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ANALYZING THE IMPACT OF ESG SCORES ON FINANCIAL PERFORMANCE USING CCEP ESTIMATION: EVIDENCE FROM BORSA ISTANBUL

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Abstract:

This study examines the impact of Environmental, Social, and Governance (ESG) practices on firm-level financial performance. Using panel data from selected firms listed on Borsa Istanbul over the period 2004Q1–2024Q2, the analysis employs the Common Correlated Effects Pooled (CCEP) estimator, which accounts for both heterogeneity and cross-sectional dependence. Empirical findings reveal that ESG scores exert no statistically significant influence on financial performance when measured by ROA, yet demonstrate a marginally positive association with Tobin's Q. Conversely, firm size is found to have a weak but statistically significant positive effect on ROA. These results imply that ESG practices may not translate into accounting-based profitability gains, while they appear to provide limited support for market-based performance, thereby underscoring the nuanced and context-dependent role of ESG in corporate financial outcomes.

Key words: *ESG practices, ROA, TOBIN-Q, CCEP*

1. Introduction

In recent years, Environmental, Social, and Governance (ESG) practices have gained considerable attention in academic and professional circles due to their strategic relevance for corporate sustainability and long-term financial performance. Before the formal adoption of ESG reporting in Türkiye, sustainability reporting aligned with the Global Reporting Initiative (GRI) framework was implemented between 2010 and 2014. Arçelik was the first BIST-listed company to publish a GRI-compliant sustainability report in 2011, followed by Tüpraş in 2014, which provided a more comprehensive version. The same year, the BIST Sustainability Index was launched to offer investors an alternative for sustainability-focused investment, selecting firms with high sustainability performance and marking the initial institutionalization of ESG concepts in the Turkish capital market.

The regulatory framework for ESG reporting was reinforced in 2020, when the Capital Markets Board of Türkiye (CMB) issued a communique adopting a "comply or

explain" principle for BIST-listed firms. Although ESG reporting remains voluntary, firms must now disclose in their annual activity reports whether they comply with predefined sustainability principles. If not, they must justify the reasons and explain any environmental or social risks associated with non-compliance. Since 2022, the BIST Sustainability 25 Index has been calculated, including only the firms with the highest sustainability performance, predominantly large-scale corporations.

Innovation is considered a key driver of competitive advantage and corporate credibility. In this context, ESG practices, which aim to ensure sustainable corporate development, should not be overlooked (Sun & Xiong, 2025). However, empirical evidence suggests that while ESG practices positively affect the performance of large-scale firms, small firms often refrain from adopting them due to associated implementation costs (Chen et al., 2023). In Türkiye, firms that prioritize ESG practices are not only favored by investors but also tend to achieve superior market returns (Şimşek & Çankaya, 2025). ESG strategies increasingly guide institutional investors toward long-term investments in sustainable projects (Karacayır & Afşar, 2024). Conversely, neglecting ESG may result in heightened financial and investment risks and foster unethical corporate behavior. As argued by Xiaotian Xu (2025), managers need to shift their perspectives regarding the potential drawbacks of ESG and place greater emphasis on its integration into core business strategies.

Although ESG reporting in Türkiye is still based on voluntary principles, global market dynamics make ESG practices a central concern for investors and corporate management. Failure to adopt and report ESG practices may lead to reputational and financial losses. This study investigates the ESG performance of cyclical and non-cyclical consumer sector firms listed on Borsa Istanbul. Unlike cyclical sectors, which are heavily influenced by macroeconomic volatility, non-cyclical sectors primarily contribute to economic resilience by supplying essential goods. Accordingly, ESG priorities differ across sectors—environmental sustainability and energy transition are crucial for cyclical firms, while food security and social responsibility dominate non-cyclical ones.

This study aims to provide relevant insights for investors, regulators, and corporate decision-makers by examining these sectoral differences. The research contributes to the literature by exploring the relationship between ESG performance and firm-level financial performance in Türkiye, shedding light on how ESG can drive competitive advantage and overall performance improvement. Ultimately, the study seeks to enhance the understanding of the financial implications of ESG adoption and encourage broader implementation across sectors.

The remainder of this study is structured as follows: Section 2 presents the theoretical and conceptual framework related to the ESG concept. Section 3 reviews national and international literature examining the relationship between ESG and financial performance. Section 4 introduces the dataset used in the analysis and outlines the model specification and variables employed. Section 5 presents and interprets the empirical findings. Finally, Section 6 discusses the overall results, provides policy implications for decision-makers and corporate managers, and offers suggestions for future research.

2. Conceptual Framework

The consumer cyclical sector is among the most sensitive segments of the economy to macroeconomic fluctuations. The sales revenues of firms in this sector vary considerably depending on overall economic conditions. These firms generally produce and market luxury and durable goods, which are typically consumed during periods of economic expansion and avoided during recessions. The sector can be broadly divided into durable and non-durable goods. Durable goods refer to physical items such as vehicles, equipment, and infrastructure-related products and include industries such as automotive, tire manufacturing, real estate, furniture, airlines, and retail. On the other hand, non-durable segments encompass services and rapidly consumed offerings, such as entertainment, hotels, restaurants, luxury fashion, beauty salons, and advertising agencies (Gejalakshmi & Azhagaiah, 2017; Fisher & Renaud, 2010). The consumer cyclical sector is also commonly referred to as the discretionary sector, as it comprises businesses offering non-essential goods and services. Discretionary spending reflects consumers' allocation of their residual income—after fulfilling basic needs like food, housing, and clothing—toward consumption rather than saving or investing.

In contrast, the consumer non-cyclical sector includes products and services that fulfill essential needs and are thus consistently demanded regardless of macroeconomic conditions. These include crucial food and beverage retail, personal care products, tobacco, household cleaning supplies, healthcare, and public utilities. Also known as the basic consumer goods sector, it comprises goods and services that consumers typically do not eliminate from their budgets. In this context, the demand for such products tends to remain relatively stable irrespective of price changes or economic cycles (Monsen & Heggen, 2020). Accordingly, the sector is considered non-cyclical due to its stable and inelastic demand.

The concept of Environmental, Social, and Governance (ESG) first appeared in the 2004 United Nations report titled "Who Cares Wins (WCW)." This report emphasized that businesses prioritizing environmental protection, social responsibility, and sound corporate governance structures would gain long-term strategic advantages and attract greater investor interest (World Bank, 2004). Over the past two decades, ESG has been used interchangeably with the broader concept of sustainability and remains relevant for firms and policymakers across the globe. The roots of ESG lie in the broader framework of corporate social responsibility (CSR), and ESG scores serve as a measurable indicator of whether firms act according to socially responsible principles in their business operations. Therefore, ESG performance has become a critical criterion for evaluating a firm's commitment to environmental sustainability and social accountability (Chen et al., 2023).

On the other hand, financial performance refers to assessing a firm's operational and economic success over a defined period, based on a range of financial and non-financial metrics. In the academic literature, commonly used accounting-based indicators include Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS). Market-based measures such as Tobin's Q, Price-to-Earnings (P/E) ratio, Price-to-Book (P/B) ratio, EBIT-to-Total Assets, EBIT-to-Sales, and total assets are frequently employed

to assess market performance. Liquidity and leverage (debt) ratios are widely used to measure a firm's financial risk exposure.

3. Literature review

Taing and Worthington (2002) examine the comovements among stock sectors in European markets during the post-Euro period between 1999 and 2002. The study focuses on six selected European Union member states (EU): Belgium, Finland, France, Germany, Ireland, and Italy. The scope of the study consists of five sectors classified according to the Global Industry Classification Standard (GICS): consumer discretionary, consumer staples, financials, industrials, and materials.

The authors employed multivariate cointegration procedures, Granger causality tests, error correction models, and generalized variance decomposition analyses based on vector autoregressive (VAR) models to investigate these markets' long-run and short-run relationships. The findings reveal that while there are only a few stable long-run relationships among sectors across different markets, numerous significant short-run causal links exist. The variance decomposition analysis indicates that the consumer discretionary, financial, and materials sectors are more integrated within the EU than the consumer staples and industrials sectors.

Pandini et al. (2018) investigated the impact of macroeconomic variables on the financial indicators of companies operating in the consumer cyclical sector (involving the production and sales of durable goods) and the consumer non-cyclical sector (involving the production and sales of basic consumer goods) listed on the Brazilian stock exchange BM&FBovespa. The study employed nine variables as indicators of economic and financial performance: current liquidity, general liquidity, acid-test ratio, debt level (leverage), composition of debt, EBIT (earnings before interest and taxes) margin, net margin, return on assets, net worth profitability, and changes in net operating income (operating profitability). The analysis was conducted on 64 consumer cyclical and 39 consumer non-cyclical companies using quantitative and descriptive data collected through surveys. Canonical correlation coefficients were calculated using SPSS statistical software. According to the findings obtained through canonical correlation analysis, the economic and financial indicators of companies in the cyclical sector were more strongly associated with macroeconomic variables than those of non-cyclical companies. This suggests that firms in the cyclical sector are more susceptible to fluctuations in the Brazilian economy.

Chiek et al. (2021) examined the existence of a cyclical relationship between financial performance and ESG scores for a total of 140 publicly listed companies on the Malaysian, Singaporean, and Thai stock exchanges during the period 2011–2016. The study employed return on assets (ROA), return on equity (ROE), Tobin's Q, and earnings per share (EPS) as measures of corporate financial performance, along with ESG scores. The empirical findings indicate a positive cyclical relationship between ESG scores and EPS for Malaysian companies. A cyclical relationship between ESG scores and EPS was also observed for Singaporean companies, but the relationship was negative in both directions. No significant cyclical relationship was found between ESG scores and financial performance indicators for Thai companies.

Monsen and Heggen (2020) investigated the short-term and long-term impact of Environmental, Social, and Governance (ESG) performance on the financial performance of companies in the consumer goods sector. The study covers the period from 2005 to 2018 and includes a sample of 374 companies across 42 countries. Return on Assets (ROA) was used as the dependent variable to represent short-term financial performance, while Tobin's Q was used to describe long-term financial performance. The research findings revealed that ESG performance positively affects financial performance in the short and long term. Moreover, the study found that both the social and environmental dimensions of ESG performance have statistically significant and positive effects on financial performance.

Aritonang and Rahardja (2022) examined the impact of corporate social responsibility (CSR) activity scores on the financial performance of enterprises in the Consumer Non-Cyclical (consumer staples) sector. Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin were used as financial performance indicators, while sales growth, firm size, and leverage were included as control variables. The study covered 39 enterprises selected from 123 firms operating in the consumer non-cyclical sector listed on the Indonesian Stock Exchange between 2015 and 2019. The analysis employed F-tests for simultaneous effects, t-tests for partial effects, and multiple linear regression. According to the findings, the governance component of ESG performance was found to have a significant and positive impact on asset profitability, equity profitability, and net profit margin. It was also concluded that the control variables—CSR score, sales growth, firm size, and leverage—had partially positive and statistically significant effects on ROA, ROE, and Net Profit Margin.

Naeem and Çankaya (2022) investigated the impact of ESG disclosures of energy and power generation companies on their financial performance, measured in terms of business profitability and market value. The study covers the period from 2008 to 2019 and includes data from 192 companies. Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q were dependent variables; ESG disclosure was the independent variable, while firm size and leverage were used as control variables. According to the research findings, ESG disclosure had a statistically significant and positive effect on ROE, but a significant and negative effect on ROA.

It is concluded that firm size does not significantly impact pre-tax ROA, whereas the leverage ratio significantly adversely affects pre-tax ROA. This suggests that firms with high debt levels tend to experience reduced profitability. ESG also significantly and negatively impacts Tobin's Q, indicating that companies with higher ESG scores do not necessarily achieve higher market valuations. Moreover, the leverage ratio was also found to have a significant and negative effect on Tobin's Q, suggesting that highly leveraged firms are not favorably valued by the market.

Iazzolino et al. (2023) examined the relationship between ESG scores and companies' performance/risk profiles, using data from 1,979 publicly listed European firms in 2021. The authors applied Data Envelopment Analysis (DEA), a non-parametric efficiency measurement technique. The analysis used total assets and equity as input variables, while EBITDA (earnings before interest, taxes, depreciation, and amortization), total revenues, and ESG scores were treated as output variables. The study's findings

revealed that firms operating in different sectors exhibit varying sensitivity to ESG indicators and their sub-components (E, S, and G), depending on the structure and composition of their inputs.

Sandu (2024) investigated the impact of ESG components on stock return volatility using data from European companies across various sectors, including basic materials, consumer cyclicals, consumer non-cyclicals, energy, finance, healthcare, industrials, real estate, technology, and utilities. The study sample includes ESG ratings and financial data from 1,095 European companies from 2019 to 2022. Independent variables used in the study include the ESG dispute score, ESG score, ESG composite score, environmental pillar score, social pillar score, and governance pillar score. Other independent variables comprise dividend yield, return on assets (ROA), leverage, firm size, and the market-to-book equity ratio. The dependent variable is defined as stock return volatility. The E, S, and G pillars were analyzed separately to assess the impact of ESG components on volatility. The research findings indicate that ESG components influence stock return volatility across different sectors.

Fatmasari and Nurcahyono (2024) analyzed companies in the non-cyclical consumer sector listed on the Indonesia Stock Exchange (IDX). The study sample consisted of 14 companies, with 42 observations obtained between 2021 and 2023. The dependent variable was company value, while the independent variables included CSR disclosure, intellectual capital, capital structure, firm size, and profitability. The study used secondary data from documentation and conducted a multiple linear regression analysis. The results indicated that CSR disclosure, intellectual capital, capital structure, and company size did not significantly affect firm value. In contrast, profitability had a positive and significant impact on firm value.

Wijayanty et al. (2024) used data from 52 companies in the non-cyclical consumer sector listed on the Indonesia Stock Exchange (IDX) between 2018 and 2022. The study investigated the effect of financial risk—specifically operational, market, liquidity, credit, and solvency—on financial performance, measured by return on equity (ROE), using panel data analysis. Firm size and leverage were included as control variables. The empirical findings revealed that market risk and credit risk have an adverse effect on ROE. In contrast, liquidity risk, solvency risk, and operational risk were found to have no significant impact on ROE.

Fransisca et al. (2024) analyzed the relationship between the carbon emission indicator—classified under the environmental (E) pillar of ESG—and various influencing factors. These factors were grouped under several independent variables, including financial performance, ownership structure, board committees, and board of directors' characteristics. In the study, carbon emissions disclosure was treated as the dependent variable, as it was assumed to be influenced by these factors. The main objective of the research was to improve the understanding of both internal and external determinants of carbon emissions reporting. The study covered 225 companies listed on the Indonesian Stock Exchange and operating in sectors such as energy, industry, basic consumer goods, basic materials, and transportation. A mixed-methods approach combining qualitative and quantitative techniques was employed, with logistic regression analysis used as the quantitative method. Independent variables included capital intensity, return on assets

(ROA), leverage, and enterprise value (Tobin's Q). Additional independent variables comprised ownership-related indicators (e.g., international investor holdings, state ownership, and strategic partners with significant managerial influence), the existence of environmental and independent audit committees, and board characteristics such as the number of independent members, frequency of board meetings, and gender diversity. Furthermore, a dummy variable was introduced to indicate whether the CEO also held the position of board chair.

The research findings show that the disclosure of carbon emissions is not affected by capital intensity and ROA, is negatively affected by leverage, and is significantly and positively affected by Tobin's Q. It was also found that among the independent variables, firm ownership had a significant impact on carbon emissions disclosure. State-owned enterprises were observed to have a stronger tendency to disclose carbon emissions than private sector firms. Furthermore, an environmental committee within companies was found to significantly affect carbon disclosure, whereas the independent audit committee had no significant impact. Among the board-related variables, only gender diversity was found to significantly influence carbon emissions disclosure, while other variables, including the dummy variable (indicating dual CEO-chair roles), showed no significant effect.

Aryati and Susilawati (2025) investigated the impact of ESG disclosure scores on the financial performance of companies. The research was conducted using panel data analysis based on data from 84 companies listed on the IDX-IC (Indonesia Stock Exchange Industrial Classification) between 2019 and 2021. Return on Assets (ROA) was used as the dependent variable. In contrast, the independent variables were ESG disclosure score, firm size, and Tobin's Q. The findings indicated that the environmental component of ESG had no significant effect on financial performance. In contrast, the social and governance components positively influenced it. However, it was also found that the overall ESG score had a negative impact on financial performance, implying that firms prioritizing long-term sustainability and social responsibility goals may experience reduced short-term profitability.

Bamel et al. (2025) explored the relationship between ESG and various dimensions of business performance – including operational, accounting, financial, and market performance. The study employed panel regression analysis using data from 237 firms listed on the Bombay Stock Exchange, including 139 heavy industry and 98 light industry enterprises. The dependent variables used to measure business performance included the natural logarithm of cost of goods sold, Return on Assets (ROA), Return on Equity (ROE), and the natural logarithm of market value per share. The independent variables were ESG and its components, while firm size and firm age were used as control variables. Additionally, industry profile and the presence of independent board members were included as mediating variables. The results revealed a positive and significant relationship between overall ESG scores and business performance. Among the ESG dimensions, the governance score was found to have a significant and positive impact on all four business performance indicators. In contrast, the environmental and social scores were significantly and positively associated only with operational and market performance.

Feryanto and Rahmawati (2023) examine firms listed in the non-cyclical consumer sector on the Indonesia Stock Exchange over 2017–2020 to assess how profitability, liquidity, firm size, and dividend policy affect firm value. Their empirical evidence shows that profitability, liquidity, and firm size are positively associated with firm value, whereas dividend policy—proxied by the dividend payout ratio (DPR)—has a negative effect. The authors conclude that investors should consider profitability, liquidity, and firm size when evaluating non-cyclical consumer companies, and that higher firm value is likely to increase these firms' attractiveness as investment targets.

Westphalen (2023) examines, within the remit of the Corporate Sustainability Reporting Directive (CSRD), the relationship between ESG reporting and financial performance in Europe's consumer staples sector. Publicly listed consumer staples firms in Europe exhibited a rising propensity to disclose sustainability-related information between 2017 and 2021. Nevertheless, when benchmarked against the European Sustainability Reporting Standards (ESRS), sector disclosures in 2021 covered only 6.7% of the required data points. The study further shows that greater adherence to disclosure requirements is associated with a higher standard deviation of market value, yet has no statistically significant effect on growth. These findings suggest that both investors and reporting firms may be relying on a limited set of ESG indicators to assess corporate value and material risks. Accordingly, the study offers a practical implication: prioritize the quality rather than the quantity of sustainability reporting and focus on areas where superior performance can be demonstrated.

Siwiec and Karkowska (2024) investigate the relationship between ESG reporting and return on assets (ROA) for 48 publicly listed firms in Central and Eastern Europe—Poland, Czechia, Romania, Slovenia, and Hungary—with the sample composed predominantly of Polish firms over 2017–2021. Employing panel regression and cross-sectional analyses with a correlation focus, they document a positive association between the disclosure of ESG activities and firms' financial performance as proxied by ROA. Moreover, the correlation is observed to be stronger for companies operating in the financial sector than for those in other industries.

Bhuiyan (2025) employs a panel-data Generalized Method of Moments (GMM) estimator to analyze the relationship between ESG scores and financial performance for U.S. firms over 2017–2023. The study documents a statistically significant effect of ESG on financial performance, with the magnitude and direction varying across industries and across ESG rating clusters. In particular, ESG is found to enhance financial flexibility in most sectors, whereas short-run effects on ROA and ROE are not consistently observed. Sectoral evidence further indicates that energy, utilities, and consumer staples derive discernible benefits from ESG implementation.

A review of the existing literature shows that studies on the ESG–financial performance nexus have provided valuable insights, yet they also suffer from certain limitations. First, many of these studies have primarily focused on accounting-based indicators (such as ROA and ROE), while market-based measures (such as Tobin's Q) have been relatively neglected. Moreover, research conducted in different institutional contexts (e.g., Europe, Brazil, Southeast Asia) often produces mixed or even contradictory results, which complicates the generalizability of findings. In the case of Türkiye, some

studies have examined the relationship between ESG and financial performance; however, these works have generally employed a limited set of variables and relatively simple econometric methods. Against this backdrop, the present study contributes to the literature in three ways: (i) by focusing on firms listed on Borsa Istanbul, (ii) by employing both accounting-based (ROA) and market-based (Tobin's Q) performance indicators, and (iii) by applying the CCEP estimator, which accounts for cross-sectional dependence and slope heterogeneity. In doing so, the study aims to fill a gap in the literature and provide a more nuanced and context-specific understanding of the ESG–financial performance relationship in an emerging market setting.

4. Data and Model Specification

4.1. Data

The empirical analysis in this study is based on an unbalanced panel dataset consisting of 15 firms over 5 years (2017–2021). The firms were selected from the cyclical and non-cyclical sectors listed on Borsa Istanbul (BIST), based on data availability for the chosen variables. The companies included in the cyclical sector are: Aksa Akrilik, Arçelik, BİM, Doğuş Otomotiv, Ford Otomotiv, Kordsa, Mavi Giyim, Şok Marketler, and Tofaş Türk. The firms representing the non-cyclical sector are: Anadolu Efes, Coca-Cola, Migros, Selçuk Ecza, Türkiye Şişe Cam, and Ülker Bisküvi. The selected period was determined according to the availability of consistent panel data. All data used in the empirical analysis were obtained from Thomson Reuters Datastream. The empirical framework incorporates environmental, social, and corporate governance indicators (esg); financial performance, measured by Return on Assets (*roa*) and Tobin's Q (*tobin*); financial risk (*fr*), measured by the leverage ratio; and firm size (s*ize*). It is worth noting that alternative financial performance indicators such as ROE were not included due to data limitations and the desire to maintain a consistent and balanced dataset across all sample firms.Detailed definitions of the variables and data sources are provided in Table 1.

Table 1. Variable definitions and summary statistics

Variable	Definition	Obs.	Mean	Std. Dev.	Min.	Max.
roa	Return on Assets Ratio (%)	75	0.072	0.069	-0.181	0.277
tobin	Tobin Q (%)	75	1.558	0.662	0.885	3.954
esg	Environmental, social, and corporate governance (%)	63	62.184	19.207	3.999	92.790
risk	Total Debt / Total Equity (%)	75	7.882	62.061	-202.380	494.092
size	Natural logarithm of the total assets	75	17.094	0.882	15.004	18.676

Source: Author's calculation

Table 1 summarizes the definitions and basic descriptive statistics of the variables used in the empirical analysis. Return on Assets (ROA) and Tobin's Q are used as proxies for financial performance, representing accounting-based and market-based measures, respectively. The average ROA is 7.2%, while the mean Tobin's Q value is 1.558, indicating that most firms are valued above the replacement cost of their assets. The

average ESG score is approximately 62.2%, with a standard deviation of 19.2%, suggesting notable variation in environmental, social, and governance practices among the sampled firms. Financial risk, measured by the leverage ratio, displays substantial dispersion with extreme minimum and maximum values, implying significant differences in firms' debt structures. Finally, firm size, represented by the natural logarithm of total assets, has a mean value of 17.094, with relatively low variation across observations.

Table 2. Correlations for the panel data set

Variable	*roa*	*tobin*	*esg*	*risk*	*size*
roa	1				
tobin	0.542	1			
esg	-0.078	-0.236	1		
risk	-0.349	-0.002	0.061	1	
size	-0.044	-0.233	0.314	-0.138	1

Source: Author's calculation

Table 2 presents the Pearson correlation coefficients among the key variables used in the study. A moderate and positive correlation is observed between ROA and Tobin's Q (r = 0.542), indicating consistency between accounting-based and market-based measures of financial performance. ESG is weakly and negatively correlated with both ROA and Tobin's Q, suggesting that ESG practices may not have a strong short-term effect on firm profitability.

A notable negative correlation is found between financial risk and ROA (r = -0.349), implying that higher leverage levels are associated with lower profitability. A positive correlation between ESG and firm size (r = 0.314) indicates that larger firms are more likely to engage in ESG practices. The correlation coefficients are relatively low, suggesting no serious multicollinearity concerns among the independent variables.

4.2. Model Specification

This study uses panel data to investigate the impact of environmental, social, and corporate governance (ESG) factors on firms' financial performance. Panel data estimation techniques were employed in the empirical analysis. The econometric model used in the empirical analysis is presented in Equation (1).

$$fp_{it} = \beta_0 + \beta_1 esg_{it} + \beta_2 risk_{it} + \beta_2 size_{it} + \varepsilon_{it} \quad (1)$$

where *fp* denotes financial performance, measured by Return on Assets (*roa*) and Tobin's Q (*tobin*); *esg* represents environmental, social, and corporate governance indicators; *fr* stands for financial risk, measured by the leverage ratio (i.e., total debt divided by total equity); *size* denotes firm size, proxied by total assets; and ε_{it} is the error term. The subscripts *i* and *t* refer to firm and time, respectively. In Equation (1), β_0 represents the constant term, while β_1, β_2, and β_3 indicate the elasticities of financial performance for ESG, financial risk, and firm size, respectively.

Two indicators were used to measure financial performance, serving as the econometric models' dependent variable. The first of these indicators is Return on Assets

(ROA), calculated by dividing net income by total assets. This ratio, an accounting-based performance measure, indicates the company's ability to generate net profit by efficiently using its assets. An increase in ROA signals improved profitability, which can attract more investors by enhancing dividend potential. As ROA reflects the efficiency of capital utilization, it positively influences the firm's financial activities and provides insight into its risk profile and financial condition (Aritonang & Rahardja, 2022). Moreover, ROA is considered a valuable metric in assessing how effectively a company manages its assets to maximize returns for itself and its stakeholders (Aryati & Susilawati, 2025).

The second indicator used to measure financial performance is Tobin's Q. Tobin's Q is calculated by dividing the firm's total market value (market value of equity plus debt) by its total assets. This ratio is used to assess the firm's market value relative to the replacement cost of its assets and is widely recognized as a key indicator of market performance (Brainard and Tobin, 1968). A Tobin's Q ratio greater than 1 suggests that the company utilizes its resources efficiently. This indicates increased investor interest and demand for the firm. Moreover, as a metric that helps determine whether a company is overvalued or undervalued, Tobin's Q can guide investors in making more informed investment decisions (Aryati & Susilawati, 2025).

There are two fundamental approaches to the relationship between ESG and financial performance (Nguyen et al., 2022): the shareholder value maximization theory and the stakeholder value maximization theory. According to the shareholder value maximization theory, shareholder-oriented ESG practices negatively affect corporate financial performance. This perspective emphasizes the agency conflict that arises between shareholders and managers. It is argued that managers, in pursuit of enhancing their own performance and personal interests, may engage in excessive ESG investments at the expense of shareholder value (Barnea & Rubin, 2010). On the other hand, the stakeholder-oriented theory highlights the benefits of ESG implementation, suggesting that such practices can enhance corporate financial performance. It posits that improved financial performance contributes to increased firm value.

Although some studies in the literature report varying results, many suggest that in the long run, companies with sustainability policies benefit from ESG disclosures through increased efficiency in resource utilization—leading to cost reductions—and enhanced market image—resulting in higher sales. These factors collectively contribute to a positive impact on Return on Assets (ROA). ESG disclosures also reduce the cost of capital and increase ROA by improving the quality of corporate governance (Bamel et al., 2025). However, because ESG implementation often requires a series of medium- to high-level expenditures, its effects may not be immediately reflected in short-term ROA performance. Nevertheless, it should not be overlooked that treating ESG disclosures merely as a reputational tool without integrating them into core operational strategies will not yield effective performance outcomes for businesses.

Companies with high ESG disclosure scores—demonstrating strong environmental awareness, social responsibility, and sound governance practices—are more likely to attract investor attention and increase their Tobin's Q value. Firm size is also expected to have a positive effect on financial performance. In large-scale enterprises, fixed costs tend

to decrease due to increased production capacity, allowing firms to benefit from economies of scale and achieve higher returns.

Financial leverage, which represents a company's level of debt financing, reflects its financial risk and ability to meet short-term funding needs. As firms are generally obligated to repay their debts regularly, leverage can serve as a proper monitoring and disciplinary tool for managers. Although financial leverage does not directly impact ROA, it may exert an indirect influence through its effects on net income and total assets. This influence can be positive or negative, depending on how efficiently the borrowed funds are utilized. If the increase in net income resulting from the use of debt exceeds the increase in total assets, the leverage effect will be positive.

5. Empirical Findings

Multicollinearity occurs when there is a high degree of correlation among the independent variables in a regression model. This issue inflates the standard errors of the estimated coefficients, resulting in wider confidence intervals and lower t-values, which ultimately reduces the reliability of statistical inferences. To determine whether multicollinearity is present in the estimated model, a Variance Inflation Factor (VIF) test was conducted. The results in Table 3 indicate that all VIF values are below 5, suggesting that multicollinearity is not a concern in this analysis.

Table 3. Multicollinearity test results

Variable	*VIF*	*1/VIF*
esg	1.13	0.885545
risk	1.01	0.993403
size	1.12	0.890076
Mean VIF	1.09	

Source: Author's calculation

Parameter estimates may vary across countries. To evaluate this possibility, homogeneity tests must be conducted. These tests help determine the appropriate estimation technique based on the structure of the panel. The homogeneity test results are presented in Table 4. According to the results of the delta test applied in this study, the differences in parameters across companies were found to be statistically insignificant. This indicates that the units in the panel are homogeneous in terms of model parameters and share similar structural relationships. In other words, the hypothesis that all units have identical regression coefficients could not be rejected. Therefore, proceeding with panel data models that assume constant parameters across units is methodologically appropriate.

Table 4. Homogeneity test results

Variable	*Delta*	*p-value*	*Decision*
roa	-0.560	0.575	Homogenous
tobin	-0.936	0.349	Homogenous

Source: Author's calculation

The panel companies may have cross-sectional dependence due to external or internal shocks. If such dependence exists, it is essential to employ econometric models that account for it. The null hypothesis in this context assumes cross-sectional independence, while the alternative hypothesis suggests cross-sectional dependence. The rejection of the null hypothesis indicates the presence of cross-sectional dependence across the units in the panel. Table 5 presents the results of the Pesaran CD test for the analyzed variables. The null hypothesis of cross-sectional independence was rejected for all variables, confirming the presence of cross-sectional dependence.

In panel data analysis, the existence of cross-sectional dependence can lead to inconsistent and biased estimation results. Therefore, the Pesaran (2004) CD test was applied, as the cross-sectional dimension (N) was larger than the time dimension (T), i.e., N > T. The hypotheses for the cross-sectional dependence test are defined as follows: H_0: There is no cross-sectional dependence; H_1: There is cross-sectional dependence. The outcome of this test should guide the choice of panel data models. When cross-sectional dependence is present, conventional panel models such as fixed effects and random effects may yield misleading results.

In panels with cross-sectional dependence, first-generation unit root tests tend to over-reject the null hypothesis. As a result, the cross-sectionally augmented IPS (CIPS) test is often preferred. This second-generation panel unit root test accounts for both heterogeneity and cross-sectional dependence. However, due to the limited time of the dataset, CIPS test results could not be obtained.

Table 5. Cross-sectional dependence test results

Variable	roa	tobin	esg	size	risk
Breusch-Pagan	140.224	174.711	177.962	223.265	167.381
LM	(0.012)**	(0.000)***	(0.000)***	(0.000)	(0.000)***
Pesaran Scaled	2.431	4.810	5.035	8.161	4.305
	(0.015)**	(0.000)***	(0.000)***	(0.000)	(0.000)***
Pesaran CD	2.493	4.245	3.717	9.053	1.972
	(0.013)**	(0.000)***	(0.000)***	(0.000)	(0.049)**

Source: Author's calculation
Note: The values in parentheses indicate probability values (p-values). ** and *** denote statistical significance at the 5% and 1%, respectively.

Pesaran (2006) developed the Common Correlated Effects (CCE) estimators to account for cross-sectional dependence within panel data. Two different estimators are employed depending on the homogeneity of the slope coefficients. The Common Correlated Effects Pooled (CCEP) estimator is used when slope coefficients are assumed to be homogeneous. In contrast, the Common Correlated Effects Mean Group (CCEMG) estimator is applied for heterogeneous panels. Cross-sectional dependence tests indicate that a shock affecting one firm also influences others in the panel. Moreover, the homogeneity test results confirm that the slope coefficients are homogeneous. Therefore, the CCEP estimator was chosen for the econometric estimations in this study. The estimation results obtained from the CCEP model, which accounts for cross-sectional dependence and assumes slope homogeneity, are presented in Table 6.

Table 6. CCEP model results

	ROA			TOBIN-Q		
Variable	Coef.	Std. Err.	Prob.	Coef.	Std. Err.	Prob.
esg	0.0094	0.0100	0.352	0.0924	0.0519	0.075*
risk	-0.0004	0.0005	0.458	-0.0022	0.0020	0.280
size	0.0354	0.0199	0.075*	0.1868	0.1194	0.118

Source: Author's calculation

Note: The values in parentheses indicate probability values (p-values). ** and *** denote statistical significance at the 5% and 1%, respectively.

According to the model results, a one-unit increase in the ESG score is associated with an increase of approximately 0.0094 units in firm profitability (ROA). Although this coefficient is not statistically significant at conventional levels, the positive sign suggests that environmental, social, and governance performance improvements may contribute positively to financial profitability. Likewise, a one-unit increase in the leverage ratio is associated with a decrease of approximately 0.0004 units in ROA. This result, though also statistically insignificant, points toward a potential adverse effect of excessive debt on firm profitability, possibly due to increased financial risk and interest burden. Firm size, measured as the natural logarithm of total assets, shows a positive and weakly significant effect on ROA. Specifically, a 1% increase in asset size corresponds to an approximate increase of 0.000354 units in ROA, implying that larger firms might benefit from economies of scale and operational efficiency, enhancing profitability.

Turning to Tobin's Q, the coefficient for ESG is 0.0924 and is statistically significant at the 10% level. This suggests that stronger ESG performance is positively associated with firm value as perceived by investors. Firms with better ESG practices may attract investor confidence and enhance their market valuation. Although the coefficient for financial risk (leverage) is negative (-0.0022), it is not statistically significant. Nevertheless, the result implies that higher indebtedness may adversely affect firm value. The firm size variable again shows a positive but statistically insignificant relationship with Tobin's Q. A 1% increase in firm size corresponds to a rise of approximately 0.001868 units in Tobin's Q. This indicates that larger firms may enjoy higher market valuations, possibly due to greater stability, diversification, or investor appeal.

6. Discussions

This study examined the impact of ESG performance on the financial performance of firms operating in the cyclical and non-cyclical consumer sectors listed on Borsa Istanbul. The empirical findings reveal that ESG scores exert an overall positive influence on firms' financial performance; however, the magnitude and statistical significance of this effect vary depending on the performance indicator employed.

The effect of ESG on accounting-based financial performance, measured by return on assets, is positive but statistically insignificant. This finding may be attributed to the fact that ESG practices do not immediately translate into improvements in short-term accounting profitability. ESG investments often entail upfront costs—such as expenditures on environmental transformation, employee training, or governance initiatives—which can suppress short-term profit margins. In contrast, the positive and statistically significant impact of ESG on Tobin's Q suggests that market-based indicators better capture

investors' expectations and long-term value creation. Investors tend to interpret strong ESG performance as a signal of reduced future risks and enhanced sustainability potential, which is then reflected in market valuations. In this sense, ESG initiatives, while costly in the short run, can be regarded as strategic investments that contribute to long-term firm value.

Firm size exhibits a weak positive effect on ROA, which can be explained by advantages stemming from economies of scale. Larger firms can spread fixed costs over higher production volumes, access financing more easily, and thereby enhance profitability. However, the insignificant effect of firm size on Tobin's Q implies that market valuations are not determined solely by size. Investors focus more on innovation capacity, competitive strength, and sustainability orientation than on firm scale alone.

The leverage ratio, representing financial risk, shows no significant effect on either ROA or Tobin's Q. This outcome may depend on how risk is measured and perceived in the market. In emerging economies, investors' risk-pricing behavior may differ substantially from that in developed markets. Furthermore, effective risk-management strategies could mitigate the direct impact of financial risk on firm performance.

These findings suggest that the influence of ESG and firm-specific factors on financial performance depends on context, measurement, and time horizon, while the effect of risk may not always conform to theoretical expectations. Thus, the ESG–financial performance nexus appears to be multidimensional, dynamic, and context-sensitive.

From a theoretical standpoint, the results are consistent with stakeholder theory, which argues that firms generate long-term value when they address the interests of all stakeholders, not just shareholders. ESG initiatives strengthen stakeholder trust and thereby foster sustainable corporate success. Similarly, the findings can be interpreted through the lens of the resource-based view, as ESG performance constitutes an intangible asset that enhances reputation, employee loyalty, and customer confidence—ultimately supporting sustained competitive advantage.

Methodologically, the use of the Common Correlated Effects Pooled estimator improves the robustness of the analysis by accounting for cross-sectional dependence and slope homogeneity—two issues often neglected in panel data studies. This approach allows a more reliable estimation of the ESG–financial performance relationship.

The findings also have significant practical and policy implications. Since ESG practices do not weaken financial performance and, in the long term, can enhance firm value, policymakers should strengthen regulatory frameworks that promote sustainability reporting and ESG integration. Expanding the use of green finance instruments, sustainability indices, and voluntary reporting standards could further encourage firms to improve their ESG performance. For investors, ESG serves as an increasingly important criterion in the decision-making process and a valuable tool for screening firms in financial markets.

These findings suggest that ESG practices in Türkiye should not remain solely at the discretion of individual firms but need to be reinforced through the regulatory framework. The Capital Markets Board of Türkiye's (CMB) sustainability reporting requirements can be seen as an important mechanism to encourage firms to adopt ESG standards. Likewise, the Borsa Istanbul Sustainability Index enhances transparency and comparability of ESG

performance among firms, providing valuable information for investors. However, expanding the index coverage and implementing stricter reporting standards would further strengthen the visibility of ESG's impact on financial performance. Thus, reinforcing the existing regulatory framework in Türkiye would contribute to aligning the ESG–financial performance nexus more closely with broader sustainable development objectives.

When compared to the existing literature, the results are mainly in line with studies such as Monsen & Heggen (2020), Bamel et al. (2025), and Şimşek & Çankaya (2025), all of which highlight the long-term positive effects of ESG. However, the weak short-term impact on ROA is consistent with findings from Naeem & Çankaya (2022), who suggest that ESG initiatives may incur short-term costs. This divergence underscores the context-dependent nature of ESG's impact and suggests that sectoral and temporal dynamics must be considered in future analyses.

Finally, several limitations of this study should be acknowledged. First, the relatively small sample size (15 firms over a five-year period) partially constrains the generalizability of the findings. This limitation implies that the dynamics of larger firms or those operating in different sectors may not be fully captured. Therefore, the results should be interpreted primarily as reflecting the tendencies observed within the examined sample, rather than as universally generalizable evidence.

In this context, the restricted sample indicates that the findings are specific to a certain group of firms and a particular time period. The purpose of this study is not to make broad generalizations, but rather to provide illustrative and informative empirical insights into the ESG–financial performance relationship. Accordingly, the results can serve as a useful foundation for future research aimed at expanding and validating these findings with broader datasets. Future studies that incorporate larger samples, longer time horizons, and a wider range of industries would be valuable in strengthening and testing the robustness of these results. Moreover, including additional firm-level variables—such as ownership structure, R&D intensity, export ratio, and governance quality—could help uncover new dimensions of the ESG–financial performance nexus.

7. Conclusion

This study aimed to examine the impact of Environmental, Social, and Governance practices on the financial performance of firms operating in the cyclical and non-cyclical consumer sectors listed on Borsa Istanbul. The core research question focused on the extent to which ESG practices influence firms' profitability (ROA) and market value (Tobin-Q). In this regard, the study sought to provide empirical evidence on whether ESG implementation offers financial advantages for firms.

The empirical findings reveal that ESG scores have a positive but statistically weak effect on Return on Assets (ROA), an accounting-based performance measure. In contrast, ESG has a statistically significant and positive impact on Tobin's Q, a market-based performance indicator. In addition, firm size exhibits a weak positive effect on ROA, while financial risk (measured by leverage) has a negative but statistically insignificant impact on both performance indicators.

These findings suggest that ESG practices contribute positively to firms' long-term value. ESG should not be viewed merely as a cost factor but as a strategic investment that

enhances investor confidence and market valuation. Therefore, firms are encouraged to integrate ESG principles into their core strategies to foster sustainable value creation over time. In conclusion, this study provides original empirical evidence on the ESG–financial performance nexus in a developing economy, Türkiye. It contributes to the academic literature and offers policy-relevant insights, emphasizing the growing strategic significance of ESG in corporate decision-making and sustainable financial management.

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