

# Does ESG performance have an impact on financial performance? Evidence from Turkey

Melih Sefa Yavuz<sup>1</sup> , Hasan Sadık Tatlı<sup>2</sup> , Gözde Bozkurt<sup>3</sup> , Gökten Öngel<sup>4</sup> 

## Abstract

**PURPOSE:** Stakeholders such as consumers, nongovernmental organizations, and public institutions have increasingly pressured companies to adopt corporate social responsibility (CSR) policies. This trend has led to the integration of environmental, social, and governance (ESG) reporting into business strategies to achieve long-term competitive advantages and enhance financial performance. ESG reporting has become a critical tool for measuring corporate CSR efforts, contributing to the institutionalization of nonfinancial reporting standards. This study aims to determine how the adoption of ESG sub-dimensions affects the financial performance of companies in Turkey. **METHODOLOGY:** The study employed panel regression analysis on data from 21 companies listed in the Borsa Istanbul-100 index over the period 2011–2020 to investigate the relationship between ESG sub-dimensions and firm performance. **FINDINGS:** The findings indicate that adopting the environmental and governance sub-dimensions positively affects ROE and Tobin's Q. However, the adoption of the governance sub-dimension negatively impacts Tobin's Q while positively influencing ROE. No statistically significant results were found regarding the impact of ESG sub-dimensions on firms' ROA ratios. **IMPLICATIONS:** The results of the research, based on the example of Turkey, are important to determine how companies' social responsibility strategies in developing countries provide them with outputs in terms of environment, social and governance and whether social responsibility-based activities are truly sustainable strategy for companies in developing countries. The findings highlight the importance of considering the macroeconomic structure, legal system, and financial development of countries when evaluating CSR activities. The regulatory environment plays a significant role, as weaker legal protections can negatively affect the relationship between governance practices and firm performance. For practitioners, the insights suggest prioritizing environmental investments and carefully strategizing governance practices to align with investor expectations and regulatory frameworks. **ORIGINALITY AND VALUE:** By focusing on the BIST 100 companies, this study contributes to the limited literature on the role of ESG sub-dimensions in shaping financial performance in developing markets. This research provides valuable insights into how environmental, social, and governance practices specifically impact the financial outcomes of firms in Turkey, offering a nuanced understanding that can inform both academic discussions and practical strategies in similar contexts.

**Keywords:** corporate social responsibility, ESG performance, Financial performance, Panel data analysis, BIST 100.

1 Melih Sefa Yavuz, Ph.D., Assistant Professor, Department of Finance and Banking, Istanbul Beykent University, Cumhuriyet Mahallesi, Beykent, Büyükçekmece, Istanbul, e-mail: sefayavuz@beykent.edu.tr (ORCID: <https://orcid.org/0000-0003-1085-5304>).

2 Hasan Sadık Tatlı, Ph.D., Assistant Professor, Department of Business Management, Istanbul Beykent University, Cihangir, Siraselviler Cd. No:65, 34433 Beyoğlu, Istanbul, e-mail: hasantatli@beykent.edu.tr (ORCID: <https://orcid.org/0000-0003-1918-3188>).

3 Gözde Bozkurt, Ph.D., Assistant Professor, Department of Economics, Istanbul Beykent University, Cihangir, Siraselviler Cd. No:65, 34433 Beyoğlu, Istanbul, e-mail: gozdebozkurt@beykent.edu.tr (ORCID: <https://orcid.org/0000-0003-1085-5304>).

4 Gökten Öngel, Md., Ph.D., Child Health and Diseases Department, Istanbul Education Research Hospital, Cerrahpaşa, Org. Abdurrahman Nafiz Gürman Cd. No:24, 34098 Fatih, Istanbul, e-mail: gozdebozkurt@beykent.edu.tr (ORCID: <https://orcid.org/0000-0002-4165-3601>).

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## INTRODUCTION

Recently, many stakeholders, e.g., consumers, nongovernmental organizations, and public institutions, have been pressing companies to establish and implement policies on CSR (Lai et al., 2018; Duque-Grisales & Aguilera-Caracuel, 2021). Today, the widespread use of reporting processes for CSR is integrated into business strategies in line with the goals of achieving long-term competitive advantage and increasing financial performance (McGuinness et al., 2017; Amorelli & Garcia-Sanchez, 2021). ESG reporting comes to the fore in measuring companies' efforts toward CSR. The emergence of ESG reporting significantly contributed to the institutionalization of nonfinancial reporting with different aspects (Oktem & Oktem, 2022). At the Global Reporting Initiative (GRI) Conference (2008), reporting financial reporting and ESG reporting to an internationally accepted standard was determined as a strategic goal. Thus, the foundations of an integrated reporting guide, including ESG, were laid (Öztürk, 2019). Deloitte (2011) states that relationships between financial results and ESG performance are better understood when there is a direct link between ESG performance and overall strategy and business models. In addition, shareholders and other stakeholders want to know what companies see as "significant" ESG issues and what they are doing to manage them (Eccles et al., 2015). Recently, ESG issues have become an element affecting many companies' investment decisions, compensation policies, or public relations activities (Berg et al., 2021). Therefore, more companies have started to publish ESG reports to meet this need. In addition to these problems, Turkey, as a developing country, also encourages the sustainability policies of companies within the scope of sustainability. For this purpose, the sustainability index was created within Borsa Istanbul (BIST) in 2014, which is aimed at encouraging companies to operate within the scope of sustainability (Borsa Istanbul, 2020).

A research agenda on ESG criteria has also emerged in the academic field. Studies often focus on how the adoption of ESG criteria affects firm performance. For example, Xie et al. (2019) stated there is a positive relationship between ESG criteria and corporate productivity. Many researchers have similarly concluded that adopting ESG criteria positively affects firms' financial performance (Broadstock et al., 2020; Albitar et al., 2020; Wu et al., 2022). However, contradicting results indicate that the adoption of ESG criteria is not related to firm performance (Atan et al., 2018). Finally, Huang (2021) concluded that the effect of the adoption of ESG criteria on a firm's financial performance is quite modest. While there is a wide variety of other results, it is not yet clear how ESG criteria contribute to a firm's performance, given the evidence in question.

The number of studies on how the results of this information affect company performance depends on the level of development of the countries (e.g., Khemir, 2019; Gok et al., 2019; Lopes & Imoniana, 2021; Wahua & Ezeilo, 2021; Harabida et al., 2022). Limited research suggests that environmental practices may result in cost increases or hinder competition (Mao & Wang, 2019). In this context, the impacts of environmental factors on businesses should not only be limited to environmental sensitivity. However, they should also be approached from a broader perspective as part of ESG paradigms.

Understanding the impact of firms' alignment with environmental, social, and governance (ESG) criteria on their financial performance has become an increasingly focused area of research in recent years. The existing literature addresses the impact of ESG criteria on firm performance from various perspectives. However, much of this research has focused on firms in developed countries, making it difficult to consider the characteristics and dynamics of developing countries. This situation makes it imperative to examine how the alignment of ESG criteria with firm performance in developing countries affects financial performance metrics such as ROA (Return on Assets), Tobins' Q (Market Performance), and ROE (Return on Equity).

This article aims to provide a new perspective on the literature by examining how the adoption of each ESG criterion by firms in developing countries such as Turkey affects their financial performance. Taking into account the gaps in the literature, this study aims to investigate in more detail the impact of each ESG criterion on firm performance in developing countries. Therefore, considering the limited number of studies results, it becomes crucial to identify the relationships between the E, S, and G sub-dimensions and ROA, ROE, and Tobin Q in Turkey and many other developing countries. Consequently, the study results regarding the relationships between ESG and financial performance are presented below, followed by the development of hypotheses.

In the research, ESG criteria and companies' financial performance are examined. In the following parts of the research, a literature review of ESG is presented; then, research hypotheses are formed. Afterward, the method and findings of the study are presented. Finally, the research results and the discussion of the results were carried out.

## THEORETICAL FRAMEWORK AND RELATIONS BETWEEN CONCEPTS

### ESG criteria and Financial performance

ESG focuses on three main issues, i.e., environmental sub-dimension that examines how a business should perform as a protector of the natural environment (e.g., waste and pollution, resource depletion, greenhouse gas emissions, deforestation, climate change, etc.); social sub-dimension that examine how a company treats people (e.g., employee relations and diversity; child labor and slavery; working conditions and local communities, thus openly funding projects or institutions that serve poor and underserved communities globally; health and safety; conflict); and, finally, governance sub-dimension that examine how the company controls itself (i.e., how the company is run, e.g., tax strategy, executive salary, donations and political lobbying, corruption and bribery, board diversity and structure). Making the necessary transformations in the enterprise's policies, strategies, and operational cycles within the framework of the three sub-dimensions can directly affect an enterprise's ability to create long-term value. For this reason, transparency and success in managing ESG processes are positively rewarded by investors (Kızıltan & Doğan, 2021). These rewards can shape company strategies. ESG criteria affect investment decisions, compensation policies, or financial and nonfinancial activities such as public relations for many companies (Berg et al., 2021).

Financial performance measures a firm's success in earning profits. ROA ratio is used as a reference to evaluate a firm's success in financial activities. Many studies show that the ROA ratio positively and significantly affects a firm's value (Luthfiah & Suherman, 2018; Rosikah et al., 2018; Sudiyatno et al., 2020; Li & Wan, 2021). ROE measures a company's profitability on its capital and is mainly used to compare its profitability with other companies in the same industry. The ROE ratio is one of the popular ratios used to measure a firm's management performance for investors (Atan et al., 2018). ROA and ROE accounting-based metrics are typically lagging indicators, while market-based indicators such as Tobin's Q are leading indicators. Tobin's Q is a key indicator of profitability. This ratio indicates whether an asset is overvalued or undervalued and is a long-term measure of the company's value (Atan et al., 2018; Rodríguez-Fernández et al., 2019).

### Theoretical background

As a trend in recent years, the purpose of companies has been extended not only to the interests of shareholders directly but also to employees, society, customers, society and all other related environments (Grove et al., 2020). While studies based on stakeholder theory have mostly had a company performance-focused perspective until recently, they have recently begun to be associated with issues such as responsibility and value creation (Signori et al., 2021). Stakeholder theory provides a convincing basis for ESG criteria as it offers a good perspective in explaining companies' relationships with their socio-economic stakeholders. ESG criteria, which prioritize responsibility towards the environment, governance and social stakeholders, are deeply related to stakeholder theory (Li et al., 2021; Fu et al., 2022; Wai-Khuen et al., 2023), so much so that combining a broader stakeholder awareness with social responsibility makes it easier for the company to adopt ESG criteria (Hu et al., 2023).

Stakeholder theory forms the basis of ESG research, as it includes internal stakeholders and society, government, customers, suppliers, and competitors. Stakeholder theory states that the long-term success of companies is possible by meeting the needs of internal and external stakeholders (Freeman, 1984). According to the social impact hypothesis, based on the stakeholder theory (Freeman, 1984), companies operating for the benefit of stakeholders positively affect the corporate reputation and financial performance (Robbins & Coulter, 2002). On the other hand, the opposite situation is the realization of negative financial impact as a result of the disappointment of these stakeholders (Preston & O'Bannon, 1997). According to the positive synergy hypothesis, there is a sequential relationship between a firm's social responsibility and its profitability (Friedman, 1970). The hypothesis assumes that companies with high corporate social performance will have the opportunity to reinvest in social responsibility actions, leading to performance improvement (Allouche & Laroche, 2005). Therefore, creating a productive cycle will result in a concurrent positive relationship between CSR and financial performance (Waddock & Graves, 1997).

In the negative synergy hypothesis, it is argued that firms' high CSR performance leads to low financial performance. It is stated that this situation will cause companies to limit their social responsibility investments (Makni et al., 2009). Based on the hypothesis, Brammer, Brooks, and Pavelin (2006) suggested that there is a vicious circle between social responsibility and financial performance and that there may be a simultaneous negative relationship. Similar to the negative synergy hypothesis in the literature, there is a balancing hypothesis, which assumes that CSR has a negative

effect on financial performance. The balancing hypothesis supports Friedman's argument; it is further argued that social responsibility behavior will provide few economic benefits. Still, the numerous costs will also reduce the firms' profits and stakeholders' wealth (Waddock & Graves, 1997). According to the positive and negative synergy hypotheses, neither party is decisive in the relationship between financial performance and corporate social performance. Financial performance and corporate social performance can affect each other mutually and simultaneously (Düzer, 2018).

## Relationships between concepts

Many factors must be considered to understand the relationship between ESG and financial performance (Nirino et al., 2021). Indeed, a firm's ESG score reflects the sum of its sub-dimensions. The effect of each sub-dimension on firm performance may differ (Duque-Grisales & Aguilera-Caracuel, 2021). While some studies state that the ESG score can be used alone, others argue that every dimension of the ESG should be used for various reasons, such as sociocultural conditions and stakeholders' expectations (Duque-Grisales & Aguilera-Caracuel, 2021; Limkriangkrai et al., 2017; Humphrey et al., 2012). Especially in developing economies, companies' top management experience problems adapting to international market conditions due to religion, culture, and social characteristics (Raynar & Fosrtater, 2002). At the same time, CSR activities in developing economies have a lower maturity level than in developed ones (Garcia et al., 2017). In these countries, ESG investments also remain at a low level (Blowfield & Frynas, 2015), reports are published in a limited manner (Serafeim, 2014), and markets are not monitored effectively (Orsato et al., 2015).

Some of the limited studies examining the alignment of firms with ESG criteria in developing countries present positive views. A study by Sherwood and Pollard (2018) found that firms aligning with ESG criteria in developing markets pose less risk to investors and generate higher returns. On the other hand, Martins (2022) suggested that market structure in a developing country may also be related to firms' alignment with ESG criteria, with competitive shocks in the market reducing firms' intentions to align with ESG criteria. At this point, Turkey is taking significant steps towards fulfilling its international commitments regarding climate, sustainability, and the European Union's (EU) policy goals within the framework of sustainability goals and ESG criteria. In line with this objective, Turkey has implemented the EU Taxonomy Regulation to achieve the 2030 climate and energy goals outlined in the European Green Deal and to ensure that investments are directed towards sustainable projects and activities. Additionally, Turkey is undertaking various activities within its legal framework in line with its sustainability goals and ESG criteria (Ministry of Trade, 2024).

Despite these developments, studies need to examine the impact of firms' alignment with ESG criteria on their financial performance in Turkey. In a study conducted by Saygılı et al. (2022), which focused on firms listed on the Borsa Istanbul, the effect of ESG criteria on corporate financial performance was investigated. According to the research findings, the environmental sub-dimension was found to have a negative impact on firms' corporate financial performance. At the same time, stakeholder engagement contributed to operational efficiency in the social dimension of CSR. Additionally, the study found that provisions related to ownership rights and the board of directors positively influence corporate financial performance in the governance dimension.

A study by Özer et al. (2023) examined the relationship between ESG scores and firms' financial performance for firms listed on the Borsa Istanbul between 2009 and 2019. The study found a positive relationship between these variables. Additionally, the study addressed the sub-dimensions of ESG, where the environmental dimension was positively associated with firms' financial performance. In contrast, the social and governance dimensions were not statistically related to financial performance.

On the other hand, a study by Özdarak and Akarcay (2022) investigated the relationship between ESG disclosures and the financial performance of firms listed on the Borsa Istanbul Metal Products Machinery Index between 2009 and 2018. The findings of the research indicate that there was no statistically significant relationship between ESG disclosures and financial performance. Therefore, considering the limited number of studies, it becomes crucial to identify the relationships between E, S, and G sub-dimensions and ROA, ROE, and Tobin Q in Turkey and many other developing countries. Consequently, the study results regarding the relationships between ESG and financial performance are presented below, followed by the development of hypotheses.

Some of the rare studies examining the adoption of ESG criteria with the performance of firms in developing countries offer positive opinions. Sherwood and Polard (2018) concluded that companies that comply with ESG criteria in emerging markets cause less risk for investors and provide higher returns. Martins (2022), on the other hand, stated that the market structure in a developing country may also be related to the adoption of the companies with the ESG criteria and determined that the competition shocks in the market reduce the intention of companies to comply with the ESG criteria

(Martins, 2022). Considering the results of rare studies, it becomes important to determine the relationships among E, S, and G sub-dimensions and ROA, ROE, and Tobin's Q in developing countries (in the case of Turkey). For this reason, the study's results, in which the relationships between ESG and financial performance are determined, are presented below, and hypotheses are developed.

ESG and firm's ROA: Buallay et al. (2021) found a positive relationship between the ESG criteria (E, S, G) and firms' financial performance. Further, Nirino et al. (2021) concluded that the governance sub-dimension negatively affects firms' financial performance. Velte (2017) supposed that there is a positive relationship between the ESG criteria and the financial performance of the firms. On the other hand, Buallay (2019) concluded that the environment and governance sub-dimensions positively affect the firm's financial performance. However, Alareeni and Hamdan (2020) determined that the environmental sub-dimension is negatively related to a firm's financial performance. Based on these results, the following hypotheses were formed:

- $H_1$ : ESG criteria positively affect firms' ROA.
- $H_{1a}$ : The environmental sub-dimension positively affects firms' ROA.
- $H_{1b}$ : The social sub-dimension positively affects firms' ROA.
- $H_{1c}$ : The governance sub-dimension positively affects firms' ROA.

ESG and firm's ROE: The expectation, based on stakeholder theory, is that firms' CSR/ESG reporting will increase firms' financial performance (Albitar et al., 2020). In addition to these views, the results of empirical studies contain contradictions. Buallay et al. (2021) found a positive relationship between the ESG criteria and the firms' financial performance. Further, Nirino et al. (2021) concluded that the governance sub-dimension negatively affects a firm's financial performance. On the other hand, Atan (2018) found no relationship between ESG criteria and financial performance in developing countries. Friede et al. (2015) and Hang et al. (2018) stated that each of the sub-dimensions that make up the ESG score has a different relationship and effect on financial performance. Therefore, we put forward the following hypotheses:

- $H_2$ : ESG criteria positively affect firms' ROE.
- $H_{2a}$ : The environmental sub-dimension positively affects firms' ROE.
- $H_{2b}$ : The social sub-dimension positively affects firms' ROE.
- $H_{2c}$ : The governance sub-dimension positively affects firms' ROE.

ESG and firm's Tobin's Q: Buallay et al. (2021) found a negative relationship between the ESG criteria and the firms' market performance. Further, Nirino et al. (2021) concluded that the governance sub-dimension negatively affects the firms' market performance. On the other hand, Atan (2018) found no relationship between ESG criteria and financial performance in developing countries. Gregory (2022) determined there is a positive relationship between ESG criteria and market performance. Velte (2017) found no significant relationship between the ESG criteria and firms' market performance. Alareeni and Hamdan (2020) revealed a negative relationship between environmental sub-dimension and market performance. Finally, it has been determined that the firm's market performance is affected positively by the environmental sub-dimension, negatively by the social sub-dimension, and positively by the governance sub-dimension (Buallay, 2019). Therefore, we put forward the following hypotheses:

- $H_3$ : ESG criteria positively affect firms' Tobin's Q.
- $H_{3a}$ : The environment sub-dimension positively affects firms' Tobin's Q.
- $H_{3b}$ : The social sub-dimension positively affects firms' Tobin's Q.
- $H_{3c}$ : The governance sub-dimension positively affects firms' Tobin's Q.

## RESEARCH METHODS

In this section, the data to be analyzed are introduced, and brief econometric information about the tests and methods used is given.

## Data collection and sample selection

The study is structured as a panel dataset covering the years 2011-2020 and consisting of 21 companies listed in the BIST 100 index. Data analysis was conducted at an annual frequency, and the ESG data for the selected period were available for the sample firms. The variables used to create the dataset were obtained from the Thomson Reuters Eikon database.

The selection of the 21 companies from the BIST 100 index was based on the availability and completeness of the ESG data in the Thomson Reuters Eikon database for the entire study period. Companies that did not have consistent ESG data for the 2011-2020 period were excluded from the sample to ensure the reliability of the analysis. This selection sub-dimensions helps mitigate any potential bias arising from incomplete data and enhances the robustness of the findings. In the study, attention was paid to tests that can be used even in very small sample size situations. The ESG scores were updated continuously by Thomson Reuters, which aggregates data from various sources such as company reports, news articles, and public disclosures. For this study, we used the ESG scores as of December 31st of each year, ensuring that they reflect the information available up to the end of that year. This means that the ESG scores for a given year (e.g., 2019) are used to predict financial performance in the following year (e.g., 2020). This temporal alignment ensures that the ESG data precede the financial performance data, allowing us to analyze the potential impact of ESG performance on subsequent financial performance.

## Research variables

### *Dependent variables*

Financial performance serves as a measure of a company's success in earning profit. To evaluate a firm's success in its financial activities, reference is frequently made to indicators such as ROA, ROE, and Tobin's Q ratios (Chadha & Sharma, 2015; Luthfiah & Suherman, 2018; Rosikah et al., 2018; Bennouri et al., 2018; Almoneef & Samontaray, 2019; Sudiyatno et al., 2020; Li & Wan, 2021). The efficiency of a firm's operations significantly influences its financial performance. In other words, performance analysis indicates how effectively and efficiently a firm can utilize its resources towards achieving its set objectives (Yakut et al., 2015). In this context, ROA, ROE, and Tobin's Q ratios were selected as the study's dependent variables. The financial performance metrics (ROA, ROE, and Tobin's Q) were obtained from the Thomson Reuters Eikon database. These metrics are derived from the companies' annual reports, which are compiled and made available through the Eikon database. For example, the financial data for the year 2020 were sourced from the Eikon database, which includes information from annual reports published in early 2021, thus reflecting the performance of the company for the entire year 2020. Tobin's Q ratio was calculated using the following formula based on the Bloomberg database:

$$\text{Tobin's Q} = \frac{(\text{Market Capitalization} + \text{Total Liabilities} + \text{Preferred Equity} + \text{Minority Interest})}{\text{Total Assets}}$$

### *Independent variables*

This study uses ESG scores from the Eikon Thomson Reuters datastream database as independent variables. The effects of the three subcomponents (E, S, G) that make up the ESG score were analyzed separately. Scores range from 0 to 100 points: 0–25 = poor; 25–50 = moderate; 50–75 = good; 75–100 = excellent ESG performance. The E, S, and G criteria include (Refinitiv, 2020):

#### *E Score*

The environmental pillar measures a company's impact on living and nonliving natural systems, including the air, land, and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities to generate long-term shareholder value.

### *S Score*

The social pillar measures a company's capacity to generate trust and loyalty with its workforce, customers, and society through best management practices. It reflects a company's reputation and the health of its operating license, which are key factors in determining its ability to generate long-term shareholder value.

### *G Score*

The corporate governance pillar measures a company's systems and processes, which ensure that its board members and executives act in the best interest of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives and checks and balances to generate long-term shareholder value. In addition, in accordance with the existing literature, frequently used in measuring financial performance, variables of total assets, total asset turnover, firm growth rate (annual change in total assets), leverage (total debt/total capital), net sales/revenues (annual change), market-to-book value, and firm age are included in the analysis (Tang et al., 2012; Rodríguez-Fernández et al., 2019; Koroleva et al., 2020; Alareeni & Hamdan, 2020; Atan et al., 2018; Dasgupta, 2022; Duque-Grisales & Aguilera-Caracuel, 2021; Bellamy et al., 2014; Kortmann et al., 2014; Lam et al., 2019; Utami & Hasan, 2021; Hasan et al., 2020).

### *Control variables*

The firm's value is closely associated with its capital structure, profitability, and size. Firm size is typically assessed through various metrics such as assets, total sales, profit, and tax burden (Elouidani & Zoubir, 2015; Mule et al., 2015; Gunawan et al., 2018; Meizari & Viani, 2017; Murdayanti et al., 2020; Sudiyatno et al., 2020; Akgül, 2020). The number of assets owned by a firm often serves as an indicator of its size, with higher asset quantities implying a larger firm size. Furthermore, the literature extensively explores the relationship between financial performance and operational efficiency, utilizing variables like financial leverage, profitability ratios, firm age, size, and operating income (Bellamy et al., 2014; Kortmann et al., 2014; Lam et al., 2019; Utami & Hasan, 2021; Hasan et al., 2020). Hence, the selection of control variables for this study aligns with the findings of previous research. As such, the control variables used in this study include the total asset turnover rate, company growth rate, leverage, total assets, sales growth rate, price/book ratio, and company age.

These control variables were selected based on their relevance and frequent usage in the literature on financial performance (Tang et al., 2012; Rodríguez-Fernández et al., 2019; Koroleva et al., 2020; Alareeni & Hamdan, 2020; Atan et al., 2018; Dasgupta, 2022; Duque-Grisales & Aguilera-Caracuel, 2021; Bellamy et al., 2014; Kortmann et al., 2014; Lam et al., 2019; Utami & Hasan, 2021; Hasan et al., 2020). Including these control variables helps isolate the specific impact of ESG performance on financial outcomes by accounting for other factors that could affect financial performance.

## **Analytic methods**

This study has utilized longitudinal data. Panel random effects (PRE) regression has been used after applying Hausman's test. Also, a Parks–Kmenta and Huber–Eicker–White regression was run to test the endogeneity and robustness of results. The fact that all units are affected at the same level against the shock that occurs in any of the units, that is, the independence of the units from each other, was examined with the Pesaran (2004) CD test. The Pesaran test, which is an improvement of the Breusch and Pagan (1980) test, is based on the sum of the correlation coefficients between the cross-section residues:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \quad (N > T) \quad (1)$$

This test statistic shows a standard normal distribution (Pesaran, 2004), under the hypothesis, which shows that there is no relationship between the cross sections. In case the basic hypothesis is not rejected as a result of the test, first-generation unit root tests were used (Breitung, 2000; Im et al., 2003; Hadri, 2000; Levin et al., 2002); in the case of rejection, second-generation unit root tests were used, taking into account the cross-section dependency (Pesaran, 2007; Hadri & Kurozumi, 2012; Bai & Ng, 2004). This study used the Levin–Lin–Chue (2002) test from the first-generation unit

root tests and Pesaran (2007) test from the second-generation unit root tests. The test developed by Pesaran (2007) can be used for differences in panel time and unit dimensions for ( $T > N$  ve  $N > T$ ):

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + \gamma_i f_t + e_{it} \quad (2)$$

In Equation 2, the error term is expressed as  $e_{it} = \lambda_i f_t + u_{it}$ . In the equation of the error term,  $f_t$ ; It is considered as an invisible common effect and is assumed to be stationary. “ $u_{it}$ ” indicates the individual error of the companies. The cross-sectional dependence in the model arises from the invisible common effect. Also, in the study, attention was paid to tests that can be used even in very small sample size situations. If the CIPS statistic is calculated according to the CADF unit root test equation, and the  $CIPS = \frac{1}{N} \sum_{i=1}^N CADF_i$  basic hypothesis ( $H_0: b_i = 0, H_a: b_i < 0$ ) is rejected, it is seen that the studied series is stationary (Pesaran, 2007: 269–271). In the test developed by Levin–Lin–Chu (2002), estimation of is made through the variables  $\Delta y_{it}$  and  $y_{it}$ , which are free of autocorrelation and deterministic features:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{p_i} b_{ij} \Delta y_{it-j} + X'_{it} \delta + e_{it} \quad (3)$$

In Equation 3,  $X'_{it} \delta$  refers to the deterministic variables “ $\alpha_{mi} d_{mt}$ ” (constant term, trend, etc.) and their coefficients. If the basic hypothesis ( $H_0: \alpha = 0$ ) is rejected, it is concluded that the studied series is stationary ( $H_a: \alpha < 0$ ). Panel regression equations were created after determining whether the series has unit roots and ensuring their stationarity with the necessary transformations.

## ESG and firm efficiency models

The study uses panel regression analysis to examine the relationship between the sub-dimensions a that make up the ESG and firm performance. The following models are estimated to achieve the research objectives.

### Model 1:

$$TobinQ_{it} = \alpha_0 + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 TotalAssetTurnoverRate_{it} + \beta_5 CompanyGrowthRate_{it} + \beta_6 Lever_{it} + \beta_7 TotalAssests_{it} + \beta_8 SalesGrowthRate_{it} + \beta_9 pd/dd_{it} + \beta_{10} CompanyAge_{it} + \varepsilon_{1it} \quad (4)$$

### Model 2:

$$ROAQ_{it} = \alpha_0 + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 TotalAssetTurnoverRate_{it} + \beta_5 CompanyGrowthRate_{it} + \beta_6 Lever_{it} + \beta_7 TotalAssests_{it} + \beta_8 SalesGrowthRate_{it} + \beta_9 pd/dd_{it} + \beta_{10} CompanyAge_{it} + \varepsilon_{1it} \quad (5)$$

### Model 3:

$$ROE_{it} = \alpha_0 + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 TotalAssetTurnoverRate_{it} + \beta_5 CompanyGrowthRate_{it} + \beta_6 Lever_{it} + \beta_7 TotalAssests_{it} + \beta_8 SalesGrowthRate_{it} + \beta_9 pd/dd_{it} + \beta_{10} CompanyAge_{it} + \varepsilon_{1it} \quad (6)$$

where  $\alpha_0$  is a constant term,  $\beta_k$   $k=1$  to 10 are the coefficients of the respective independent/control variables,  $i$ =company,  $t$ =year, and  $\varepsilon_{1it}$  is an error term. In cases of varying variance, autocorrelation, and inter-unit correlation, the variance covariance matrix ( $\Omega$ ) of the error term is not equal to the unit matrix.

In this case, ( $Cov(\varepsilon_{it} \varepsilon_{it}) = \sigma_\varepsilon^2 Z_T$ ); further, in the presence of at least one heteroscedasticity, autocorrelation, and inter-unit correlation, the estimates are inconsistent but efficient. In this case, the standard errors should be corrected without touching the parameter estimates (obtainable standard errors with resistance); if they exist, estimation should be made with appropriate methods. **Model 1** and **Model 2** are solved with the Parks–Kmenta estimator with the generalized least-squares method, which needs fewer restrictions than the least-squares method. In this approach, the model examined first is estimated by the OLS method; then, the residues obtained are used to calculate autocorrelation and heteroscedasticity, again by the GLS method. This process continues until  $\beta_k$ 's approach a fixed number (Kmenta, 1986). **Model 3** was estimated with the Huber–Eicker–White estimator, also called the White estimator, for the variable variance problem only. The estimator introduced by Huber (1967), Eicker (1967), and White (1980) is used under the assumption that the  $\Omega$  matrix is known and diagonal, but the diagonal elements are not equal to each other when there is only varying variance in the model, that is, if the residues are independently distributed (Astivia & Zumbo: 2019).



## RESULTS

This section introduces the data to be analyzed, stability tests are performed, brief information is given about the tests and methods, and panel regression analyses evaluate the findings.

### Statistical analysis

Summary statistics of the sample covering the years 2011–2021 of 20 companies are given in Table 1. The natural logarithm of the variables was taken to ensure stationarity in variance.

**Table 1.** Descriptive statistics

Statistics	Shortening	Number of observations	Average value	Standard deviation	Minimum	Maximum
<b>Variables</b>						
<i>ln(Environment)</i>	<i>ln(env)</i>	210	3.9589	0.5232	1.5368	4.5792
<i>ln(Social)</i>	<i>ln(soc)</i>	210	3.9846	0.4834	2.3369	4.5735
<i>ln(Governance)</i>	<i>ln(gov)</i>	210	3.8223	0.5197	1.5581	4.5038
<i>ln(TobinQ)</i>	<i>ln(tQ)</i>	210	0.1799	0.3113	-0.2613	1.4562
<i>ln(Roa)</i>	<i>ln(roa)</i>	210	4.1754	0.1022	3.9518	4.7563
<i>ln(Roe)</i>	<i>ln(roe)</i>	210	4.4790	0.1449	3.8037	4.9649
<i>ln(Total Asset Turnover Rate)</i>	<i>ln(tatr)</i>	210	17.609	1.5383	13.867	20.387
<i>ln(Company Growth Rate)</i>	<i>ln(cgr)</i>	210	5.8472	0.0618	5.7526	6.4777
<i>ln(Leverage)</i>	<i>ln(lev)</i>	210	3.6974	1.2243	-2.3025	4.4266
<i>ln(Total Assets)</i>	<i>ln(ta)</i>	210	-1.0191	1.1358	-3.2188	1.0331
<i>ln(Sales Growth Rate)</i>	<i>ln(sgr)</i>	210	4.8667	0.1385	4.1612	5.4194
<i>ln(price/book)</i>	<i>ln(pd)</i>	210	0.2782	0.6627	-1.5606	1.7387
<i>Company Age</i>	<i>ca</i>	210	53.2619	21.964	14	96

The fact that some variables (for example, *ln(roa)* and *ln(cgr)*) have low standard deviations may indicate that these variables are more stable over time. The wide distribution observed in the *ln(lev)* and *ln(pd)* variables suggests differences in the companies' financial structures and market valuations. High average values of performance and growth metrics such as *ln(ta)*, *ln(cgr)*, and *ln(sgr)* indicate that companies are generally growth-oriented and have high active usage. Table 2 shows the correlation matrix that expresses the relationship and direction of the variables as *a priori*.

**Table 2.** Correlation matrix

	<i>ln(env)</i>	<i>ln(soc)</i>	<i>ln(gov)</i>	<i>ln(tQ)</i>	<i>ln(roa)</i>	<i>ln(roe)</i>	<i>ln(tatr)</i>	<i>ln(cgr)</i>	<i>ln(lev)</i>	<i>ln(ta)</i>	<i>ln(sgr)</i>	<i>ln(pd)</i>	<i>ln(ca)</i>
<i>ln(env)</i>	1.000												
<i>ln(soc)</i>	0.626	1.000											
<i>ln(gov)</i>	0.380	0.383	1.000										
<i>ln(tQ)</i>	-0.012	-0.262	-0.018	1.000									
<i>ln(roa)</i>	-0.146	-0.415	-0.047	0.681	1.000								
<i>ln(roe)</i>	0.031	-0.171	-0.057	0.555	0.723	1.000							
<i>ln(tatr)</i>	0.292	0.543	-0.070	-0.661	-0.628	-0.311	1.000						
<i>ln(cgr)</i>	0.013	0.081	-0.062	0.083	0.256	0.390	-0.027	1.000					
<i>ln(lev)</i>	0.334	0.523	0.254	-0.288	-0.644	-0.211	0.493	-0.036	1.000				
<i>ln(ta)</i>	-0.068	-0.175	0.245	0.569	0.493	0.308	-0.760	0.063	-0.148	1.000			
<i>ln(sgr)</i>	0.037	0.061	-0.006	0.030	0.165	0.147	0.035	0.260	-0.070	-0.004	1.000		
<i>ln(pd)</i>	-0.017	-0.301	0.043	0.806	0.499	0.383	-0.696	0.014	-0.146	0.618	-0.070	1.000	
<i>ca</i>	0.150	0.272	-0.052	-0.575	-0.407	-0.165	0.611	0.064	0.319	-0.421	0.045	-0.633	1.000

It has been determined that the relations between the variables differ according to the correlation matrix findings and coefficient signs. While the highest positive relationship is between ROA and ROE, it is seen that the lowest positive relationship is between the environment and firm growth rate. The highest negative relationship is between total assets and total asset turnover, and the lowest relationship is between total assets and sales growth rate.

Before determining the stationarity of the series, it is necessary to examine the cross-section dependence. If there is a correlation between the sections, unit root tests that take this dependency structure into account should be used. The cross-sectional dependence of the series was examined; the results are given in Table 3.

**Table 3.** Cross-sectional dependence

Variables	CD-test	p-value	Correlation	Absolute correlation	Decision: No cross-sectional dependence
<i>ln(env)</i>	14.87	0.000	0.32	0.51	rejected
<i>ln(soc)</i>	21.786	0.000	0.48	0.57	rejected
<i>ln(gov)</i>	0.909	0.363	0.02	0.31	not rejected
<i>ln(tQ)</i>	17.232	0.000	0.38	0.46	rejected
<i>ln(roe)</i>	1.288	0.198	0.03	0.35	not rejected
<i>ln(roe)</i>	2.141	0.032	0.05	0.34	rejected
<i>ln(tatr)</i>	13.337	0.000	0.29	0.40	rejected
<i>ln(cgr)</i>	7.871	0.000	0.17	0.31	rejected
<i>ln(lev)</i>	0.973	0.330	0.02	0.43	not rejected
<i>ln(ta)</i>	43.204	0.000	0.94	0.94	rejected
<i>ln(sgr)</i>	12.129	0.000	0.26	0.37	rejected
<i>ln(pd)</i>	10.212	0.000	0.22	0.47	rejected
Number of Sections	21	21	21	21	

**Note:** Horizontal sections are independent of each other.  $CD \sim N(0,1)$ .

According to the results obtained from the Pesaran (2004) cross-section dependency test, the main hypothesis could not be rejected in the variables of governance, ROA, and leverage. In other variables, as a result of the rejection of the basic hypothesis, it was determined that there was a correlation between the sections (firms) that make up the data set, that is, a cross-section dependency. The variable with the highest correlation level was calculated as total assets, and the variable with the lowest level was calculated as ROE. Pesaran's (2003) CADF test, which is one of the second-generation unit root analyses that can be used in the presence of this problem, was applied for the series with cross-section dependence. However, beforehand, the multicollinearity problem among the independent variables was tested using the VIF (Variance Inflation Factor) criterion.

**Table 4.** Multiple linear correlation

Variables	VIF	1/VIF
<i>ln(ta)</i>	3.48	0.287356
<i>ln(tatr)</i>	3.24	0.308828
<i>ln(soc)</i>	2.77	0.360702
<i>ln(pd)</i>	2.28	0.437825
<i>ln(env)</i>	1.89	0.529817
<i>ln(gov)</i>	1.51	0.663391
<i>ln(lev)</i>	1.30	0.767764
<i>ln(cgr)</i>	1.11	0.898650
<i>ln(sgr)</i>	1.05	0.956027
Mean VIF	2.07	

Table 4 shows that the average value of the VIF criterion is 2.07. Since it is less than 5, it can be said that there is no multicollinearity between the variables. It supports that there is no multicollinearity in the results based on variables.

In addition, the coefficients in the correlation matrix given in Table 3 support that there is no multicollinearity problem between the study's variables. For series where cross-sectional dependence was not detected, the Levin-Lin and Chu (2002) test, one of the first generation unit root tests, was applied. The results are given in Table 5.

**Table 5.** Unit root tests

Variables	Constant Term + Trend (Second Generation)			Constant Term + Trend (First Generation)		Decision: $H_0$ : There is a unit root	Result
	<i>t</i> -bar	<i>Z</i> -bar	<i>p</i> -value	<i>t</i> -statistic	<i>p</i> -value		
<i>ln(gov)</i>				-8.372	0.000	$H_0$ rejected	$I(0)$
<i>ln(roe)</i>				-8.565	0.000	$H_0$ rejected	$I(0)$
<i>ln(lev)</i>				-9.337	0.000	$H_0$ rejected	$I(0)$
<i>ln(tQ)</i>	-2.843	-1.749	0.040			$H_0$ rejected	$I(0)$
<i>ln(sgr)</i>	-3.820	-4.584	0.000			$H_0$ rejected	$I(0)$
<i>ln(tatr)</i>	-3.046	-2.337	0.010			$H_0$ rejected	$I(0)$
<i>ln(env)</i>	-2.161	-1.610	0.054			$H_0$ not rejected	
$\Delta \ln(env)$	-3.246	-5.320	0.000			$H_0$ rejected	$I(0)$
<i>ln(soc)</i>	-2.621	-1.106	0.134			$H_0$ not rejected	
$\Delta \ln(soc)$	-2.593	-3.089	0.001			$H_0$ rejected	$I(0)$
<i>ln(roe)</i>	-1.825	-0.463	0.322			$H_0$ not rejected	
$\Delta \ln(roe)$	-2.245	-1.889	0.029			$H_0$ rejected	$I(0)$
<i>ln(cgr)</i>	-2.377	-0.398	0.345			$H_0$ not rejected	
$\Delta \ln(cgr)$	-2.438	-2.559	0.005			$H_0$ rejected	$I(0)$
<i>ln(ta)</i>	-2.209	0.091	0.536			$H_0$ not rejected	
$\Delta \ln(ta)$	-2.270	-1.985	0.024			$H_0$ rejected	$I(0)$
<i>ln(pd)</i>	-1.656	0.118	0.547			$H_0$ not rejected	
$\Delta \ln(pd)$	-2.520	-2.839	0.002			$H_0$ rejected	$I(0)$

**Note:** When the time path graphs of the companies are examined; They were added because it was determined that they showed a certain average and a trend over time.

In line with the findings obtained from the stationarity analysis, it was determined that governance, ROA, leverage, Tobin's Q, sales growth rate, and total asset turnover series do not contain unit roots. As a result of the rejection of the basic hypothesis in the related series, it was concluded that they were stationary at the 5% significance level with their level states. However, as seen in the table, there is no stationarity in the levels of other variables. For this reason, it was determined that the series became stationary when the first differences were taken and retested for the same significance level. In the next phase of the analysis, the variables were studied in their stationary states. A non-stationary (with unit root) series violates econometric assumptions and causes the model to produce biased and inconsistent estimates. F-test, Breusch–Pagan, and Hausman tests were applied to determine the correct model for the series selection with determined stationarity and the panel data models. The results are given in Table 6.

**Table 6.** Model selection

Test	Model 1 (Dependent Variable, Tobin's Q)	Model 2 (Dependent Variable, ROA)	Model 3 (Dependent Variable, ROE)
<i>F</i>	11.44 (0.000)	7.03 (0.000)	5.76 (0.000)
LM (Breusch- Pagan)	178.39 (0.0000)	92.99 (0.000)	56.10 (0.000)
Hausman	10.76 (0.4683)	5.60 (0.8989)	12.65 (0.1791)

**Note:** The values in parentheses show the *p*-probability values of the relevant test statistic.

Table 6 shows the model selection tests of three different model estimations, where the dependent variable, Tobin's Q, ROA, and ROE are given collectively. The *F*-test was applied to test the classical model against the fixed effects model. The  $H_0$  hypothesis that the unit and time effect is equal to zero is rejected. In this case, it is concluded that there are fixed effects, and the classical model cannot be applied. As a result of the Breusch–Pagan LM test applied to test the suitability of the classical model against the random effects model, the  $H_0$  hypothesis is rejected. It was concluded that the classical model is not suitable because the variance of the unit effects is nonzero. According to the Hausman test result, since the  $H_0$  hypothesis was not rejected, it was decided for each internal model that the random effects estimator was valid because

it was effective. However, since the basic assumptions of this approach should be examined in the analyses based on the established linear least-squares models, the results are given in Table 7.

**Table 7.** Assumption tests

Test	Model 1 (Dependent Variable, Tobin's Q)	Model 2 (Dependent Variable, ROA)	Model 3 (Dependent Variable, ROE)
Levene-Brown and Forsythe	W0 = 4.1885 (0.0000) W50 = 3.0788 (0.0000) W10 = 4.1885 (0.0000)	W0 = 3.2420 (0.0000) W50 = 2.6867 (0.0003) W10 = 3.2421 (0.0000)	W0 = 5.1988 (0.0000) W50 = 1.8915 (0.0158) W10 = 5.1988 (0.0000)
Baltagi Wu LBI	DW: 1.1824 LBI: 1.5971	DW: 1.2591 LBI: 1.6254	DW = 1.7809 LBI = 2.0362
Friedman	13.455 (0.5862)	15.213 (0.7641)	16.914 (0.6585)

The cross-section dependency in the research models was examined using the Friedman R (1937) test, since the panel size of the study was  $T < N$ . As a result of the test, it was determined that the  $H_0$  hypothesis could not be rejected and that the models had no cross-sectional dependence. In testing the autocorrelation assumption in the research model, Bhargava, Franzini, and Nerendranathan's Durbin-Watson and Baltagi-Wu's local best invariant tests were applied. According to the autocorrelation test results, it was determined that there was no autocorrelation problem, as the  $H_0$  hypothesis could not be rejected in Model 3 alone. It was concluded that the statistical values in Model 1 and Model 2 were less than 2, so there was no autocorrelation problem in the random effects model. Levene, Brown, and Forsythe's test was used to test the constant variance assumption in random effects models. When the test statistics are examined, it is seen that the  $H_0$  hypothesis, which was established as "the variances of the units are equal," was also rejected for all models. According to the results obtained, Model 1 and Model 2 have autocorrelation and varying variance problems, while Model 3 has only varying variance problems. In this case, estimation will be performed using the Parks-Kmenta estimator, which produces standard errors resistant to autocorrelation and varying variance problems for Model 1 and Model 2. The results obtained by using the Huber-Eicker-White Estimator, which is also called the White estimator because of the standard errors for Model 3 and the problem of only changing variance in the model, are given in Table 8 by making consistent efficient and unbiased coefficient estimations.

**Table 8.** Model estimators results

Variable	Model 1 (Parks-Kmenta) (Dependent Variable, Tobin's Q)		Model 2 (Parks-Kmenta) (Dependent Variable, ROA)		Model 3 (Huber, Eicker, and White) (Dependent Variable, ROE)	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.	Coefficient	$P >  z $
$\Delta \ln(env)$	0.0701998	0.034			0.08015	0.005
$\Delta \ln(soc)$						
$\ln(gov)$	-0.0793527	0.030			0.0194557	0.036
$\ln(tQ)$						
$\ln(roa)$						
$\Delta \ln(roe)$						
$\ln(tatr)$	0.1404593	0.036	0.0421742	0.008		
$\Delta \ln(cgr)$						
$\ln(lev)$			-0.0338324	0.002		
$\Delta \ln(ta)$						
$\ln(sgr)$			0.1700452	0.042	0.046105	0.000
$\Delta \ln(pd)$						
<i>ca</i>	-0.0063535	0.001				
<i>_cons</i>	0.96002424	0.141	3.515938	0.209	-2.331548	0.000
<i>Num. of obs.</i>	189		189		189	
$R^2$	0.4884		0.5912		0.2529	
<i>Wald Test</i>	0.0000		0.0000		0.0000	

**Note:**  $P > |z|$  values were evaluated according to the 5% significance level, and only statistically significant variables were given.

According to the analysis results in Table 8, the variables given in the models were statistically significant at the 5% level. Statistically insignificant variables can negatively affect the prediction accuracy of the model. Unnecessary variables can increase noise in the model and cause uncertainty in predictions. In econometric analysis, the principle of parsimony aims to provide the best explanation using the least number of variables possible. In addition, including non-significant variables in the model may show high correlations with other independent variables and increase the multicollinearity problem. This can make it difficult to estimate and interpret model parameters. Removing meaningless variables helps avoid such problems.

Model 1 shows that a 1% change in the environment variable increases the Tobin's Q variable by 0.07% and the total asset turnover rate by 0.14%, while the governance variable decreases it by 0.07%. In Model 2, it was observed that a 1% change in total asset turnover increased the ROA variable by 0.04% and the sales growth rate by 0.17%, while the leverage variable decreased by 0.03%. In Model 3, it was concluded that a 1% change in the sales growth rate increased the ROE variable by 0.04%, the environment variable by 0.08%, and the governance variable by 0.019%.

## RESULTS AND DISCUSSION

This study determined different relationships among the ROA, ROE, and Tobin's Q variables, which represent the financial performance of 21 companies in BIST 100, and the environmental, social, and governance scores that make up the ESG sub-dimensions. Findings regarding the variables taken to measure firm performance are as follows.

### Effect of ESG sub-dimensions on ROA

The research findings show that the sub-dimensions that make up ESG are statistically insignificant on ROA. Table 7 shows that companies reporting ESG do not affect their ROA. According to the findings obtained, it was determined that the main hypothesis H1 and its sub-hypotheses were rejected. In addition, it has been determined that while the total asset turnover ratio and sales growth rate data set positively affect the ROA of the companies that make up the data set, the leverage ratio has a negative effect of 0.3%. The literature shows similar results regarding the effect of ESG factors on firms' ROA (Buallay, 2019; Qureshi et al., 2021).

### Effect of ESG sub-dimensions on ROE

Table 7 shows that the E and G scores of the sub-dimensions that make up the ESG are statistically significant on ROE. It positively affects ROE, with an E score of 0.08% and a G score of 0.02%. According to the findings, it was determined that the H2b hypothesis, one of the sub-hypotheses of the H2 main hypothesis, was rejected. In addition, a statistically significant and positive effect on the market-to-book ratio, ROE, was determined. Firms' investments in E and G scores had an increasing effect on the ROE. The findings are different from those of some studies in the current literature. Per Kamatra and Kartikaningdyah (2015), Han et al. (2016), and Atan et al. (2018), the effect of ESG sub-dimensions on ROE could not be determined. The findings of our study differ from the existing literature in this respect.

### Effect of ESG sub-dimensions on Tobin's Q

Table 7 shows that the E score has a positive effect of 0.07% on Tobin's Q and is statistically significant. Contrary to the E score, the G score has a negative effect of 0.08% on Tobin's Q, and the result is statistically significant. El Khoury et al.'s (2021) findings are similar to those in the study's results. The study stated that the E score had a positive effect on the market performance, while the G score had no effect on the market performance. However, according to our findings, a negative effect has been determined on the market performances of the companies that make up our G score data set. In line with the findings, it was determined that the H3b hypothesis, which is one of the sub-hypotheses of the H3 main hypothesis, was rejected. In addition, the total asset turnover ratio has been found to have a positive effect of 1.4% on Tobin's Q ratio of companies. Total assets are negatively and significantly correlated with Tobin's Q ratio. This indicates that small companies can be valued more in the market than large ones (Atan et al., 2018). It has been determined that the firm's age has a small (0.006%) negative effect on Tobin's Q. Considering the size of the 21 companies that make up our data set and the literature, it can be said that our obtained result is consistent.

According to the findings of our study, when examining the effect of the sub-dimensions constituting ESG on dependent variables, it is observed that environmental investments positively affect ROE and Tobin's Q ratios. This indicates that the market rewards companies for their environmental investments. This finding demonstrates that, in addition to enhancing their financial performance in the medium and long term by investing in areas outside their operations, companies may also improve their visibility and reputation in the markets. Indeed, it would be correct to assume that BIST 100 investors value CSR practices and consider these practices in their investments. Furthermore, these results support the findings of the studies conducted by Saygılı et al. (2022) and Ozer et al. (2023).

On the other hand, it was found that social investments did not significantly affect the variables representing financial performance. This result differs from studies that have concluded a statistically significant relationship between social investments and financial performance (Shen et al., 2016; Siueia et al., 2019; Wu et al., 2017). Additionally, existing studies indicate that increasing the social performance of firms does not affect their financial performance. Our findings parallel a study by Ozdarak and Akarcay (2022), which found no statistically significant relationship between ESG disclosures of firms listed on the Borsa Istanbul Metal Products Machinery Index between 2009 and 2018 and their financial performance. We conclude that ESG investments should be evaluated through market-based ratios that support stakeholder theory. Indeed, our findings support our assumption.

However, it was observed that investments made based on governance scores positively affected firms' ROE ratios. Nevertheless, according to our findings, the governance score negatively affected the firms' market performance (Tobin's Q) in our dataset. Although this finding differs from some studies in the literature (Ozdarak & Akarcay, 2022; Ozer et al., 2023), it is consistent with the results of many other studies (Perez de Toledo & Bocatto, 2008; Abdi and Càmara-Turull, 2022; Ghabri, 2022; Saygılı et al., 2022). Therefore, this finding regarding the governance score supports the negative synergy hypothesis.

In the findings, it was determined that any of the ESG sub-dimensions did not influence ROA. This finding is different from the findings of some studies in the literature (Buallı et al., 2021; Velte, 2017; Saygılı et al., 2022). Given that ESG investments are long-term and future-oriented, it is foreseeable that there is no statistically significant relationship with the accounting-based ROA ratio, which is inherently short-term and past-oriented. Indeed, many studies in the existing literature have found that ESG criteria do not affect ROA (Alareeni & Hamdan, 2020; Nirino et al., 2021; Ozdarak & Akarcay, 2022; Ozer et al., 2023).

## CONCLUSION AND IMPLICATIONS

This study focused on the activities of the 21 companies forming the BIST 100 index in Turkey regarding ESG criteria. The empirical effect of environmental, social, and governance sub-dimensions, which constitute ESG, on companies' financial performance was examined in the study. Panel regression analysis investigated the relationship between the ESG sub-dimensions and firm performance. As a result of the research, we found that environmental and governance scores significantly impact firms' financial performance. According to the research findings, the alignment of firms listed on the BIST-100 with environmental and governance sub-dimensions affects financial performance and market performance. Environmental investments positively influence firms' ROE and Tobin's Q ratios. Embracing governance sub-dimension negatively affects firms' Tobin's Q and positively influences ROE. Statistically significant results regarding the impact of the sub-dimensions constituting ESG on firms' ROA ratios were not found. These findings provide a new perspective on the different results of existing research. The results of our analysis demonstrate that the sub-dimensions of ESG have a significant impact on firms' financial performance.

In general, the research findings indicate that each ESG sub-dimensions has different effects on firms' financial performance. It would not be incorrect to assume that activities conducted by firms under CSR are interpreted differently by investors. Additionally, it is important to consider the macroeconomic structure, legal system, and level of financial development of the countries where firms operate. Studies have identified a regulatory effect of countries' legal systems on the relationship between environmental, social, and governance sub-dimensions and firm performance. Indeed, economic activities are built on trust, and the fundamental elements that provide trust are legal regulations. Investors prefer their capital to be legally protected and may hesitate to invest in countries where legal protection is weak. This situation is supported by various studies in the literature. It has been observed that firms operating in countries where legal protection is less effective or ineffective have a negative governance and firm performance relationship

(Ghabri, 2022). Indeed, our findings determined that the governance sub-dimensions had a negative effect on Tobin's Q ratios of the firms constituting our dataset.

Additionally, firms' performance is also influenced by the macroeconomic situation of countries. Fluctuations or shocks that may occur at the global or regional level can affect financial markets and, thus, firms. In such events, the extent to which financial markets and firms are affected also varies depending on countries' financial development. Since these environments can impact the relationship between firms' CSR activities and financial performance in the short to medium term, future studies need to analyze longer-term data and consider the macroeconomic structure and level of financial development of the countries where the studied firms are located. The research utilizes a dataset covering the period from 2011 to 2020. The primary reason for selecting this period is the limited number of firms disclosing the data and the difficulty in accessing these data. Indeed, this limitation constitutes one of the most significant constraints of the study. Therefore, future research could use datasets covering broader time intervals and examine the practices of other developing markets and other corporate groups in Turkey.

In future studies, consider the legal structure of the countries where the firms are located, especially when examining the effects of governance scores on firm performance. Additionally, by considering sectoral differences, board structure and characteristics, CEO duality, and other relevant factors, researchers can examine the impact of ESG and its sub-dimensions on firms' financial performance.

## References

- Abdi, Y., Li, X., & Càmara-Turull, X. (2022). Exploring the impact of sustainability (ESG) disclosure on firm value and financial performance (FP) in airline industry: The moderating role of size and age. *Environment, Development and Sustainability*, 24(4), 5052-5079. <https://doi.org/10.1007/s10668-021-01649-w>
- Akgül, Y. (2020). The impact of company size on return on assets: Evidence from the Turkish insurance industry. *Istanbul Commerce University Journal of Social Sciences*, 19(39), 993-1006. <https://doi.org/10.46928/iticusbe.768360>
- Alareeni, B. A., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance*, 20(7), 1409-1428. <https://doi.org/10.1108/CG-06-2020-0258>
- Albitar, K., Hussainey, K., Kolade, N., & Gerged, A.M. (2020). ESG disclosure and firm performance before and after IR: The moderating role of governance mechanisms. *International Journal of Accounting & Information Management*, 28(3), 429-444. <https://doi.org/10.1108/IJAIM-09-2019-0108>
- Allouche, J., & Laroche, P.A. (2005). Meta-analytical investigation of the relationship between corporate social and financial performance. *Revue de Gestion des Ressources Humaines*, 57, 8-41.
- Almoneef, A., & Samontaray, D. P. (2019). Corporate governance and firm performance in the Saudi banking industry. *Banks and Bank Systems*, 14(1), 147. [http://dx.doi.org/10.21511/bbs.14\(1\).2019.13](http://dx.doi.org/10.21511/bbs.14(1).2019.13)
- Amorelli, M. F., & García-Sánchez, I. M. (2021). Trends in the dynamic evolution of board gender diversity and corporate social responsibility. *Corporate Social Responsibility and Environmental Management*, 28(2), 537-554. <https://doi.org/10.1002/csr.2079>
- Astivia, O.L., & Zumbo, B.D. (2019). Heteroskedasticity in multiple regression analysis: what it is, how to detect it and how to solve it with applications in R and SPSS. *Practical Assessment, Research & Evaluation*, 24(1), 1-16.
- Atan, R., Alam, M.M., Said, J., & Zamri, M. (2018). The impacts of environmental, social, and governance factors on firm performance: Panel study of Malaysian companies. *Management of Environmental Quality*, 29(2), 182-194. <https://doi.org/10.1108/MEQ-03-2017-0033>
- Bai, J., & Ng, S. (2004). A PANIC attack on unit roots and cointegration. *Econometrica*, 72(4), 1127-1177. <https://doi.org/10.1111/j.1468-0262.2004.00528.x>
- Baltagi, B. H. (2008). Forecasting with panel data. *Journal of Forecasting*, 27(2), 153-173. <https://doi.org/10.1002/for.1047>
- Bellamy, M.A., Ghosh, S., & Hora, M. (2014). The influence of supply network structure on firm innovation. *Journal of Operations Management*, 32(6), 357-373. <https://doi.org/10.1016/j.jom.2014.06.004>
- Berg, F., Fabisik, K., & Sautner, Z. (2021). Rewriting history II: The (Un)Predictable past of ESG ratings. ECGI Working Paper Series in Finance, Working Paper No: 708/2020.
- Blowfield, M., & Frynas, J. G. (2005). Editorial Setting new agendas: Critical perspectives on Corporate Social Responsibility in the developing world. *International Affairs*, 81(3), 499-513. <https://doi.org/10.1111/j.1468-2346.2005.00465.x>
- Borsa Istanbul (BIST). (2020). Borsa Istanbul Sustainability Guide for companies. Retrieved from <https://www.borsaistanbul.com>
- Brammer, S., Brooks, C., & Pavelin, S. (2006). Corporate social performance and stock returns: UK evidence from disaggregate measures. *Financial Management*, 35(3), 97-116. <https://doi.org/10.1111/j.1755-053X.2006.tb00149.x>
- Breitung, J. (2001). The local power of some unit root tests for panel data. In B.H. Baltagi, T.B. Fomby, & R. Carter Hill (Eds.), *Nonstationary Panels, Panel Cointegration, and Dynamic Panels (Advances in Econometrics, Vol. 15)* (pp. 161-177). [https://doi.org/10.1016/S0731-9053\(00\)15006-6](https://doi.org/10.1016/S0731-9053(00)15006-6)
- Breusch, T.S., & Pagan, A.R. (1980). The lagrange multiplier test and 317.its applications to model specification tests in econometrics. *Review of Economic Studies*, 47(1), 239-253.
- Broadstock, D.C., Chan, K., Cheng, L.T. & Wang, X. (2020). The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Finance Research Letters*, 38, 101716. <https://doi.org/10.1016/j.frl.2020.101716>
- Brown, M.B., & Forsythe, A.B. (1974). Robust tests for the equality of variances. *Journal of the American Statistical Association*, 69(346), 364-367. <https://doi.org/10.1080/01621459.1974.10482955>
- Buallay, A. (2019). Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Management of Environmental Quality*, 30(1), 98-115. <https://doi.org/10.1108/MEQ-12-2017-0149>
- Buallay, A., El Houry, R., & Hamdan, A. (2021). Sustainability reporting in smart cities: A multidimensional performance measures. *Cities*, 119, 103397. <https://doi.org/10.1016/j.cities.2021.103397>

- Chadha, S., & Sharma, A. K. (2015). Capital structure and firm performance: Empirical evidence from India. *Vision*, 19(4), 295-302. <https://doi.org/10.1177/0972262915610852>
- Dasgupta, R. (2022). Financial performance shortfall, ESG controversies, and ESG performance: Evidence from firms around the world. *Finance Research Letters*, 46(B), 102487. <https://doi.org/10.1016/j.frl.2021.102487>
- Deloitte. (2011). Integrated reporting: A better view?. Global Sustainability and Climate Change Services. Retrieved from <https://www.iasplus.com/en/binary/sustain/1109integratedreportingview.pdf>
- Duque-Grisales, E., & Aguilera-Caracuel, J. (2021). Environmental, social and governance (ESG) scores and financial performance of multinationals: Moderating effects of geographic international diversification and financial slack. *Journal of Business Ethics*, 168(2), 315-334. <https://doi.org/10.1007/s10551-019-04177-w>
- Düzer, M. (2018). Sürdürülebilirlik Performans Göstergelerine İlişkin Açıklamaların Finansal Performans Üzerine Etkisi. Doctoral Thesis. Eskişehir: Anadolu University. Retrieved from <https://earsiv.anadolu.edu.tr/xmlui/handle/11421/9611>
- Eccles, R., Krzus, M., & Ribot, S. (2015). Meaning and momentum in the integrated reporting movement. *Journal of Applied Corporate Finance*, 27(2), 8-18. <https://doi.org/10.1111/jacf.12113>
- Eicker, F. (1967). Limit theorems for regressions with unequal and dependent errors. *Proceedings of Fifth Berkeley Symposium on Mathematical Statistics and Probability*, 1(1), 59-82.
- El Khoury, R., Nasrallah, N., & Alareeni, B. (2021). ESG and financial performance of banks in the MENAT region: Concavity–convexity patterns. *Journal of Sustainable Finance & Investment*, 1-25. <https://doi.org/10.1080/20430795.2021.1929807>
- Elouidani, A., & Zoubir, F. (2015). Corporate social responsibility and financial performance. *African Journal of Accounting, Auditing and Finance*, 4(1), 74. <https://doi.org/10.1504/AJAAF.2015.071749>
- Freeman, R.E. (1984). *Strategic management: A stakeholder approach*. Boston: Pitman.
- Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance. Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233. <https://doi.org/10.1080/20430795.2015.1118917>
- Friedman, M. (1937). The use of ranks to avoid the assumption of normality implicit in the analysis of variance. *Journal of the American Statistical Association*, 32(200), 675-701.
- Friedman, M. (1970). The social responsibility of business is to increase its profits. *New York Times Magazine*, September 13, 32-33.
- Fu, L., Boehe, D. M., & Orlitzky, M. O. (2022). Broad or narrow stakeholder management? A signaling theory perspective. *Business & Society*, 61(7), 1838-1880. <https://doi.org/10.1177/00076503211053018>
- Garcia, A. S., Mendes-Da-Silva, W., & Orsato, R. J. (2017). Sensitive industries produce better ESG performance: Evidence from emerging markets. *Journal of Cleaner Production*, 150, 135-147. <https://doi.org/10.1016/j.jclepro.2017.02.180>
- Ghabri, Y. (2022). Legal protection systems, corporate governance and firm performance: A cross-country comparison. *Studies in Economics and Finance*, 39(2), 256-278. <https://doi.org/10.1108/SEF-09-2021-0404>
- Gok, I. Y., Ozdemir, O., & Unlu, B. (2019). The effect of corporate sustainability practices on financial performance: Evidence from Turkey. In A. Antonaras & P. Dekoulou (Eds.), *Cases on Corporate Social Responsibility and Contemporary Issues in Organizations* (pp. 52-70). IGI Global. <https://doi.org/10.4018/978-1-5225-7715-7.ch004>
- Gregory, R. P. (2022). A meta-analysis of the effect of third party ESG ratings on Tobin's Q, ROA, and ROE. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4081189](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4081189)
- Grove, H., Holcomb, J. M., Clouse, M., & Xu, T. (2020). Analyzing the business roundtable statement on the purpose of a corporation and linking it to corporate governance. *Corp. Board Role Duties Comp*, 16, 19-27. <https://doi.org/10.22495/cbv16i1art2>
- Gunawan, I. M. A., Pituringsih, E., & Widyastuti, E. (2018). The effect of capital structure, dividend policy, company size, profitability and liquidity on company value (study at manufacturing companies listed on Indonesia Stock Exchange 2014-2016). *International Journal of Economics, Commerce and Management*, 6(6), 405-442.
- Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *The Econometrics Journal*, 3(2), 148-161. <https://doi.org/10.1111/1368-423X.00043>
- Hadri, K., & Kurozumi, E. (2012). A simple panel stationarity test in the presence of serial correlation and a common factor. *Economics Letter*, 115, 31-34. <https://doi.org/10.1016/j.econlet.2011.11.036>
- Han, J. J., Kim, H. J., & Yu, J. (2016). Empirical study on relationship between corporate social responsibility and financial performance in Korea. *Asian Journal of Sustainability and Social Responsibility*, 1(1), 61-76. <https://doi.org/10.1186/s41180-016-0002-3>
- Hang, M., Geyer-Klingenberg, J., & Rathgeber, A.W. (2018). It is merely a matter of time: A meta-analysis of the causality between environmental performance and financial performance. *Business Strategy and the Environment*, 28(2), 257-273. <https://doi.org/10.1002/bse.2215>
- Harabida, M., Radi, B., & Gueyie, J. P. (2022). Socially responsible investment during the COVID-19 Pandemic: Evidence from Morocco, Egypt and Turkey. *International Journal of Economics and Finance*, 14(4), 1-65. <https://doi.org/10.5539/ijef.v14n4p65>
- Hasan, M.R., Shiming, D., Islam, M.A., & Hossain, M.Z. (2020). Operational efficiency effects of blockchain technology implementation in firms: Evidence from China. *Review of International Business and Strategy*, 30(2), 163-181. <https://doi.org/10.1108/RIBS-05-2019-0069>
- Hu, A., Yuan, X., Fan, S., & Wang, S. (2023). The impact and mechanism of corporate ESG construction on the efficiency of regional green economy: An empirical analysis based on signal transmission theory and stakeholder theory. *Sustainability*, 15(17), 13236. <https://doi.org/10.3390/su151713236>
- Huang, D.Z.X. (2021). Environmental, social and governance (ESG) activity and firm performance: A review and consolidation. *Account Finance*, 61, 335-360. <https://doi.org/10.1111/acfi.12569>
- Huber, P.J. (1967). The behavior of maximum likelihood estimates under nonstandard conditions. *Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability*, 1(1), 221-233.
- Humphrey, J. E., Lee, D. D., & Shen, Y. (2012). The independent effects of environmental, social and governance initiatives on the performance of UK firms. *Australian Journal of Management*, 37(2), 135-151. <https://doi.org/10.1177/0312896211410081>
- Im, K., Pesaran, H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53-74. [https://doi.org/10.1016/S0304-4076\(03\)00092-7](https://doi.org/10.1016/S0304-4076(03)00092-7)
- Kamatra, N., & Kartikaningdyah, E. (2015). Effect corporate social responsibility on financial performance. *International Journal of Economics and Financial Issues*, 5(1S), 157-164.
- Khemir, S. (2019). Perception of ESG criteria by mainstream investors: evidence from Tunisia. *International Journal of Emerging Markets*, 14(5), 752-768. <https://doi.org/10.1108/IJOEM-05-2017-0172>



- Kızıltan, B., & Doğan, D. U. (2021). Çimento sektöründe karbon ayak izlerinin raporlanması amacıyla bir çerçeve önerisi. *Çağ University Journal of Social Sciences*, 18(1), 40-58. Çağ University Journal of Social Sciences
- Kmenta, J. (1986). *Elements of Econometrics* (Second ed.), New York: Macmillan.
- Koroleva, E., Baggieri, M., & Nalwanga, S. (2020). Company performance: Are environmental, social, and governance factors important. *International Journal of Technology*, 11(8), 1468-1477. <https://doi.org/10.14716/ijtech.v11i8.4527>
- Kortmann, S., Gelhard, C., Zimmermann, C., & Piller, F.T. (2014). Linking strategic flexibility and operational efficiency: The mediating role of ambidextrous operational capabilities. *Journal of Operations Management*, 32(7/8), 475-490. <https://doi.org/10.1016/j.jom.2014.09.007>
- Lai, A., Melloni, G., & Stacchezzini, R. (2018). Integrated reporting and narrative accountability: The role of preparers. *Accounting, Auditing and Accountability Journal*, 31(5), 1381-1405. <https://doi.org/10.1108/AAAJ-08-2016-2674>
- Lam, H.K.S., Zhan, Y., Zhang, M., Wang, Y., & Lyons, A. (2019). The effect of supply chain finance initiatives on the market value of service providers. *International Journal of Production Economics*, 216, 227-238. <https://doi.org/10.1016/j.ijpe.2019.04.031>
- Levene, H. (1960). Robust tests for equality of variances. in contributions to probability and statistics: *Essays in Honor of Harold Hotelling*, 2, 278-292.
- Levin, A., Lin, C.F., & Chu, C.S.J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1- 24. [https://doi.org/10.1016/S0304-4076\(01\)00098-7](https://doi.org/10.1016/S0304-4076(01)00098-7)
- Li R., & Wan Y. (2021). Analysis of the negative relationship between blockchain application and corporate performance. *Mobile Information Systems*, 9912241. <https://doi.org/10.1155/2021/9912241>.
- Li, T. T., Wang, K., Sueyoshi, T., & Wang, D. D. (2021). ESG: Research progress and future prospects. *Sustainability*, 13(21), 11663. <https://doi.org/10.3390/su132111663>
- Limkiangkrai, M., Koh, S., & Durand, R. B. (2017). Environmental, social, and governance (ESG) profiles, stock returns, and financial policy: Australian evidence. *International Review of Finance*, 17(3), 461-471. <https://doi.org/10.1111/irfi.12101>
- Lopes, Washington D. S., & Imoniana, J. O. (2021). Auditing as an effective mean of communication on environmental, social and governance issues in brazil. *Entrepreneurship and Sustainability Issues*, 9(1), 103-122. [https://doi.org/10.9770/jesi.2021.9.1\(7\)](https://doi.org/10.9770/jesi.2021.9.1(7))
- Luthfiah, A. A., & Suherman, S. (2018). The effects of financial performance toward firm value with ownership structure as moderating variable (the study on manufacturing companies listed in Indonesia stock exchange in the period of 2012-2016). *Journal of Business and Behavioural Entrepreneurship*, 2(1), 18-27. <https://doi.org/10.21009/jobbe.002.1.03>.
- Makni, R., Francoeur, C., & Bellavance, F. (2009). Causality between corporate social performance and financial performance: Evidence from Canadian firms. *Journal of Business Ethics*, 89(3), 409-422. <https://doi.org/10.1007/s10551-008-0007-7>
- Mao, Y., & Wang, J. (2019). Is green manufacturing expensive? Empirical evidence from China. *International Journal of Production Research*, 57(23), 7235-7247, doi: 10.1080/00207543.2018.1480842
- Martins, H. C. (2022). Competition and ESG practices in emerging markets: Evidence from a difference-in-differences model. *Finance Research Letters*, 46, 102371. <https://doi.org/10.1016/j.frl.2021.102371>
- McGuinness, P. B., Vieito, J. P., & Wang, M. (2017). The role of board gender and foreign ownership in the CSR performance of Chinese listed firms. *Journal of Corporate Finance*, 42, 75-99. <https://doi.org/10.1016/j.jcorpfin.2016.11.001>
- Meizari, A., & Viani, T. O. (2017). Effect of profitability, size and debt policy to company value (study on business-27 company listed on BEI). In *3rd International Conferences on Information Technology and Business (ICITB)*. Retrieved from <https://jurnal.darmajaya.ac.id/index.php/icitb/article/view/907/705>
- Ministry of Trade. (2024). Proposal for a directive on corporate sustainability due diligence. Retrieved from <https://www.trade.gov.tr/>
- Mule, R.K., Mukras, M.S., & Nzioka, O.M. (2015). Corporate size, profitability and market value: An econometric panel analysis of listed firms in Kenya. *European Scientific Journal*, 11(13),376-396.
- Murdayanti, Y., Ulupui, I. G. K. A., Pahala, I., Indriani, S., & Surherman, S. (2020). Corporate governance and value relevance in Indonesia manufacturing companies. *Journal of Asian Finance, Economics and Business*, 7(11), 335-346. <https://doi.org/10.13106/jafeb.2020.vol7.no11.335>
- Nirino, N., Santoro, G., Miglietta, N., & Quaglia, R. (2021). Corporate controversies and company's financial performance: Exploring the moderating role of ESG practices. *Technological Forecasting and Social Change*, 162, 120341. <https://doi.org/10.1016/j.techfore.2020.120341>
- Oktem, R., & Oktem, B. (2022). Analysis of the COVID-19 pandemic data in the banking sector related to the revised international integrated reporting framework. *Journal of Financial Research and Studies*, 14(2), 193-208. doi: 10.14784/marufacd.1055216.
- Orsato, R. J., Garcia, A., Mendes-Da-Silva, W., Simonetti, R., & Monzoni, M. (2015). Sustainability indexes: Why join in? A study of the 'Corporate Sustainability Index (ISE)' in Brazil. *Journal of Cleaner Production*, 96, 161-170. <https://doi.org/10.1016/j.jclepro.2014.10.071>
- Ozdarak, E., & Akarçay, Ç. (2022). Is environmental, social and governance (ESG) reporting financially useful? Evidence from Turkey. *Journal of Research in Business*, 7(1), 261-280. <https://doi.org/10.54452/jrb.1094498>
- Ozer, G., Aktaş, N., & Çam, I. (2023). Environmental, social, and governance (ESG) scores and financial performance of publicly listed companies in Turkey. *Eskişehir Osmangazi University Journal of Economics and Administrative Sciences*, 18(2), 337-353. <https://doi.org/10.17153/oguiibf.1239759>
- Oztürk, S. (2019). Integrated reporting as the future of corporate reporting approach: Garanti bank example. *Journal of Accounting and Finance*, 81, 1-20. <https://doi.org/10.25095/mufad.510443>.
- Parks, R. (1967). Efficient estimation of a system of regression equations when disturbances are both serially and contemporaneously correlated. *Journal of the American Statistical Association*, 62, 500-509. <https://doi.org/10.1080/01621459.1967.10482923>
- Perez de Toledo, E., & Bocatto, E. (2008). Does corporate governance matter after all? Quality of governance and the value of Canadian firms after 2008. Retrieved from <http://dx.doi.org/10.2139/ssrn.1985672>
- Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. *Cambridge Working Papers in Economics*, 435, 1-42.
- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross section dependence. *Journal of Applied Econometrics*, 22, 312-365. <https://doi.org/10.1002/jae.951>
- Preston, E. L., & O'Bannon, P.D. (1997). The corporate social-financial performance relationship: A typology and analysis. *Business & Society*, 36(4), 419-429. <https://doi.org/10.1177/000765039703600406>
- Qureshi, M. A., Akbar, M., Akbar, A., & Poulouva, P. (2021). Do ESG endeavors assist firms in achieving superior financial performance? A case of 100 best corporate citizens. *Sage Open*, 11(2), 21582440211021598. <https://doi.org/10.1177/21582440211021598>
- Raynard, P., & Forstater, M. (2002). Corporate social responsibility: Implications for small and medium enterprises in developing countries. *International Journal of Scientific & Engineering Research*, 5(1), 116-126.
- Robbins, S.P., & Coulter, M.C. (2002). *Management*. 7th Edition. New Jersey: Prentice Hall.

- Rodríguez-Fernández, M., Sánchez-Teba, E. M., López-Toro, A. A., & Borrego-Domínguez, S. (2019). Influence of ESGC indicators on financial performance of listed travel and leisure companies. *Sustainability*, 11(19), 5529. <https://doi.org/10.3390/su11195529>
- Rosikah, P.D.K., Muthalib, D. A., Azis, M. I., & Rohansyah, M. (2018). Effects of return on asset, return on equity, earning per share on corporate value. *The International Journal of Engineering and Science*, 7(3), 6-14. <https://doi.org/10.9790/1813-0703010614>
- Saygili, E., Arslan, S., & Birkan, A. O. (2022). ESG practices and corporate financial performance: Evidence from Borsa Istanbul. *Borsa Istanbul Review*, 22(3), 525-533. <https://doi.org/10.1016/j.bir.2021.07.001>.
- Serafeim, G. (2015). Integrated reporting and investor clientele. *Journal of Applied Corporate Finance*, 27(2), 34-51. <https://doi.org/10.1111/jacf.12116>
- Shen, C.-H., Wu, M.W., Chen, T.H., & Fang, H. (2016). To engage or not to engage in corporate social responsibility: Empirical evidence from global banking sector. *Economic Modelling*, 55, 207-225. <https://doi.org/10.1016/j.econmod.2016.02.007>.
- Sherwood, M W., & Pollard, J.L. (2018). The risk-adjusted return potential of integrating ESG strategies into emerging market equities. *Journal of Sustainable Finance & Investment*, 8(1), 26-44. <https://doi.org/10.1080/20430795.2017.1331118>
- Signori, S., San-Jose, L., Retolaza, J. L., & Rusconi, G. (2021). Stakeholder value creation: Comparing ESG and value added in European companies. *Sustainability*, 13(3), 1392. <https://doi.org/10.3390/su13031392>
- Siuëia, T.T., Wang, J., & Deladem, T.G. (2019). Corporate social responsibility and financial performance: A comparative study in the Sub-Saharan Africa banking sector. *Journal of Cleaner Production*, 226, 658-668. <https://doi.org/10.1016/j.jclepro.2019.04.027>
- Sudiyatno, B., Puspitasari, E., Suwanti, T. & Asyif, M. M. (2020). Determinants of firm value and profitability: Evidence from Indonesia. *The Journal of Asian Finance, Economics and Business*, 7(11), 769-778. <https://doi.org/10.13106/jafeb.2020.vol7.no11.769>.
- Tang, A., Chiara, N., & Taylor, J. E. (2012). Financing renewable energy infrastructure: Formulation, pricing and impact of a carbon revenue bond. *Energy Policy*, 45, 691-703. <https://doi.org/10.1016/j.enpol.2012.03.022>.
- Utami, E. S. & Hasan, M. (2021). The role of corporate social responsibility on the relationship between financial performance and company value. *The Journal of Asian Finance, Economics and Business*, 8(3), 1249-1256. <https://doi.org/10.13106/JAFEB.2021.VOL8.NO3.1249>.
- Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility*, 8(2), 169-178. <https://doi.org/10.1108/JGR-11-2016-0029>
- Waddock, S.A. & Graves, S.B. (1997). The corporate social performance – financial social link. *Strategic Management Journal*, 18(4), 303-319. [https://doi.org/10.1002/\(SICI\)1097-0266\(199704\)18:4<303::AID-SMJ869>3.0.CO;2-G](https://doi.org/10.1002/(SICI)1097-0266(199704)18:4<303::AID-SMJ869>3.0.CO;2-G)
- Wahua, L. & Ezeilo, F. I. (2021). Effects of environmental, social and governance imperatives on the performance of selected listed mortgage banks in Nigeria. *International Journal of Economics, Business and Management*, 13(4), 34-48.
- Wai-Khuen, W., Boon-Heng, T., & Siow-Hooi, T. (2023). The influence of external stakeholders on environmental, social, and governance (ESG) reporting: Toward a conceptual framework for ESG disclosure. *Foresight and STI Governance*, 17(2), 9-20. <https://doi.org/10.17323/2500-2597.2023.2.9.20>
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), 817-838. <https://doi.org/10.2307/1912934>
- Wu, C., Xiong, X. & Gao, Y. (2022). Does ESG certification improve price efficiency in the Chinese stock market? *Asia-Pacific Financial Markets*, 29, 97-122. <https://doi.org/10.1007/s10690-021-09346-4>
- Wu, M.-W., Shen, C.-H., & Chen, T.-H. (2017). Application of multi-level matching between financial performance and corporate social responsibility in the banking industry. *Review of Quantitative Finance and Accounting*, 49(1), 29-63. <https://doi.org/10.1007/s11156-016-0582-0>
- Xie, J., Nozawa, W., Yagi, M., Fujii, H., & Managi, S. (2019). Do environmental protection, social responsibility, and corporate governance activities improve corporate financial performance? *Business Strategy and the Environment*, 28(2), 286-300. <https://doi.org/10.1002/bse.2224>
- Yakut, E., Harbaloğlu, M., & Pekkan, N.U. (2015). Data envelopment analysis and examination of total factor efficiency and financial performance of BIST registered businesses in the tourism sector. *Journal of Business Research*, 7(2), 235-257.

## Biographical notes

**Melih Sefa Yavuz** is an Assistant Professor in the Department of Banking and Finance at Istanbul Beykent University. He is a dedicated researcher in the field of finance, with a focus on digitalization, blockchain, sustainability, and financial markets. He has authored numerous national and international publications that contribute to the body of knowledge in these areas. In addition to his research, he is actively involved in the Quality and Strategy Development Department at Istanbul Beykent University, where he applies his expertise to enhance academic and operational excellence.

**Hasan Sadık Tatlı** conducts research in the fields of management and strategy. He has many publications nationally and internationally. He currently teaches management and strategy as an Assistant Professor in the Department of Business Administration at Istanbul Beykent University. His specific research areas include digitalization, responsibility, leadership, senior management teams, and dynamic capabilities. Additionally, Hasan Sadık TATLI serves as the Assistant Director at the Graduate School of Istanbul Beykent University, where he contributes to the development and administration of postgraduate programs.

**Gözde Bozkurt** conducts research in the field of econometrics. She has many national and international publications. She teaches research methods, econometrics, and economics courses as an Assistant Professor in the Department of Economics at Istanbul Beykent University. Her research themes include time series, health economics, environmental awareness, quantitative techniques, and mixed techniques.

**Gökten Öngel** works in the field of health management and is currently a physician at Istanbul Training and Research Hospital. He also conducts research in business management and has numerous national and international publications. His research themes include health management, health economics, business management, social responsibility, and leadership. Dr. ÖNGEL's work focuses on integrating medical expertise with business management principles to enhance healthcare outcomes and improve organizational effectiveness.

### **Authorship contribution statement**

**Melih Sefa Yavuz:** Conceptualization, Data Curation, Writing – Original Draft Preparation, Writing, Review & Editing, Supervision, Revisions. **Hasan Sadık Tatlı:** Conceptualization, Writing – Original Draft Preparation, Formal Analysis, Writing, Review & Editing, Supervision, Revisions. **Gözde Bozkurt:** Methodology, Formal Analysis, Validation, Writing, Review & Editing, Revisions. **Gökten Öngel:** Conceptualization, Formal Analysis, Writing, Review & Editing, Revisions.

### **Conflicts of interest**

The authors declare no conflict of interest.

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