** (0.148)	0.516 *** (0.149)	0.508 *** (0.148)	0.508 *** (0.147)
Y_2021	-	-	-	-
GrowthOpp	0.00302 *** (0.000937)	0.00305 *** (0.000944)	0.00312 *** (0.000938)	0.00316 *** (0.000933)
Ebitda_TA	0.393 ** (0.194)	0.332 * (0.196)	0.381 * (0.194)	0.314 (0.192)
Gov_New_Market		−0.0798 (0.137)		
Environmental			0.285 ** (0.131)	
Social				0.378 *** (0.130)
Constant	0.772 (0.788)	0.688 (0.812)	1.000 (0.807)	0.369 (0.781)
Observations	331	331	331	331
R-squared	0.360	0.351	0.360	0.367

Standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

In the Table 7, we performed linear regression (OLS) analysis with robustness (reg) using the dependent variable EBITDA and the governance (using only the New\_market companies, as above), ESG, social, and environmental indices. In this model, we found a negative relationship between governance and EBITDA, showing that higher governance worsens the EBITDA of companies. This may be explained by the costs required to maintain the structure of governance, which reduce the financial performance of companies. The ESG index presented a negative and significant relationship with EBITDA, which meant that companies investing in ESG presented worse performance. Furthermore, the environmental index presented a negative and significant relationship with EBITDA, while a positive and significant relationship was found between the social index and EBITDA, which

meant that investments in social issues brought better performance to these companies. Thus, hypothesis H1b was not rejected. This is an important achievement regarding the identification of negative relationships between governance, ESG, and environmental indices and EBITDA, which could be considered as due to the level of compliance of these companies in order to be part of this classification.

**Table 7.** OLS between financial performance (EBITDA) and governance, social, environmental, and ESG indices.

Variables	EBITDA Governance	EBITDA ESG	EBITDA Social	EBITDA Environmental
Gov_New_Market	−0.0114 (0.0247)			
Lev	0.154 *** (0.0510)	0.171 *** (0.0507)	0.181 *** (0.0505)	0.177 *** (0.0512)
Size	−0.00729 (0.00920)	−0.00375 (0.00913)	−0.00992 (0.00902)	−0.00282 (0.00943)
SalesGw	0.000866 *** (0.000275)	0.000806 *** (0.000272)	0.000850 *** (0.000270)	0.000851 *** (0.000273)
Sec_PetroGas	0.0840 (0.0640)	0.104 (0.0632)	0.169 ** (0.0676)	0.113 * (0.0637)
Sec_Ciclic	0.0116 (0.0519)	0.0273 (0.0514)	0.0662 (0.0534)	0.0271 (0.0516)
Sec_Non_Ciclic	−0.0358 (0.0614)	−0.0241 (0.0606)	0.0412 (0.0636)	−0.0152 (0.0613)
Sec_Industry	0.106 * (0.0604)	0.133 ** (0.0600)	0.179 *** (0.0627)	0.144 ** (0.0613)
Sec_Financial	0.272 *** (0.0616)	0.288 *** (0.0602)	0.325 *** (0.0631)	0.300 *** (0.0614)
Sec_Basic_Mat	0.137 ** (0.0651)	0.153 ** (0.0628)	0.225 *** (0.0665)	0.162 ** (0.0631)
Sec_Public_Utili	0.137 ** (0.0608)	0.158 *** (0.0598)	0.210 *** (0.0622)	0.158 *** (0.0602)
Sec_Communic	0.344 *** (0.0833)	0.402 *** (0.0832)	0.404 *** (0.0827)	0.386 *** (0.0831)
Sec_Health	0.116 * (0.0596)	0.130 ** (0.0589)	0.178 *** (0.0606)	0.133 ** (0.0592)
Y_2018	−0.0422 (0.0275)	−0.0397 (0.0272)	−0.0491 * (0.0270)	−0.0388 (0.0273)
Y_2019	−0.0276 (0.0271)	−0.0263 (0.0267)	−0.0341 (0.0265)	−0.0243 (0.0269)
Y_2020	−0.0279 (0.0269)	−0.0269 (0.0265)	−0.0334 (0.0263)	−0.0249 (0.0266)
GrowthOpp	0.0000258 (0.000171)	0.0000244 (0.000168)	0.0000342 (0.000167)	0.0000217 (0.000169)

Table 7. Cont.

	EBITDA	EBITDA	EBITDA	EBITDA
Variables	Governance	ESG	Social	Environmental
ESG_Index		−0.0674 *** (0.0198)		
Social			0.0847 *** (0.0233)	
Environmental				−0.0534 ** (0.0236)
Constant	0.252 * (0.146)	0.190 (0.141)	0.193 (0.139)	0.174 (0.145)
Observations	331	331	331	331
R-squared	0.274	0.294	0.293	0.283

Standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

We also calculated the VIF to verify whether there was any collinearity in the model. The mean VIF was 2.87, and there were no VIF values between variables that exceeded 5.4. Therefore, the variables in the model did not present collinearity [67,68].

#### 4.3. Panel Data Analysis

To perform a more comprehensive analysis of the effects of the ESG indices on the market value and financial performance of companies, we decided to use panel data, considering that such data follow the same subjects (i.e., corporations) over a certain time period. This method is used to avoid the unobserved heterogeneity that could influence the dependent variable, allowing the results to be more accurate and more efficient estimates to be obtained, compared to simple OLS regression models. We performed the Hausman test, which indicated that the Prob > chi2 was 0.6587, thus rejecting the hypothesis that fixed effects are more efficient; therefore, we used random effects.

Table 8 presents the panel data regression results using random effects between market value and governance (using only the New\_market companies, considering that these companies had the highest level of governance), ESG, social, and environmental indices. The results showed that there was a negative but non-significant relationship between governance and market value, a positive and non-significant relationship between the ESG index and market value, a positive and significant relationship between the social index and market value, and a positive and non-significant relationship between the environmental index and market value.

These results indicated that, when using panel data and controlling by sector and year, the only effect that was still observed on financial performance over the years was associated with the social investments of the company. This might be an indication that companies are signaling more in this dimension than others, considering the social problems that might be present in a developing country.

In Table 9, we present the panel data regression results using random effects between financial performance (EBITDA) and the governance (using only the New\_market and Gov\_level2 companies, as above), ESG, social, and environmental indices. In this case, none of the dimensions presented a significant relationship with the performance of the company.

**Table 8.** Panel data regression with random effects using market value and governance, social, environmental, and ESG indices.

Variables	Market Value	Market Value	Market Value	Market Value
	ESG	Governance	Environmental	Social
ESG_index	0.221 (0.184)			
Lev	−1.879 *** (0.338)	−1.844 *** (0.338)	−1.890 *** (0.339)	−1.787 *** (0.337)
Size	0.0965 (0.0739)	0.107 (0.0743)	0.0868 (0.0757)	0.0975 (0.0730)
SalesGw	0.000800 (0.00119)	0.000766 (0.00118)	0.000788 (0.00119)	0.000712 (0.00118)
GrowthOpp	0.00294 *** (0.000733)	0.00293 *** (0.000734)	0.00298 *** (0.000735)	0.00298 *** (0.000733)
Ebitda_TA	0.296 (0.222)	0.268 (0.223)	0.290 (0.222)	0.263 (0.221)
Y_2018	0.138 (0.115)	0.144 (0.115)	0.131 (0.115)	0.138 (0.115)
Y_2019	0.346 *** (0.110)	0.350 *** (0.110)	0.341 *** (0.110)	0.345 *** (0.110)
Y_2020	0.530 *** (0.107)	0.532 *** (0.107)	0.527 *** (0.107)	0.528 *** (0.107)
Sec_PetroGas	−0.916 (0.562)	−0.886 (0.568)	−0.963 * (0.567)	−0.485 (0.602)
Sec_Ciclic	−0.164 (0.467)	−0.116 (0.471)	−0.172 (0.468)	0.139 (0.484)
Sec_Non_Ciclic	−0.859 (0.541)	−0.823 (0.546)	−0.920 * (0.548)	−0.498 (0.567)
Sec_Industry	−0.0346 (0.541)	0.0482 (0.542)	−0.0982 (0.555)	0.400 (0.565)
Sec_Financial	−1.064 * (0.555)	−1.039 * (0.565)	−1.150 ** (0.568)	−0.693 (0.578)
Sec_Basic_Mat	−1.021 * (0.556)	−1.028 * (0.577)	−1.054 * (0.559)	−0.619 (0.589)
Sec_Public_Utili	−0.986 * (0.536)	−0.946 * (0.544)	−1.011 * (0.540)	−0.617 (0.557)
Sec_Communic	−1.461 * (0.762)	−1.311 * (0.759)	−1.432 * (0.759)	−1.045 (0.752)
Sec_Health	0.534 (0.537)	0.583 (0.542)	0.516 (0.538)	0.842 (0.552)
Gov_New_Market		−0.0732 (0.230)		

Table 8. Cont.

Variables	Market Value	Market Value	Market Value	Market Value
	ESG	Governance	Environmental	Social
Environmental			0.236 (0.216)	
Social				0.365 * (0.215)
Constant	0.0462 (1.115)	−0.0239 (1.161)	0.183 (1.139)	−0.344 (1.109)
Observations	331	331	331	331
Number of Id	83	83	83	83

Standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 9. Panel data regression with random effects with EBITDA and governance, social, environmental, and ESG indices.

Variables	EBITDA	EBITDA	EBITDA	EBITDA
	ESG	Governance	Environmental	Social
Social	0.0301 (0.0693)			0.0302 (0.0683)
Lev	0.00965 (0.0875)	0.00710 (0.0870)	0.0156 (0.0875)	0.00965 (0.0875)
Size	0.00426 (0.0214)	0.00274 (0.0213)	0.00951 (0.0219)	0.00426 (0.0214)
SalesGw	−0.000202 (0.000280)	−0.000193 (0.000280)	−0.000206 (0.000280)	−0.000202 (0.000280)
GrowthOpp	0.000158 (0.000175)	0.000162 (0.000175)	0.000143 (0.000176)	0.000158 (0.000175)
Y_2018	−0.0205 (0.0277)	−0.0212 (0.0277)	−0.0172 (0.0279)	−0.0205 (0.0277)
Y_2019	−0.0179 (0.0261)	−0.0184 (0.0261)	−0.0157 (0.0262)	−0.0179 (0.0261)
Y_2020	−0.00633 (0.0250)	−0.00651 (0.0250)	−0.00512 (0.0250)	−0.00633 (0.0250)
Sec_PetroGas	0.222 (0.190)	0.184 (0.174)	0.217 (0.177)	0.222 (0.190)
Sec_Ciclic	0.0500 (0.154)	0.0301 (0.145)	0.0483 (0.147)	0.0500 (0.154)
Sec_Non_Ciclic	−0.0135 (0.179)	−0.0388 (0.167)	−0.00622 (0.171)	−0.0135 (0.179)
Sec_Industry	0.133 (0.179)	0.0929 (0.166)	0.154 (0.174)	0.133 (0.179)
Sec_Financial	0.521 *** (0.179)	0.467 *** (0.170)	0.538 *** (0.173)	0.521 *** (0.179)
Sec_Basic_Mat	0.167 (0.185)	0.0939 (0.176)	0.163 (0.173)	0.167 (0.185)
Sec_Public_Utili	0.197 (0.175)	0.150 (0.166)	0.203 (0.167)	0.197 (0.175)
Sec_Communic	0.286 (0.237)	0.240 (0.233)	0.314 (0.237)	0.286 (0.237)
Sec_Health	0.122 (0.176)	0.106 (0.167)	0.121 (0.169)	0.122 (0.176)
Gov_New_Market		−0.0754 (0.0717)		



Table 9. Cont.

Variables	EBITDA	EBITDA	EBITDA	EBITDA
	ESG	Governance	Environmental	Social
Environmental			−0.0657 (0.0680)	
Constant	0.0820 (0.329)	0.209 (0.336)	0.0383 (0.332)	0.0820 (0.329)
Observations	331	331	331	331
Number of id	83	83	83	83

Standard errors are in parentheses \*\*\*  $p < 0.01$ .

## 5. Final Remarks

Recent discussions on the public awareness of environmental, governance, and social issues have contributed to consumers and investors [125] becoming more stringent, seeking companies who are engaged in sustainable strategies and social causes [16,126]. In this context, the present study analyzed the relationship between the adoption of ESG principles and the performance and market value of companies. To do so, we analyzed 93 companies from 10 sectors, all listed on the Brazilian stock exchange, using accounting and financial indicators. In particular, 81 companies were linked to at least one ESG-related index, while 12 companies had no connection with any ESG dimension. Considering that companies must consider these impacts in their share value, this study identified the impact of each of the ESG dimensions—environmental, social, and governance—on company value.

Based on the results obtained from the data analysis, we did not reject H1a, as there were significant relationships between market value and the ESG, social, and environmental dimensions. By contrast, we did not observe an impact of governance on market value. In relation to performance, we only observed a significant impact of the social dimension on EBITDA [127].

Other studies have discussed the advantages of adopting environmental, social, and governance practices [128]. For example, ref. [62] conducted a study with Natura and identified value generation since its listing in 2004, having detected a positive return rate on assets and significant performance in terms of stock value, indicating a differential indicator for investor decision making. Ref. [46] conducted a study on the return of conventional portfolios compared to ESG portfolios, grouping developed and emerging countries. The author concluded that, in emerging countries and Canada, investments and benefits in ESG companies showed superior long-term financial performance compared to others. However, as verified throughout this study, merely adhering to ESG conduct is not a determining factor for a company to have better performance in its financial indicators.

One limitation of this study could be the absence of similar values throughout the sample, instead of all corporations having values in all ESG indicators. This would enhance the completeness of the sample but, as [72] argued, “business is competitive, and it is important to know whether those companies that embrace sustainability fare better than those that neglect sustainability”. For this reason, the authors aim to justify that the differences in the sample reveal the diversity of their behaviors. It is relevant for companies to be concerned with the stock market because, as [129] defended, “ESG investors aim to hold companies to follow accountable to the ESG standards, impact investors actively pursue opportunities that generate positive externalities”. Considering this discussion, we have published the dataset used in this study so that it remains available for future research.

Another limitation could be that the five-year period of analysis ended in 2021; therefore, the “COVID-19 pandemic year” represented 20% of this period. However, instead of being a disruption, as [130] argued, “the pandemic is leading asset allocators to take a hard look at investing more heavily into the “S” factor in their ESG frameworks, in addition to environmental considerations”. This accomplishment provides stronger evidence of the sample and this research in general in terms of revealing the benefits of adopting sustainable strategies.

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