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An Analysis of the Determinants of Environmental, Social and Governance (ESG) Scores at the Firm level on Borsa İstanbul Companies

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ABSTRACT

Environmental, Social, and Governance (ESG) scores reflect how major corporations are evaluated based on ethical practices and sustainability efforts. This study aims to analyse the factors at the firm level that influence the ESG scores of 34 companies traded on Borsa Istanbul between 2018 and 2022. While the dependent variables are the ESG scores, the independent variables are financial leverage (LEV), the logarithm of total assets (SIZE), return on invested capital (ROIC), return on capital employed (ROCE), market to book value (MB) ratio, and foreign net transactions/total volume (YS) ratio. The analyses are carried out individually, focusing on the three distinct aspects of corporate sustainability: environmental, social, and governance. This study employs fixed-effect panel data analysis utilizing the Driscoll and Kraay (1998) estimators. According to the results of the analyses, it is found that the variables LEV, ROCE, YS, and SIZE have positive impacts on ESG scores. Furthermore, the criteria that make up the ESG score are also examined separately. It is determined that the environmental criterion (ENV) is positively influenced by the variables LEV, ROCE, MB, and SIZE. The social criterion (SOC) is positively and significantly influenced by the variables LEV, ROCE, MB, and SIZE, while the variable ROIC has a negative effect. The governance criterion (GOV) is positively influenced by the variables ROCE, YS, and SIZE, while the variable MB has a negative impact on the criterion. The results of the analyses are in line with the legitimacy theory and agency theory.

Keywords: ESG Performance, Sustainability, Firm Performance, Profitability, BIST

Borsa İstanbul Firmalarında ESG Skorlarının Firma Düzeyindeki Belirleyicilerinin Analizi

Süreç

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ÖZ

Çevresel, Sosyal ve Yönetişim (ESG) skorları, büyük şirketlerin etik uygulamalar ve sürdürülebilirlik çabalarına göre nasıl değerlendirildiğini yansıtır. Bu skorlar, bir şirketin çevresel, sosyal ve yönetişim uygulamalarıyla ilgili çeşitli faktörlerden etkilenir. Bu çalışmada Borsa İstanbul'da işlem gören 34 firmanın 2018-2022 dönemi ESG skorlarını etkileyen firma düzeyindeki faktörlerin incelenmesi amaçlanmıştır. Bağımlı değişken olarak ESG skorları kullanılırken bağımsız değişkenler olarak ise finansal kaldıraç (LEV), toplam varlıkların logaritması (SIZE), yatırılan sermayenin getirisi (ROIC), kullanılan sermayenin getirisi (ROCE), piyasa değeri/defter değeri (MB) ve hisse yabancı net işlem/toplam hacim (YS) oranları kullanılmıştır. Analizler ayrı ayrı yürütülmekte olup, kurumsal sürdürülebilirliğin üç farklı boyutuna odaklanılmaktadır: çevresel, sosyal ve yönetişim. Çalışmada Driscoll ve Kraay (1998) tahmincileri ile sabit etkiler panel veri analizi kullanılmaktadır. Analiz sonuçlarına göre LEV, ROCE, YS ve SIZE değişkenlerinin ESG skorları üzerinde pozitif etkiye sahip olduğu bulunmuştur. Ayrıca ESG skorunu oluşturan ölçütler ayrı ayrı da incelenmiştir. Çevre ölçütünü (ENV) LEV, ROCE, MB ve SIZE değişkenlerinin olumlu etkilediği tespit edilmiştir. Sosyal ölçüt (SOC) üzerinde LEV, ROCE, MB ve SIZE değişkenleri pozitif ve anlamlı bir etkiye sahipken ROIC değişkeninin negatif etkisi olduğu görülmüştür. Yönetişim ölçütünü (GOV) ROCE, YS ve SIZE değişkenlerinin pozitif yönde etkilediği, diğer taraftan MB değişkeninin ölçüt üzerinde negatif etkiye sahip olduğu bulunmuştur. Analiz sonuçları meşruiyet teorisi ve vekalet teorisi ile uyumludur.

Anahtar Kelimeler: ESG Performansı, Sürdürülebilirlik, Firma Performansı, Karlılık, BİST

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Introduction

The Environmental, Social and Governance (ESG) scores are implications of how higher corporate entities are judged on the grounds of ethics and sustainability. These scores are affected by various features of the Environmental Social Governance of business.

The environmental scores are determined by various factors related to a firm's ESG performance. Keyinternal initiatives such as evaluating climate change risks, energy consumption intensity, and emission reduction efforts play a significant role in shaping these scores (Mahapatra et al., 2021: 3). Apart from that, Wang and Wang (2022) explain that the level of environmental regulations played a role via triggers, including foreign direct investment, technological revolution, and industrial construction. Among them, the lack of good governance, barriers to renewable energy adoption, and national energy policies are identified as key critical determinants impeding the elevation of an environmental rating (Fatima et al., 2021: 51716).

Factors that can influence the social scores under workforce diversity, community engagement and stakeholder relations are a pool of factors. For example, research has found that social scores are particularly sensitive to workforce composition concerning gender and ethnicity (Kiradoo, 2022: 144). This increasing importance of ESG criteria in measuring how ethical and sustainable a firm's practices are cement yet again the domineering contribution that social factors have on overall ratings (Warouw et al., 2024: 817).

Governance ratings, a principal part of ESG evaluations, are influenced by board composition and corporate practice as well as company structure. The study documents a positive relation between board diversity, in particular women representation, and company value (Carter et al., 2003: 38). From the empirical analysis significant determinants of disclosure are firm size, firm age, family members in the board and verticality (Pfeiffer & Jarchow, 2024: 662). Certain others act as the major discriminants between good governance firms and high governance-rated ones underlining the importance of strategic management decisions.

The Dow Jones Sustainability Index is the world's first universal sustainability index, founded in 1999. The Sustainability Index was launched as a joint publication under the roof of Borsa İstanbul (BIST) on November 4, 2014. The primary purpose of the BIST Sustainability Index, which replaced the voluntary market segments Star Market, Main Market, and SubMarket, is to try and increase understanding, knowledge, and practice on sustainability by creating an index with BIST traded companies having high corporate sustainability performance. Formerly calculated by EIRIS (Ethical Investment Research Services Limited), the BIST Sustainability Index began to utilize Refinitiv ESG scores as of October 2021. Also, BIST Sustainability 25 Index started to be published within BIST on November 21, 2022.

Assessing the factors affecting ESG scores reveals the inextricable interplay between the environmental, social and governance dimensions of firm operations. Understanding and addressing these determinants is key for businesses in the driver's seat to improve ESG performance and stakeholder trust. This way, by ranking environmental sustainability, social accountability, and effective governance performance, firms will be able to enhance ESG scores while making their share of contribution to society and environment goodwill as well. It's no other way that these efforts have to be followed up by adequate and balanced financing. With that, this paper therefore goals to explore the firm-level factors influencing the ESG scores of 34 firms listed on the BIST during 2018-2022. In this study, which is modelled by utilizing variables used in international literature owing to the restricted number of studies specific to firms traded on BIST and is thought to contribute to the field in this respect, independent variables are the same as those foreign ones used in most international sources as there were no earlier research specifically tailored for companies traded on BIST. These are the ESG scores from the Refinitiv Eikon database as dependent variables and financial leverage, logarithm of total assets, ROIC, ROCE, market to book value, and foreign stock net transaction/total volume ratios obtained from the Finnet Stock Expert application. The present study also contributes to shedding light on the mechanisms underlying corporate behaviour with respect to sustainability and social responsibility, through an investigation of ESG score determinants. As the importance of ESG scores rises, so does the trend among investors to show preference for firms with strong environmental and social credentials, coupled with good governance. For this reason, knowledge about what drives the ESG scores will be essential not only for knowing what companies are doing but also for making investment decisions and policy formulations as far as Türkiye's growing market is concerned.

Literature Review

ESG scores have been examined in the finance literature in three basic ways: as firm-level variables, sector-level variables, and country-level variables. Stakeholder theory (Ansoff, 1965), legitimacy theory (Perrow, 1970), agency theory (Jensen & Meckling, 1976), signalling theory (Spence, 1973), and institutional theory (DiMaggio and Powell, 1983) provide a few among many possible explanations. The variables that drive our study have been shown are the most widely used in the literature. While some of these consider ESG scores and/or basic measures as dependent variables, there are also some that include these scores in the analysis as independent variables in the literature. Overall, though ESG scores are positively related to profitability and firm value, some studies find a negative relation between these variables. Studies have also indicated that the relation between ESG scores and firm value as well as

profitability is heterogeneous with respect to (positive, neutral or negative) different key metrics of ESG scores.

In this study, ESG score is accepted as a dependent variable and determinants of ESG score have been investigated. The main aim of this paper is to investigate which factors affect the ESG scores of BIST firms. In the case of dependent variables being ESG scores and/or basic metrics, Crespi & Migliavacca (2020) study the determinants of ESG scores for 22 countries over the period 2006 to 2017. They find that ESG scores increased linearly over time and that return on equity and firm size have positive effects on ESG scores. In addition to reporting a similar finding Sharma et al. (2020) investigated the determinants of ESG scores for Indian firms from 2015 to 2016. The results expose that variables like return on assets and ROCE have positive effect on ESG scores. Further, market performance, the share of foreign institutional investors, and the leverage ratio have a negative relation with ESG scores. In their report, Zhao & Murrell (2022) note that "Might financial performance (ROA, ROE, and Tobin's Q) have positive relations with ESG scores." In another research work described by Garcia et al. (2017), 365 firms' data in BRICS stock exchanges during the period 2010-2012 are reviewed. It is therefore profitability (ROA) has a positive influence on environmental scores, one of the ESG basic metrics, for sensitive companies exposed to systematic social taboos and moral debates, political pressures that cause social and environmental damage and are likely to be sensitive. Just recently, Drempetic et al. (2020) commented that 'May firm size' have positive relations with ESG scores. In their study, they report that examining 3828 companies from different countries, namely the USA, UK, Canada and Japan. Furthermore, Khaled et al. (2021) established that higher market capitalization, profitable, more substantial, and less levered firms enjoy better ESG scores. ESG scores are influenced more by country-specific factors compared to firm-specific factors, as indicated by Cai et al. (2016), who analyse data on 2,632 companies from 36 countries. DasGupta (2021) find that firms in both developed and developing country stock exchanges between 2010 and 2019 report very strong financial performance deficiencies leading to high ESG scores. In his analysis, there is high, and statistically significant negative relation between R&D intensity and ESG scores. In the line with the study by Garcia-Blandon (2019), the financial performance of companies led by the World's Best-Performing CEOs, as ranked by Harvard Business Review in 2016, showed a negative effect in relation to ESG scores. This finding is further supported by Shahbaz et al. (2020), who found that superior ESG scores do not necessarily lead to high financial performance, based on their study of energy companies from 2011 to2018. However, the research by Choi & Lee (2018) confirms the opposite: it also has a positive influence on performance, diminishing only as companies granted franchises. Another work confirming this was by Arminen et al. (2017), which shows that ESG scores are positively influenced by the degree of economic development, firm size, and financial performance. Branco & Rodrigues (2008) investigate whether the degree of international activity, firm size, consumer proximity, environmental sensitivity, and media exposure is effective in social responsibility disclosure of Portuguese firms. They find that firm size and media exposure positively affect social responsibility disclosure. Jennifer Ho & Taylor (2007) examine the triple-bottom-line (TBL) reporting practices of 50 major companies from the U.S. and Japan. They find that overall TBL disclosures, which include economic, social, and environmental aspects, are more extensive among larger firms, those with lower profitability and liquidity, and companies within the manufacturing sector. Al Amosh & Khatib (2022) examine how ownership structure might influence the disclosure of environmental, social, and governance performance within Jordan. The findings indicate that both foreign and state ownership significantly impact the level of ESG performance disclosure. Foreign ownership is also accepted as an important dimension for emerging markets by Alkhawaldeh (2012). It is found to be an important factor affecting credit ratings of Jordan firms. Khoury et al. (2023) aim to examine the factors influencing ESG scores in the banking sector across Middle Eastern and North African countries. Findings show that banks with lower performance tend to have lower ESG scores, while larger banks generally have higher ESG scores.

The other part of the literature uses ESG scores as independent variables and investigates whether they are effective on firm performance. One of the studies that ESG scores have been positively related to firm value and/or profitability is evidenced in Velte (2017) by stating that ESG scores had a positive effect on profitability for German firms and governance is also strongly related to financial performance. For instance, this is the case in the study by Baldini et al. (2018) where the authors found firm-level variables (leverage, firm size) to be positively related to ESG scores in a study ranging over the years 2005-2012 and conducted on a multinational basis. Because, as Yoon et al. (2018) find that Corporate Social Responsibility initiatives did affect market value, but the effect is dependent on characteristics of the firm. They study the effect of ESG scores on financial performance for Indian firms over a period of two years by studying another set of US company between 2006-2011, just like Dalal & Thaker (2019) had done. A similar effect has been confirmed for recent US firms by a very intensive emphasis on ESG activities and reporting, as is done by Fatemi et al. (2018). Another research by Bhaskaran et al. (2020) follows on from a study aimed at re-examining the Tobin's Q, ROE and ROA ratios and ESG scores interrelation at the level of their effects on financial performance. The result of their analysis shows, indeed, that firms excelling in environmental, governance and social aspects are inclined to generate more value at the market level. Likewise, De Lucia et al. (2020) analysed 22 European countries on a sample of 1038 public firms. Their findings show a positive association between ESG scores and financial returns. Chairani & Siregar (2021) conducted an analysis of firms listed on the stock exchanges of Indonesia, Malaysia, the Philippines, Singapore and Thailand over the period 2014-2018. They find ESG scores which tend to magnify the impact of corporate risk management to have positive relation with firm value and profitability. In another

related development, Naeem et al. (2022) address how ESG performance influences financial performance. According to their findings, both individual ESG and combined scores are positively associated with Tobin's Q and ROA. For instance, at the industrial level, one study by Zhao et al. (2018) dwelt on the ESG performance of Chinese energy firms based on financial metrics and find out that higher ESG scores could drive a company to better financial performance. Likewise, using 2010-2020 data for companies in the Shanghai A Share index, Chen et al. (2023) prove in their study that ESG performance has a risk-lowering impact by increasing the cost of equity. Abdi et al. (2022) evaluate ESG scores' impact on firm value and profitability in the airline industry by conducting a study on 38 airline firms from 2009 to 2019 and found that ESG scores hiked the market to book value. For instance, for the London Stock Exchange companies between 2004 and 2013, Li et al. (2018) have hinted that ESG reporting might enhance firm value by building trust and responsiveness to stakeholders. Over the period 2002–2018, D'Amato et al. (2023) claim that ESG scores outperform traditional accounting variables in relation to explaining EBIT and that corporate social responsibility actions were a driver of firm performance. For the FTSE350 London Stock Exchange, Ahmad et al. (2021) argue that ESG scores provide a significant improvement in companies' financial performance. Parikh et al. (2023) aims to explore how ESG scores relate to shareholder wealth and to identify potential criteria for future investment choices. The findings reveal that the governance factor has a positive effect on stock returns, while the environmental factor has a negative effect. Additionally, the social factor appears to have no significant impact on equity returns.

One of the studies finding the ESG scores to be negatively related to firm value and/or profitability, Brammer et al. (2006) researched the effect of corporate social performance on market returns of UK firms and found that low social scores are associated with better-than-average market returns. Recent research by Landi & Sciarelli (2019) shows a negative correlation between ESG scores and financial performance for Italian companies. Folger-Laronde et al. (2020) recently compare Canadian exchange-traded funds with respect to their ESG scores and financial returns during the Covid-19. They communicate that hence positive ESG scores, such exchange-traded funds do not give shelter during a period of severe market decline. Using accounting as well as market-based variables, the relation between social performance and financial performance is analysed for S&P500 firms by Nollet et al. (2016). Based on the results of the study, it can be affirmed that via linear models, the relation between the variables is negative. Another study by Marsat & Williams (2011) through MSCI ESG scores reflected that a negative relation persisted between Corporate Social Responsibility rating and firm value. Likewise did Garcia & Orsato (2020) compare the developing and developed countries, where data is collected from 2165 companies during 2007-2014. Results indicate that in the emerging markets, ESG scores are negatively related to financial performance. Duque-Grisales & Aguilera-Caracue (2021) conduct research on Latin America firms during 2011-2015. They show a negative relation of ESG scores with financial performance.

Han et al. (2016) argue that the relation between ESG scores and firm value and profitability is contingent on the basic features of the metrics of ESG scores. They find no relation between the social scores and financial returns of Korean Stock Exchange-traded firms over the period 2008-2014. Further, they find a positive relation with the governance score and a negative relation with the environmental score. Atan et al. (2018) find that there is not any relation between ESG scores of Malaysian Stock Exchange firms and firm value or profitability. Referring to Lopez-de-Silanes et al. (2020), they mention that ESG scores do not really have an impact on firm financial performance. In their research, Şişman & Çankaya (2021) consider twenty-six publicly traded airlines and the effect of ESG scores on financial performance (ROA, ROE, Tobin's Q) during the period 2010-2017. They do not find any relation between ESG basic metrics and financial performance. Examining publicly held banks in G8 countries, Şimşek & Çankaya (2021) determine the relation between ESG scores and financial performances (ROA, ROE, debt/equity) to find that the environmental score has negative, while the social metric score has a positive relation with ROA and ROE, respectively, but governance does not show significant such. Saygili et al. (2022) find a negative relation between environmental reporting and the financial performance of companies in BIST ESG scores for the period 2007 to 2017, stakeholder engagement with management having a positive relation with the social dimension and governance having a positive relation with financial performance. Giannopoulos et al. (2022) find that for Norwegian publicly traded firms during the period 2010-2019 Tobin's Q is positively related to ESG scores while ROA has a negative dependency with ESG scores. According to Aydoğmuş et al. (2022), who examine this issue with data from 1720 companies from the stock exchanges of different countries, firm value is positively linked with ESG scores. On the other hand, they state that ESG environmental, social and governance scores are all positively and significantly related to firm profitability. Parikh et al. (2023) find that the governance factor has a positive effect on the ESG score of 225 Indian companies in 20 different sectors, and it has no significant effect on ROA. The study does not find any sign supportive to the notion that the social, economic, demographic, and environmental factors of ESG contribute to a salutary change in profitability via ROA. Karyağdı & Şit (2023) find the relation between ESG scores and ROA and financial performance to be positive using the capital cost variables based on the data obtained from BIST Sustainability 25 index.

The general consensus derived from research results in relation to the connection between ESG scores, and firm value plus financial performance is still debatable. ESG literature reviews as a whole report the findings. According to Friede et al. (2015), about 90% of ESG studies showed a positive relationship between ESG scores and the financial performance of firms. Alshehhi et al. (2018) state that 78% of these articles show a positive relationship between sustainability and the financial performance of firms. Whelan et al. (2021) report that generally corporate studies had 58% positivity of finding operational metrics such as ROE, ROA or stock price along with them and ESG scores having a positive relation with financial performance, 13% neutrality and 21% mixed results (positive, neutral or negative) and only 8% negativity.

Material and Method

This study investigates the level of ESG performance with available ESG data spanning 2018 to2022 for 34 non-financial companies listed in the BIST All Shares index (XUTUM).Data is

obtained from the Refinitiv Eikon database; company-specific financial data is collected using the Finnet Stock Expert application. Companies lacking ESG data or independent variable data from the other sources were excluded from the analyses focused on 34 non-financial companies, as presented in Table 1.

Analyses were conducted using the following equations:

$$ESG = ROA + LEV + SIZE + ROIC + ROCE + MB + YS \quad (1)$$

$$ENV = ROA + LEV + SIZE + ROIC + ROCE + MB + YS \quad (2)$$

$$SOC = ROA + LEV + SIZE + ROIC + ROCE + MB + YS \quad (3)$$

$$GOV = ROA + LEV + SIZE + ROIC + ROCE + MB + YS \quad (4)$$

The ESG score created by Refinitiv assesses a company's ESG performance and efficacy based on self-reported data. The ESG score further includes those variables that reflect the company's social, environmental, and corporate governance. These scores are on a scale of 0 to 100. This score comprises 3 distinct core metrics: ENV, SOC and GOV. The environmental metric (ENV) is all about how the activities of a company impact air, land, and water, and total ecosystems. This core metric has to do with the usage of resources; reductions in emissions and waste; and innovations from an environmental standpoint. The social metric (SOC) is all about how well a company can build trust and loyalty with the workforce, customers and greater society. This core metric takes four dimensions into account: workforce, community, human rights and product responsibility. The governance metric (GOV) involves the systems and processes of a firm to ensure that the board's behaviour is in the shareholders' best interest. This fundamental metric has three dimensions: management and control, shareholder rights, and corporate social responsibility strategy (Khoury et al., 2023).

LEV is the leverage ratio, SIZE is the natural logarithm of total assets, MB is market to book value, and YS is foreign equity net transaction/total volume. ROIC, the firm's operative return on invested capital, is a measurement of how effectively this capital is used to create profitability. ROIC is a further measure of an organization's operational performance in relation to its capacity for sustained growth. In plain words, ROIC is an additional profitability measure of a firm's operational efficiency in generating revenues with its deployed capital. The higher the ROIC, the more robustly the company turns a profit from the funds invested in it by its financiers. It is specified as follows:

$$\text{ROIC} = \frac{\text{Net Operating Profit } (1 - \text{Tax Rate})}{\text{Net Working Capital} + \text{Net Tangible Assets}}$$

ROCE, return on capital employed, is a financial ratio measuring the efficiency of the utilization of a company's capital and profitability. It is the ratio of net operating income to capital employed. The higher a firm's ROCE, the better it is in the utilization of its capital. This is because a high ROCE reflects that the firm is using its capital very efficiently in its business.

In this paper, fixed effects panel data analysis is used after which the F test is done to choose between the fixed effects model and Pooled Least Squares (OLS) model. The fixed effects model is preferred to OLS due to the results of F test. Second, Breusch Pagan Lagrange Multiplier test is used to opt out of random effects and OLS models. In this case, random effects model is chosen. Finally, fixed effects model is preferable to random effects model as a result of Hausman test. Cross-sectional dependency, heteroskedasticity and autocorrelation problems are reduced using Driscoll and Kraay (1998) estimator. The primary reason outlined in this paper is its broad recommendations for fixed effects models, particularly in cases where the number of units (N) in the panel dataset significantly exceeds the number of time periods (T).

Empirical Results

Table 2 reports the summary statistics of the variables used in the analyses. The average graded basic metric ESG score is 60,34 out of 100. When the average basic metrics of the three different sustainability criteria are considered separately, the GOV variable turns out to have the lowest value, and the SOC variable turns out to have the highest value. Therefore, BIST companies represent a sustainability performance at a medium level, the criterion they are best at is the social criterion, and the criterion wherein they have the lowest score is the corporate governance criterion. Companies have an average leverage ratio of 60,34. The variables ROIC and ROCE have an average value of 19,37 and 0,26, whereas that of MB and SIZE is 4,16 and 23,85, respectively.

Table 1. Firms in the Analysis

No	Code	No	Code	No	Code
1	AEFES	13	FROTO	24	TAVHL
2	AKSA	14	KORDS	25	TCELL
3	AKSEN	15	KOZAA	26	THYAO
4	ARCLK	16	KRDMA	27	TKFEN
5	ASELS	17	MGROS	28	TOASO
6	AYGAZ	18	OTKAR	29	TTKOM
7	BIMAS	19	PETKM	30	TTRAK
8	CCOLA	20	PGSUS	31	TUPRS
9	DOAS	21	SASA	32	ULKER
10	ENJSA	22	SISE	33	VERUS
11	ENKAI	23	SOKM	34	VESTL
12	EREGL				

Table 2. Descriptive Statistics

Variable	N	mean	sd	p25	p50	p75
LEV	170	60,34	19,69	50,53	64,19	73,15
ROIC	170	19,37	20,29	7,99	14,33	23,33
ROCE	170	0,26	0,20	0,13	0,21	0,36
MB	170	4,16	19,28	1,04	1,54	2,73
YS	170	-1,12	7,87	-3,89	-0,66	1,72
ENV	170	61,21	24,17	45,49	66,70	79,47
SOC	170	68,43	24,74	55,54	74,09	88,38
GOV	170	56,16	23,25	43,87	60,78	74,01
ESG	170	62,43	22,18	53,26	67,62	77,19
SIZE	170	23,85	1,32	22,97	23,90	24,66

Table 3. Pearson Correlation Matrix

	ESG	LEV	ROIC	ROCE	MB	YS	SIZE
ESG	1						
LEV	0,1661	1					
ROIC	-0,0152	0,1977*	1				
ROCE	-0,3199*	0,3368*	0,5826*	1			
MB	-0,0038	0,2172*	0,0868	0,1863	1		
YS	-0,0002	0,1138	-0,0364	-0,0188	0,0190	1	
SIZE	0,5080*	0,0405	-0,0015	-0,1681	-0,0738	0,1413	1

Note: '*' shows 10% significance level.

Table 4. Pesaran CD Cross Sectional Dependence Test

Variable	CD-test	p-value
LEV	7,569	0
ROIC	2,933	0,003
ROCE	0,39	0,696
MB	7,338	0
YS	0,45	0,653
ENG	28,68	0
SOC	30,376	0
GOV	-1,503	0,133
ESG	24,518	0
ASSETS	51,397	0

Table 5. Heteroscedasticity, Autocorrelation and Inter-Unit Correlation Tests

	Modified Wald Test Chi2(39)	Durbin-Watson Test	Baltagi-Wu LBI	Pesaran
1. Model	(7319,25)***	1,23	1,75	(9,301)***
2. Model	(3180,15)***	1,13	1,63	(8,990)***
3. Model	(9275,35)***	1,19	1,72	(8,848)***
4. Model	(17500,73)***	1,36	1,79	-0,138

Note: '***', shows 1% significance level.

Table 3 presents Pearson Correlation coefficients. We concluded that there is not any multicollinearity problem among the variables. ESG is negatively correlated with ROCE and positively correlated with SIZE. ROIC, ROCE and MB variables have positive effects on LEV. ROCE is positively correlated with ROIC.

Table 4 presents Pesaran CD cross-sectional dependence test results. According to the table, all variables except the ROCE, YS and GOV variables reflect cross-sectional dependence. In other words, the null hypothesis could not be rejected for ROCE, YS and GOV variables.

The F test, Breusch Pagan LM test and Hausman test are done to identify the method to be used in the analyses. The F test is used to choose between fixed effects and pooled OLS. In this test, the null is rejected and in this case, it is concluded that the fixed effects model should be used. Secondly, the Breusch Pagan LM test is used to do a selection between random effects and the pooled model. In this test the null is rejected and, in this claim, random effects are to be used. Finally, the Hausman test is done to decide between random effects and fixed effects. As a result of this test, fixed effect model is preferred. It is found that these results are valid for all 4 models in this paper.

In the next stage, the model is tested for heteroscedasticity, autocorrelation and inter-unit correlation assumptions. The results of these tests for all models are shown in Table 5.

Table 6. Driscoll Kraay Test Results

	ESG	ENV	SOC	GOV
LEV	0,14**	0,087*	0,372***	-0,066
	[0,046]	[0,046]	[0,089]	[0,054]
ROIC	-0,023	0,022	-0,073***	0,014
	[0,019]	[0,036]	[0,016]	[0,011]
ROCE	16,687***	16,759***	17,322***	10,369***
	[2,493]	[3,497]	[2,460]	[3,146]
MB	0,0006	0,021**	0,038**	-0,0810**
	[0,0158]	[0,010]	[0,018]	[0,034]
YS	0,059**	-0,007	0,002	0,201***
	[0,022]	[0,0597]	[0,026]	[0,070]
SIZE	9,342***	10,845***	12,288***	2,668***
	[1,488]	[2,058]	[1,923]	[0,270]
constant	-172,661***	-207,510***	-255,088***	-5,909
	[32,857]	[51,090]	[51,683]	[7,363]

Note: '***', '**', '*' show 1%, 5% and 10% significance levels, respectively. Values in parentheses are standard errors.

First, the Modified Wald test is used in order to check for heteroskedasticity in the model. The null hypothesis of homoscedasticity is rejected in all four models. Second, Durbin-Watson and Baltagi-Wu LBI tests are conducted to evidence auto-correlation. According to Table 5, test values are below 2 in both Durbin-Watson and Baltagi-Wu LBI tests. This value indicates that the data has auto-correlation. Finally, Pesaran test is used to test for a cross-sectional dependence between units and it rejects the hypothesis of no cross-sectional dependence between units in three models.

After revealing heteroskedasticity, autocorrelation, and cross-section dependency, Driscoll Kraay test are used in regression analysis.

Model 1 results are given in Table 6, first column. According to the analysis results, LEV, ROCE, YS and SIZE variables have positive effects on ESG. Firms with high return on capital employed, companies with high foreign shareholding, firms with high leverage ratio and large companies have high sustainability performance. When we examine separately in three dimensions the sustainability performance, changes are observed in the results. Dependent variable in column 2 of Table 6 is ENV variable. Unlike Model 1, the YS ratio does not affect the environmental criterion. In addition, it can be concluded that companies with high MB values have high sustainability performance. On the other hand, in Model 3, the leverage ratio has a positive effect on the social criterion and the ROIC variable has a negative effect on the social criterion. ROCE, MB and SIZE variables have positive impacts on social criterion. In the last column (Model 4), the factors affecting the governance criterion are examined. It is found that ROCE, MB, YS and SIZE variables have effects on sustainability performance. While MB variable has a negative effect on the governance measure, the other variables have positive effects.

Conclusions

This study aims to reveal the firm-specific financial variables that influence sustainability performance among corporations belonging to the XUTUM index. The analyses are conducted separately, setting the three different dimensions of the corporate sustainability criteria that are: environmental, social, and governance. The determinants of ESG performance are taken individually from these metrics. Large-sized firms exhibit a high level of sustainability performance. The size variable has a positive effect on all three sustainability criteria. These results are in line with the results of Arminen et al. (2017), Drempetic et al. (2020), and Crespi & Migliavacca (2020). The literature finds an explanation for the positive relation between ESG score and firm size in legitimacy theory and agency theory. Because these are heavily scrutinized in terms of the general public and are bound to disclose much more information in exchange for legitimacy (Branco & Rodrigues, 2008). Moreover, for larger firms, due to the scale economies, ESG adoption and disclosure have relatively lower costs because such firms have higher financial resources (Jennifer Ho & Taylor, 2007; Khoury et al., 2023). On the contrary, larger firms specifically bear higher degrees of information asymmetry, hence leading to higher agency costs (Jensen and Meckling, 1976), and would thus be expected to prefer more disclosure.

It is concluded that firms with high financial leverage also have high sustainability scores and that this variable is only effective on all the ESG criterions except governance criterion score. This positive relation is attributed to the possibility of high-leverage firms being audited more by their creditors. Therefore, to diminish agency costs, these firms tend to release more ESG information as collateral to their creditors (Jennifer Ho & Taylor, 2007).

According to agency theory, managers in highly profitable companies use the available evidence to their benefit. Thus, they are likely to reveal detailed information to support the continuity of their positions and reward contracts (Sharma, et al., 2020). Hence, we expect the firm's profitability to be positively related to the ESG score. ROCE variable has a positive relation with ESG score and also with all the indicators of ESG. Among the studies related to other measures of profitability, such as ROA and ROE, Zhao et al. (2018), Karyağdı & Şit (2023), Zhao and Murrell (2022), Naeem et al.(2022), Şişman & Çankaya (2021), Crespi & Migliavacca (2020) find similar results. Furthermore, the ROIC variable has a negative impact on the social criterion and a positive impact on the

governance criterion. Parikh et al. (2023) similarly find profitability has a positive relation with the governance factor.

Sharma et al. (2020) in their study argue that market performance has an effect on ESG and accepts MB ratio as a measure of market performance. According to the analysis results in this study, it is seen that the MB ratio has a positive effect on the environmental, social and governance criteria of ESG criteria.

For the ESG score as well as governance measure, foreign ownership has positive impacts. The proactive role that foreign shareholders play in initiating transparency and trust between firms and their stakeholders is the reason for this positive impact. This allows the company to benefit from increased expectations from stakeholders due to foreign ownership specificity. As a result, it undermines some legitimacy for their activities, since they are forced to undertake certain nonmarket-oriented practices to compete (Alkhawaldeh, 2012). Proactive foreign expertise can direct corporate policy towards a specific agenda, for instance sustainability (Al Amosh & Khatib, 2022: 51). Therefore, foreign ownership being expected to have a positive effect on sustainability scores is reasonable.

Just as important as financial information, environmental, social and governance skills have been noted to be the aspects that are kept under warning to the community and the governance of company strategies by different stakeholders eager to enhance communication with the companies they work with. Which itself is considering this positional state from any existing or potential investors and the company management is expected to take any compulsory steps for disclosure and development of its ESG scores given strong financial performance. From the standpoint of the existing and potential investors and portfolio managers, when the positive influence of LEV, ROCE, YS, and SIZE variables on ESG is analysed, this data can be valued enough to launch a long position in the Borsa Istanbul equity market. High return on capital employed selected companies, high leveraged firms, high foreign shareholding companies, and large companies will have high sustainability performance hence high ESG scores as well as high stock returns. Revealing their ESG scores by BIST listed companies is limited in number so it is expected to be beneficial to replicate this study in future with same and/or different variables for comparability of results and monitoring the development of ESG scores. Furthermore, one of the separate research questions that need to be dealt with in the future is how in forthcoming studies these variables that boast such a positive report card for ESG scores shall come to influence stock returns.

Katkı Oranları ve Çıkar Çatışması / Contribution Rates and Conflicts of Interest

Etik Beyan	Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.	**Ethical Statement**	It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited
Yazar Katkıları	Çalışmanın Tasarlanması: SA (%40) NA(%60) Veri Toplanması: SA (%60) NA (%40) Veri Analizi: NA (%60) SA (%40) Makalenin Yazımı: SA (%60) NA (%40) Makale Gönderimi ve Revizyonu: NA (%60) SA (%40)	**Author Contributions**	Research Design: SA (%40) NA(%60) Data Collection: SA (%60) NA (%40) Data Analysis: NA (%60) SA (%40) Writing the Article: SA (%60) NA (%40) Article Submission and Revision: NA (%60) SA (%40)
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Çıkar Çatışması	Çıkar çatışması beyan edilmemiştir.	**Conflicts of Interest**	The author(s) has no conflict of interest to declare.
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Etik Kurul	Etik kurul iznine ihtiyaç bulunmamaktadır	**Ethics Committee**	Ethics committee approval is not required.

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