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Exploring the Impact of Sustainability on Corporate Financial Performance Using Discriminant Analysis

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Abstract: The impact of sustainability on corporate financial performance has been an important subject of both academic and professional debate since the 1990s. However, there is a lack of consensus in the literature, and studies from developing countries remain scarce. Accordingly, this study uses discriminant analysis to shed light on the variables that discriminate between sustainable and non-sustainable companies using the companies included in Borsa Istanbul (BIST100) (Istanbul Stock Exchange) and the Borsa Istanbul Sustainability Index for a three-year period. Financial and market variables are used in the analysis. Financial variables include the return on equity (ROE), return on assets (ROA), leverage ratios, and company size. The analysis also incorporates market variables such as alpha, beta, volatility, earnings per share, and the price to book ratio. The results show that the relationship between sustainability and performance is significantly influenced by the company size, leverage, volatility, and price to book ratio. The large companies are considered to be more sustainable as their commitment is well recognized. In this way, they attract more investors. Therefore, their stock prices are less volatile and achieve a better price to book ratio. They obtain easy access to external financing compared to companies considered to be non-sustainable. Moreover, they are less volatile in the market and better valued by investors.

Keywords: corporate sustainability; financial performance; discriminant analysis; sustainability impact; corporate social responsibility

1. Introduction

The last four decades have witnessed a great development in the concern for the environment as well as social and sustainability issues in the business world. Companies are pushed to include sustainability in their strategies in order to respond to the growing pressure from all stakeholders and to protect their market shares. Corporate sustainability changes organizations into responsible enterprises that pay attention to economic, environmental, and social aspects of their operations to let our descendants satisfy their needs [1]. Accordingly, sustainability, which means that companies have to meet actual and future societies' requirements, becomes imperative. However, the benefits of sustainability programs can be underestimated or ignored by managers who have a short-term focus. Despite the rise of the issue in the world today, the costs, management approach, and company performance pressures make it difficult to embed the sustainability perspective in company activities. Some companies even consider the sustainability approach as incurring a financial penalty and are not willing to adopt it unless they see clear advantages and gains.

Moreover, the current literature on the link between sustainability and firm performance shows inconsistent results [e.g., 2–6]. Grewatsch et al. (2017) [7] argue that a clear, unidirectional relationship for all organizations does not exist. The difficulties with sustainability measurements and differences in company sector, country, and focus make the results even less convincing, as suggested by many researchers of the field [e.g., 8–10]. This lack of precise measurement has created confusion about the relationship between social performance and financial performance [11]. Thus, the use of the stock market indices, especially the sustainability index and investigation of the differences from other companies, overcomes at least this measurement difficulty and seems to be a well-practiced method.

Accordingly, in order to contribute to the extant literature, this study tries to shed light on the performance differences between companies identified as sustainable and others by advancing the understanding of the relationship between sustainability and company performance in a developing country market context using Borsa Istanbul data. Many studies in the field have used regression analysis to investigate the relationship between sustainability and financial performance. However, in this study, discriminant analysis is used to determine which predictor variables are related to the dependent variable, since discriminant analysis has various benefits as a statistical tool and is quite similar to regression analysis.

This research examines the impact of sustainability on financial performance. First, it contributes to the extant literature by the use of data from an emerging market. Secondly, despite the extensive use of regression analysis in similar works, the study uses the discriminant analysis method. The empirical results of the study show that the sustainability practices have no impact on the profitability of the companies. However, the company size, leverage, volatility, and price to book ratio are positively affected by sustainability practices. Hence, the research has several implications for stakeholders and practitioners.

This paper is organized as follows: Section 2 presents the relevant literature in the field; Section 3 explains the data and variables used in the research; Section 4 shows the results of the analysis; Section 5 discusses the results; and finally, Section 6 outlines the conclusions.

2. Literature Review

The literature review shows different points of view on firms engaged in sustainability initiatives, but the mainstream thoughts on sustainability can be summarized by three competing views.

First, Friedman's (1962) [12] approach, in which economic profit making is the only social responsibility of an organization so long as it stays within the rules of the law, had an important impact in the corporate world and pushed companies to focus on their profits. Respectively, environmental and social engagements are considered to harm the profitability of a firm and decrease the shareholder value [13]. Accordingly, many researchers found a negative relationship between these practices and the return on equity and share price performance [e.g., 14–15]. Then, Porter (1991) [16] argued that sustainability initiatives create positive returns for firms and investors in the long-term. Sustainability practices give companies access to more investment projects [17] and financial resources [18, 19]. This view affirms the idea that the positive returns also include competitiveness [20], ease in complying with new regulations and lower costs [21], and improved return on equity and share performance [22]. Moreover, these social initiatives send positive and healthy signals to consumer and financial markets, leading to an improved brand reputation [23], greater employee productivity, and an increase in operating efficiency.

However, the major studies from the last two decades shows that the relationship between firm performance and sustainability is insignificant or negative. These works argue that the integration of sustainability into corporate strategies provides mixed results on company performance. Moore (2001) [24] argues that these studies assume that there is a linear relationship between sustainability and company performance. However, a non-linear, inverted U-shaped relationship, where companies have to reach an optimum level of sustainability investment, has also been considered by many scholars [e.g., 25]. This form of relationship is also another factor showing the difficulty in explaining the impact of sustainability practices on company performance as well as the mixed results. An overview of these mixed results since the year 2002 is presented in Table 1.

Table 1. Mixed results in the field since 2002.

Research	Financial Variables	Methodology	Number of Observations	Number of Years Covered	Country	Main Results
Wagner et al. (2002) [26]	ROE, ROS, ROCE	Regression	57	3	Europe	negative
Seifert, Morris, Bartkus (2003) [27]	ROA, ROE, ROS	Correlation	90	1	US	insignificant
Seifert, Morris, Bartkus(2004) [28]	Cash flow/sales	SEM	157	2	US	positive
Goll, Rasheed (2004) [29]	ROA, ROS	Regression	62	1	US	positive
Luo, Bhattacharya (2006) [30]	Tobin's Q	Regression	452	4	US	positive
Brammer et al. (2006) [31]	Stock returns	Regression	296	1	UK	negative
Barnett, Salomon (2006) [32]	ROA	OLS	61	28	US	positive
Scholtens (2008) [33]	Financial risk and return	Panel Regression	289	13	US	insignificant
Surroca, Tribó (2008) [34]	ROA	Regression	448	4	International	negative
Prado-Lorenzo et al. (2008) [35]	Sales growth	Regression	117	1	Spain	positive
Mahoney et al. (2008) [36]	ROA	Regression	44	5	US	positive
Makni, Francoeur, Bellavance (2009) [37]	ROA, ROE, market return	Regression	179	2	Canada	negative
Siregar, Bachtiar (2010) [38]	ROA	Regression	87	1	Indonesia	insignificant
Orens et al. (2010) [21]	Cost of financing	Regression	895	1	US and Europe	negative
Mishra, Suar (2010) [39]	ROA	Regression	150	1	India	positive
Keele, DeHart (2011) [40]	Stock price reaction	Event study	103	1	US	negative
Ameer, Othman (2012) [41]	ROA, PBT, CFO	Content analysis	100	5	International	positive
Al-Najjar, Anfimiadou (2012) [42]	Market performance	Regression	350	10	UK	positive
Fujii et al. (2013) [43]	ROA	Regression	758	8	Japan	inverted U-shaped
Wang, Li, Gao (2014) [44]	Tobin's Q	Regression	69	1	Australia	negative
Gallego-Alvarez, et al. (2014) [45]	ROA	Panel Data	855	4	International	positive
Trumpp, Guenther (2015) [46]	Stock Price	Factor Analysis	696	5	US	U-shaped
Charlo et al. (2015) [19]	ROE, Leverage, Size, EPS, P/B	Discriminant Analysis	87	1	Spain	positive
Dangelico, Pontrandolfo (2015) [47]	Firm Performance	OLS	122	1	Italy	positive
Yadav, Han, Rho (2015) [48]	Stock returns	Event study	394	2	US	positive
Hoepner et al. (2016) [49]	Cost of debt	Regression	470	8	International	insignificant
Gregory et al. (2016) [50]	Firm Value	Regression	48	18	US	positive
Wiengarten, Lo, Lam (2017) [51]	ROA	Regression	123	9	US	positive
Junjie et al. (2017) [52]	Share Price	T-test, Anova	198	8	UK	positive
Rajat et al. (2017) [53]	ROI, ROS, Sales Growth, Profit	Regression	478	1	US	insignificant
Wang, Feng, Lawton (2017) [54]	ROA	Regression	264	2	China	positive
Oh, Bae, Kim (2017) [55]	Stock Return	Regression	337	20	US	negative

Goel, Misra (2017) [56]	ROE, ROS, ROCE	Tobin's Q	120	1	India	insignificant
Lassala et al. (2017) [57]	ROE	fsQCA	84	1	Spain	insignificant
Feng Wei, Jiawei Lu, Yu Kong (2017) [58]	NPM, TAT, Growth	AHP	730	7	China	insignificant
Paun (2017) [59]	ROA, Roe, Debt	Regression	91	4	Romania	insignificant
Nuber et al. (2018) [60]	ROA	Tobin's Q	110	10	Germany	U-shaped
Gatimbu et al. (2018) [61]	ROA, Leverage, Growth, Size	Regression	54	5	Kenya	negative
Ray, Mitra (2018) [62]	ROA, ROE	Log. Regression	100	2	India	positive
Cantele, Zardini (2018) [63]	ROA, ROS	SEM	348	1	Italy	positive
Ignacio, Gutierrez & Ruiz-Moreno (2019) [64]	Tobin's Q	PLS-SEM	432	3	US and Europe	inverted U-shaped
Soytas et al. (2019) [65]	ROA, ROE	IV, OLS	1714	3	US	positive
Hapsoro, Husain (2019) [66]	ROE, EPS, CR	PLS	60	3	Indonesia	positive
Kartadjumena, Rodgers (2019) [67]	Bank Ratios	SEM	39	7	Indonesia	negative
Sroufe, Gopalakrishna-Remani (2019) [68]	ROI, ROA, NPM	SEM	82	3	US	insignificant
González, Plaza, Olmeda (2019) [69]	ROE, ROA	Regression	13	17	US	insignificant
Nizam et al. (2019) [70]	ROE	Regression	713	3	International	positive
Jan et al. (2019) [71]	ROAE, ROAA, PCA	Regression	16	10	Malaysia	positive
Wasara, Ganda (2019) [72]	ROI, Sales, Leverage	Regression	10	5	Australia	negative
Siminica et al. (2019) [73]	ROA, ROE	SEM	614	5	Europe	positive
Mendonca, Zhou (2019) [74]	Profitability, Turnover, Debt	PLS-SEM	267	3	US	positive
Li, Minor, Wang, Yu (2019) [75]	Stock Return,	Regression	40—75	5	International	positive

It must also be emphasized that the extant body of literature is mainly focused on developed countries and markets. Accordingly, as mentioned in the introduction, using data from Borsa Istanbul, this research adds the results from an emerging market to the literature on sustainability. Studies on emerging markets started in the mid-1990s with works based on corporate social responsibility activities. Then, research slowly evolved towards sustainability. For instance, the BIST Sustainability Index was only launched at the end of 2014 and is assessed annually. This index shows companies' perspectives on sustainability principles and issues to allow their performances to be compared on local and global levels. Thus, the index gives companies a competitive advantage along with global clients and capital by adding to their international visibility and prestige.

In this study, in order to shed light on these issues and add to the extant literature on sustainability, the results from an emerging market and the financial aspects of sustainability used in the literature are analyzed to investigate the differences between BIST 100 companies and BIST Sustainability index companies over a three year period. In this way, the companies that work on sustainability issues are easily identified on a yearly basis presenting a homogeneous group that differs from others objectively. To evaluate a firm's performance, both accounting and market performance measures are used, as is recommended by many studies [76,4,6]. Finally, discriminant analysis is conducted to determine the most influential independent variables on sustainable companies' performances. Discriminant analysis is an especially efficient technique that is used to distinguish between the categorical dependent variables according to independent variables. This method shows the significant differences among groups in terms of independent variables and evaluates the classification. In this research, the categorical dependent variables are the BIST Sustainability Index and the BIST 100 Index. The independent variables are financial and market variables measuring the financial performance of companies.

3. Data

3.1. Sample Size

The two share indices used in this research were the BIST 100 Index and the BIST Sustainability Index, which represent two groups. The BIST 100 Index consists of 100 stock, and it is used as the main index for Borsa Istanbul. In this study, Group 0 represents the BIST 100 Index, which is composed of national market companies. It started to be calculated as price and return with the code XU100 in January 1986. Group 1, or the BIST Sustainability Index, is a corporate sustainability index involving companies with a high level of performance in Turkey. It started to be calculated as price and return with the code XUSRD in November 2014.

The panel research data consist of two groups: 26 non-financial companies in XU100 and 32 non-financial companies in XUSRD that show persistence in the same groups for the period of 2016–2018, with a total of 174 observations. So, the panel data consist of the same 26 companies in XU100 for three years with 78 observations and the same 32 companies in XUSRD for three years with 96 observations. The financial data from a total of 58 firms included in the sample were provided by the Bloomberg database. The main reason for using companies between 2016 and 2018 in the research was the small number of sustainability index companies represented in the 2014–2016 period. There are three companies in the XU100 Index that have missing variable information, so they were not included in the research. Therefore, as shown in Table 2, 23 non-financial companies in the XU100 Index and 32 non-financial companies in XUSRD were used, giving a total of 165 observations. The related research data for both market and accounting variables in this paper were collected from the Bloomberg database.

Table 2. Sample summary.

Unweighted Cases		N	Percent
Valid		**165**	**94.8**
Excluded	Missing or out-of-range group codes	0	.0
	At least one missing discriminating variable	9	5.2
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	.0
	Total	9	5.2
Total		174	100.0

3.2. Variable Definitions

The variables in the table were selected from accounting and market indicators that reflect the financial performance frequently used in the literature [e.g., 27,34,54,55,64). Table 3 gives descriptions of the variables used in the analysis.

Table 3. Definition of variables.

Variable	Description
Alpha (α)	Alpha is the measure of a portfolio's return that cannot be attributed to market factors and is thus dependent on its idiosyncratic risk
Beta (β)	Beta is the measure generated from a portfolio that can be attributed to overall market factors and is thus dependent on its systematic risk
Volatility (Vol)	Volatility is a statistical measure of the fluctuation for a given share price
Return on Equity	The ratio between net income and average shareholders’

(ROE)	equity
Earnings per Share (EPS)	The ratio between net income and the number of shares of its outstanding common stock
Price to Book (P/B) Ratio (PBR)	The market price of a share divided by the book value per share
Leverage (Lev)	The ratio between total liabilities of the company and total assets
Size (Sz)	Natural logarithm of the total assets
Return on Asset (ROA)	The ratio between net income and average total assets

Alpha measures the active portion of an investment's return, showing the performance of that investment compared to an appropriate market index. An alpha of 1% means that the return on investment in the selected period is 1% better than the market in the same period, and a negative alpha value means that the investment is performing poorly on the market. Beta and alpha are the two main coefficients used to assess the performance of investments and funds in financial markets [77].

Accordingly, the beta coefficient (β, beta, or beta coefficient) measures the volatility of a stock in order to be able to compare it to the general volatility. The beta coefficient depends on the response of a stock to market movements [78].

Volatility is a statistical measure of the fluctuation of returns for a stock or market index. It shows the degree of variation in prices and it is measured by the standard deviation of logarithmic returns [79,80].

The return on equity (ROE) is a ratio showing the management's ability to generate income from available equity. It is an indicator of the use of investments to generate earnings growth. The ROE is specifically used to contrast companies in the same industry [81]. In a similar manner, the Return on Assets (ROA) is a ratio of the use of a company's assets to generate income. The ROA varies across industries according to the capital intensity of the companies, and a ROA of 5% is generally considered good [82].

Earnings per share is the ratio of a company's profit distributed to each share of common stock. It is measured by subtracting the dividends paid for the preferred stock from the net income of a company and dividing this number by the average number of shares [80].

4. Analysis

First, the descriptive statistics of the variables were calculated in order to understand and summarize our variable set. There are three companies in the XU100 Index that have missing variable information, so they were not included in the research. The missing variables are the ROE and P/B Ratio for these companies. Accordingly, the lack of data from three companies for three years decreased the total number of valid observations N from 174 to 165. Then, the discriminant analysis was used to estimate the relationship between the categorical dependent variable and the metric independent variables.

The standard deviation and the mean for each variable are shown in Table 4. The companies in our sample had an average alpha value of 5.3 and an average beta coefficient of 0.89, so companies in our sample performed 5.3% better than the general market and reacted 11% less to market movements. The average volatility was 37.17. Regarding the ROA (3.6%), ROE (11.71%), and EPS data, the positive average values show that the companies are profitable. However, the companies are also highly indebted according to the average leverage value (62.4%). Regarding the size, the companies are of different sizes.

Table 4. Descriptive statistics.

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Alpha	174	−0.8894	1.3041	0.053646	0.2992901
Beta	174	−3.2177	4.5645	0.897286	1.0442099
Volatility	174	19.9040	75.6560	37.172397	11.2964640
ROE	165	−1.0166	0.7303	0.117711	0.2234037
EPS	174	−4.6797	110.3238	2.426304	9.8446063
P/B Ratio	165	0.2804	16.3185	2.156402	2.1460196
Size	174	5.6891	12.8258	8.528132	1.5013996
Leverage	174	0.0801	2.8482	0.624772	0.3739673
ROA	174	−0.9100	0.5392	0.036704	0.1278669
Valid N (listwise)	165				

The discriminant analysis built a predictive model for group memberships. The discriminant function provided the best discrimination between the groups according to the independent variables. The analysis showed the variables that cause the differences between companies in the BIST 100 and BIST Sustainability indexes.

In the first part of the analysis, all variables were used in order to eliminate non-discriminating variables. Accordingly, the first discriminating function (1) was obtained using the weighting from the standardized canonical discriminant function coefficient shown in Table 5.

Table 5. Standardized canonical discriminant function coefficients for the first discriminant function.

	Function 1
Alpha	−0.033
Beta	−0.202
Volatility	−0.077
ROE	0.356
EPS	0.009
P/B Ratio	0.122
Size	0.776
Leverage	0.554
ROA	−0.193

$$D_1 = -0.033\alpha - 0.202\beta - 0.077Vol + 0.356ROE + 0.009EPS + 0.122PBR + 0.776Sz + 0.554Lev - 0.193ROA \quad (1)$$

The canonical correlation coefficient shows that the first model explains 48.86% (square of canonical correlation value 0.699) of the variance in the dependent variable, and the eigenvalue (0.955 > 0.4) confirms that the function discriminates between the two groups.

Table 6. Eigenvalues for the first discriminant function.

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0.955[a]	100.0	100.0	0.699

a. First 1 canonical discriminant functions were used in the analysis.

A significant 0.511 Wilks' lambda value showed that this first discriminant function was adequate to continue the analysis.

Table 7. Wilks' Lambda value for the first discriminant function.

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.511	106.278	9	0.000

The second discriminant function (2) was calculated using the variables with significant Wilks' lambda values, as shown in Table 8. These variables were size, leverage, volatility, and P/B ratio.

Table 8. Significance test of Wilks' Lambda values for variables.

Variable	Wilks' Lambda	F	df1	df2	Sig.
Alpha	0.998	0.271	1	163	0.603
Beta	0.999	0.199	1	163	0.656
Volatility	0.874	23.601	1	163	0.000
ROE	0.984	2.649	1	163	0.106
EPS	0.988	2.014	1	163	0.158
P/B Ratio	0.974	4.278	1	163	0.040
Size	0.671	80.055	1	163	0.000
Leverage	0.732	59.642	1	163	0.000
ROA	1.000	0.034	1	163	0.853

$$D_2 = -0.190\text{Vol} + 0.113\text{PBR} + 0.732\text{Sz} + 0.554\text{Lev} \quad (2)$$

Table 9. Standardized canonical discriminant function coefficients for the second discriminant function.

Function 1	
Volatility	-0.190
P/B Ratio	0.113
Size	0.732
Leverage	0.554

This second model explains 46.78% of the variance and has a good discrimination level (eigenvalue 0.880 and a significant Wilks' lambda value of 0.532). The function reveals that the size is the strongest of the variables that have an impact on the discrimination, followed by leverage, P/B ratio, and volatility. So, sustainable companies are larger in size and more debited. Moreover, these companies were shown to be better evaluated by the market and less volatile, as the volatility coefficient was negative.

Table 10. Eigenvalues for the second discriminant function.

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0.880[a]	100.0	100.0	0.684

a. First 1 canonical discriminant functions were used in the analysis.

Table 11. Wilks' Lambda value for the second discriminant function.

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.532	101.656	4	0.000

The groups classification results also confirm the findings as they show that for the first group of companies in the BIST 100 Index, 69.6% of the companies are correctly classified. For the sustainable companies from the BIST Sustainability Index, the ratio rises up to 89.6%, making the average correct classification ratio 81.2%.

Table 12. The second discriminant function classification results [a,c]

XU100-XUSRD Inclusion	Counts	Group	Predicted Group Membership 0	1	Total
Original	Count	0	48	21	69
		1	10	86	96
	%	0	69.6	30.4	100.0
		1	10.4	89.6	100.0
Cross-validated [b]	Count	0	48	21	69
		1	10	86	96
	%	0	69.6	30.4	100.0
		1	10.4	89.6	100.0

a. 81.2% of original grouped cases correctly classified; b. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case; c. 81.2% of cross-validated grouped cases correctly classified.

5. Results

The study of financial performance indicators shows that companies with a greater size are more inclined to adopt sustainability activities. In our analysis, the size, with a standardized canonical discriminant function coefficient of 0.732, was shown to be the most discriminating variable, as larger companies attract more public attention and have to protect their reputations. Moreover, they have to manage their public relations well, using every possible opportunity. These companies are also considered to have enough power to initiate sustainability reporting as they are seen to be pioneers by the public.

Concerning the leverage data, the value of 0.554 indicates that these companies are capable of easily accessing credit as they are positively valued by creditors and investors. Through their market reputation and strong financial structure, these companies are attractive for investors willing to invest responsibly, so sustainable companies can increase their indebtedness level to a greater extent compared with other companies. In view of these results, it can be argued that the sustainability, reputation, and size of the companies form a positive circle for companies. There is no doubt that companies in the sustainability index reinforce their reputations, hence allowing them to have easy access to loans which, in turn, enables them to achieve better growth.

From the market variables P/B ratio and volatility, it can be seen that the sustainable companies' share prices are less volatile following fluctuations in the market as they are, according to investors, stronger, more reliable, and more stable. Accordingly, the price to book ratio of the sustainable companies confirms that they are positively valued in the market. They are expected to perform better in the future and are especially expected to be less vulnerable to crises in an emerging market.

According to the discriminant analysis results, sustainability investment has no discriminating effect on the investors' decisions, as the investors in an emerging market consider sustainability investment only as a sign of a good reputation for big companies and as easy access to external financing. However, the alpha and beta variables showed neither negative nor positive effects, which is a good sign for the development of sustainability efforts in emerging markets.

The profitability ratios (i.e., ROE, ROA, and EPS) did not reveal any significant results. This shows that sustainability investment has no discriminating effect on the profitability between the two groups.

6. Conclusions

This study analyzed the relationship between sustainability practices and financial performance in an emerging country using discriminant analysis. Although this analysis method has been used in previous studies [e.g., 19], this is the first time that discriminant analysis has been used in an emerging market context. The study shows that market data and accounting data are both related to sustainable company behaviors.

According to the results, size is the most important variable for responsible investors, as bigger companies are considered to be more sustainability-oriented and powerful in an emerging market context. These companies are visible and invest in sustainability, as they are big companies that are constantly followed by investors. Therefore, their commitment is well understood, which attracts more investors, making their stock prices less volatile and allowing them to achieve a better P/B ratio. These results are in line with [16] and [20], arguing that real commitment towards sustainability can generate positive outcomes in diverse financial performance objectives. Moreover, as no differences in terms of alpha, beta, ROA, ROE, or EPS with companies considered to be non-sustainable were shown, this means that sustainability activities do not scare investors willing to maximize their profit. Although [19] showed that alpha and beta are significant variables in a developed country context, our results do not confirm this discrimination effect in an emerging market. This could be due to the investors' perceptions of emerging markets, where investors are short-term-oriented and consider that sustainability efforts could damage his/her own interests.

The empirical results provide several insights. First, the profitability ratios do not show any significant relationship with sustainable investment, while size shows a significant correlation with sustainability investment. The alpha and beta variables are both insignificant according to the analysis. However, the volatility, P/B ratio, and leverage data do show significant and positive results that reinforce the sustainability efforts of the companies. These results contribute to stakeholder theory and the existing debate on the relationship between sustainability and financial performance by showing that profitability is not affected by sustainability initiatives. The results also show the practical implications to design-market-oriented sustainability campaigns that will add to the reputation and visibility [83] of the companies and demonstrate the commitment towards sustainable development, since they are at the core of the growth of the companies.

In this way, this study suggests that future research could investigate possible differences in terms of sustainability, according to markets and the development level of countries. Industry differences are also important for sustainability and could be further analyzed in the future. It should also be pointed out that our research is limited to the BIST 100 and BIST Sustainability Indices with a total of 165 observations, so future studies with larger databases could address this limitation.

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