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Borsa İstanbul Review

Borsa İstanbul Review 22-S2 (2022) S119–S127

http://www.elsevier.com/journals/borsa-istanbul-review/2214-8450

Full Length Article

Impact of ESG performance on firm value and profitability

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Received 6 September 2022; revised 12 November 2022; accepted 13 November 2022
Available online 17 November 2022

Abstract

In this study, we examine impact of Environment, Social, Governance (ESG) performance on firm value and profitability. Our large dataset gives us the chance to better conceptualize this impact. Our findings suggest that overall ESG combined score is positively and significantly associated with firm value. Individual Social and Governance scores have a positive and significant relationship while Environment score does not have a significant relationship with firm value. On the other hand, ESG combined score, Environment, Social, and Governance scores have positive and significant relationships with firm profitability. These findings suggest that investing in high ESG performance promises financial return for the firm in terms of both value and profitability.

JEL classification: C33; G32; L25; M14; Q56

Keywords: Environment; Social; Governance; ESG; Firm value; Tobin's Q; ROA

1. Introduction

Increasing interest of investors and global awareness on risks associated with particularly the environment and other non-financial factors, such as social responsibility and proper governance, puts pressure on firms to increase their efforts and focus on non-financial aspects of their work. Investors, employees, suppliers, customers and the government increasingly expect the firm to be keen on all these fronts, take necessary mitigation measures and report effectively. Firms report their performance on these risks broadly through three categories namely Environment, Social and Governance (ESG). However, from the firm's perspective, taking action means investment. A key question on the issue in board meetings and relevant committees is whether the required investment and resources makes financial sense. This paper aims to shed light on the question of whether ESG performance can be associated with financial return for the firm.

Stakeholder theory (Freeman, 1984) put forward the idea that successful companies are able to align the interest of all stakeholders and therefore they are more sustainable. They focus on not only profit maximizing interests of the shareholders but also interests of other stakeholders of the firm as well. Business Roundtable, an association bringing together CEOs of leading companies in USA, announced that they subscribe to the stakeholder model and the purpose of the corporation should be to serve multiple stakeholders in addition to shareholders, including customers, employees, communities, the environment and suppliers. As an emerging strategic model for the vision of the company, ESG metrics may evaluate performance and position on a range of issues important to the company's larger group of stakeholders, much like how financial metrics evaluate a company's performance for shareholders (Kay et al., 2020).

ESG disclosures increase in popularity among publicly traded firms in recent years as they work towards inclusion of stakeholders, responding to investor demand, establishing credibility, and reacting to crises and competition in their

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Peer review under responsibility of Borsa İstanbul Anonim Şirketi.

https://doi.org/10.1016/j.bir.2022.11.006

respective industries (Olsen et al., 2021). Some firms use sustainability to gain competitive advantage, others see it as a regular procedure, in ay case the adoption of sustainability is a dynamic and nuanced process over time (Ioannou & Serafeim, 2019, p. 19). Corporations around the world are now voluntarily engaging in more ESG practices, indicating that they may be receiving some economic reward from these activities (Yoon et al., 2018). International organizations, sector institutions and governments boost their support to a sustainable global economy. United Nations Sustainable Stock Exchange Initiative (SSE) works with exchanges to advance sustainability agenda. According to SSE, 66 out of 120 member stock exchanges publish ESG reporting guidelines for firms (SSE, 2022).

Companies and investors are increasingly factoring in ESG issues in their own decision-making (Eccles & Youmans, 2015, p. 15). The impact of ESG performance on firm value and profitability has been a topic of discussion in academia and business research for several years. The focus of many studies had been traditionally on how corporate governance influence stock price performance. In line with the rising interest in climate change, circular economy and biodiversity issues, research began to cover the link between environmental performance and stock price performance. More recently, with the COVID-19 pandemic and global health crisis, the impact of changing demographics and social issues on stock returns, with a particular emphasis on health, safety, and wellbeing, as well as on human capital management issues such as employee satisfaction, diversity and inclusion gets a lot of attention.

Many researchers studied the link between ESG and financial performance of the firm. While more recently they mostly find positive results, there are also quite many papers with negative results, supporting the Shareholder theory where the primary objective of the firm is to maximize shareholder profit. This article sheds more light on this ongoing debate. Our large dataset, up-to-date ESG scores and global coverage are instrumental in conducting a robust analysis. Accurate measurement of ESG performance is challenging. We used Refinitiv ESG scores to increase data quality. Refinitiv runs one of the world's largest ESG data gathering and analysis operations. They collect and process a variety of publicly available information to offer up-to-date and thorough ESG coverage. Borsa İstanbul Sustainability Index started using Refinitiv ESG scores as well since October 2021. Sustainability data and ESG scores are accessible from Refinitiv's website except for the non-compliance notes. Sustainability assessment, normally a once-a-year exercise, became continuous with Refinitiv's assessment methodology enabling up-to-date ESG data throughout the year. This continuity provides flexibility for our analysis as well.

We start the analysis by selecting largest 5000 publicly listed firms in the world from Bloomberg database spanning 9 years from 2013 to 2021. We match and filter for Refinitiv ESG score and end up with 1720 companies. Our final panel data entails 14043 firm year observations. We find that ESG performance has a positive and highly significant relationship with firm value and profitability with a coefficient of 0.008 and 0.049 respectively. These findings provide evidence for corporate managers to justify mobilizing more resources for ESG. They also provide evidence for policy makers to develop more policy measures in support of ESG.

The structure of the paper is as follows: Section 2 discusses prior research and develops the hypotheses. Section 3 outlines data, variables and methodology. Section 4 presents the results. Section 5 provides concluding remarks and suggestions for future research.

2. Literature review

Several studies document how ESG affects firm value and profitability. According to Friede et al. (2015), researchers began looking for a link between ESG standards and corporate financial success around 1970s. After reviewing 2200 papers, they conclude that the research validates the rationale for investing in ESG and that about 90% of studies indicated a favorable relationship between ESG and firm financial performance. Another meta-analysis of 132 papers published in reputable journals reveals that 78% pointed to a positive relation between sustainability and financial performance of the firm. (Alshehhi et al., 2018).

In a more recent meta-analysis, Whelan et al. (2021) from Rockefeller Asset Management and the NYU Stern Center for Sustainable Business investigated more than 1000 papers published between 2015 and 2020 focusing on the link between ESG and financial performance. The analysis revealed that 58% of the papers found positive relationship between ESG and financial performance, 8% negative relationship, 13% no relationship, and 21% mixed results. They conclude that, while majority is positive, the results indicate ongoing disagreement on the issue.

2.1. Papers with findings of positive relationship between ESG performance and firm value - profitability

Many researchers report a positive link between ESG performance and firm value or profitability. When we investigate country-focused studies, we observe this for many countries. Velte (2017) demonstrate that ESG has a positive effect on firm value (Tobin's Q) and profitability (Return on Assets -ROA) for firms in Germany. He also finds that governance has a significant effect on financial performance. Yoon et al. (2018) examine the link between ESG ratings and market value in Korea. They show that CSR initiatives have a favorable and considerable effect on market value of the firm, but the effect may vary depending on the characteristics of the firm. To explore the association between ESG performance and energy market financial indicators, Zhao et al. (2018) review China's listed energy enterprises and find that higher ESG performance may actually have an impact on boosting their financial performance. According to Dalal and Thaker (2019), examining 65 Indian enterprises between 2015 and 2017, the ESG score has a positive effect on financial success. Fatemi et al. (2018)

investigate US companies from 2006 to 2011 and find that strength in ESG activities and reporting improves firm value. They conclude that reporting moderates valuation by reducing the impact of deficiencies and amplifying the impact of strengths.

A few multi-country studies support the positive relation between ESG scores and firm financial performance as well. Xie et al. (2019) focus on the relationship between specific ESG initiatives and financial performance of worldwide large sample of firms and find that majority of ESG initiatives have a positive association with financial performance. Bhaskaran et al. (2020) review the impact of ESG on financial performance of 4887 firms from 2014 to 2018 using firm value (Tobin's Q) and operational performance (ROE and ROA) as dependent variables. They indicate that firms with high performance on environment, governance, and social pilars tend to create more value in the market. Similarly, De Lucia et al. (2020) investigate a sample of 1038 public companies of 22 European countries from 2018 to 2019 and they find a positive association between ESG variables and the financial performance (ROE and ROA). Using 1042 companies from emerging countries from 2010 to 2019, Naeem et al. (2022) investigate the effects of ESG performance on financial performance. They document that both individual and combined ESG scores have positive and significant association with firm value (Tobin's Q) and profitability (ROA). Chairani and Siregar (2021) study listed firms in ASEAN (Indonesia, Malaysia, Philippines, Singapore, and Thailand) from 2014 to 2018. The findings reveal that ESG increases the impact of enterprise risk management (ERM) on firm value and that ERM has a positive relationship with both firm value and profitability.

Some researchers investigate FTSE listed companies. Li et al. (2018) use a cross-sectional dataset of 367 FTSE listed companies between 2004 and 2013 to investigate whether ESG reporting improves firm value. They find a strong relation between the level of ESG reporting and firm value, indicating that stakeholder trust and accountability have a positive influence on firm value. Moreover, Ahmad et al. (2021) explore the effect of ESG on financial performance of 351 FTSE350 companies for the period of 2002–2018 and find that overall ESG score significantly and positively affects financial performance of companies, but individual ESG performances have mixed results.

There are also sector-focused studies. For example, Abdi et al. (2022), consider the effect of ESG scores on firm value and profitability in the aviation industry using 38 airlines from 2009 to 2019. They report that investment in governance increase a company's market-to-book ratio and involvement in social and environmental causes increase financial efficiency.

2.2. Papers with findings of negative relationship between ESG performance and firm value - profitability

Some scholars argue that ESG investment has a negative impact on profitability or firm value. According to Barnett's (2007), it is reasonable to predict investing in CSR will have a negative impact on firm financial performance due to reallocation of funds to other stakeholders from shareholders.

We observe a number of country-based studies supporting negative relationship between ESG performance and firm value. Brammer et al. (2006) analyze impact of corporate social performance of firms in UK using market returns and find that low social score firms perform better than the market. Landi and Sciarelli (2019) focus on 54 listed Italian companies from 2007 to 2015 and report a negative relationship between their ESG scores and financial performance. Folger-Laronde et al. (2020) analyze the link between ESG ratings and financial returns of ETFs (Exchange Traded Funds) during Covid-19 in Canada. They conclude that high ESG performance in ETFs does not ensure protection during severe downturn of the market.

Nollet et al. (2016) use accounting and market metrics to investigate the connection between social and financial performance of S&P 500 companies from 2007 to 2011. They find evidence of negative relationship on linear models and positive relationship on non-linear models. Marsat and Williams (2011) report negative relationship between CSR rating and firm value using worldwide MSCI ESG ratings.

There a few multi-country studies reporting negative relationship as well. Duque-Grisales and Aguilera-Caracue (2021) examine 104 multinational firms in Latin America from 2011 to 2015. Their findings indicate negative relationship between ESG scores and financial performance of these firms. Garcia and Orsato (2020) compare emerging and developed countries through 2165 firms from 2007 to 2014. They reveal that in emerging markets the relationship between ESG scores and financial performance is negative.

2.3. Papers with findings of mixed relationship between ESG performance and firm value - profitability

A third group of researchers found mixed relationship between ESG performance and financial return of the firm. Han et al. (2016) examine listed companies on Korea Stock Exchange from 2008 to 2014 and find no relationship for social score, positive relationship for governance score, and negative relationship for environment score. Atan et al. (2019) assess how ESG scores affect profitability, firm value, and cost of capital of listed companies in Malaysia. They find no evidence of relationship with firm value or profitability. Saygili et al. (2021) study the effect of ESG performance on the financial performance of listed companies in Türkiye from 2007 to 2017. They find that reporting on environment has a negative relationship with firm financial performance, stakeholder participation in management has a positive relationship with social dimension, and governance has a positive relationship with financial performance. Giannopoulos et al. (2022) examine the impact of ESG scores on financial performance of Norwegian listed firms from 2010 to 2019. They reveal mixed results, indicating a positive relation between ESG scores and firm value (Tobin's Q) and negative relation between ESG scores and profitability (ROA). Behl et al. (2022) explore the

relationship between ESG reporting and value of Indian energy sector firms and found mixed results.

Lopez-de-Silanes et al. (2020), in their multi-country study, investigate the relationship between ESG reporting and quality and find that ESG scores have no impact on firm financial performance.

2.4. Hypotheses

In light of the literature review above, considering the increased interest from investors and public image of the firm, we expect high performance on ESG scores may have a positive impact on firm value and profitability. The following hypotheses are tested:

Hypothesis 1. ESG scores have positive and significant impact on firm value

Hypothesis 2. ESG scores have positive and significant impact on profitability

Many academic studies and observations from market practice suggest a positive relationship between ESG and firm value and profitability. However, there are also quite a number of negative and mixed results in previous research. Using the hypotheses, the paper will attempt to contribute to this debate with a large, recent and comprehensive dataset.

3. Data and Methodology

This section explains sample data, followed by a description of variables, descriptive statistics and methodology. We use two panel data models for each dependent variable and eight models in total for each independent variable.

3.1. Sample data

We select the largest 5000 publicly listed companies from Bloomberg database (market cap of USD 2.85 billion and above) from 2013 to 2021 which provides an initial universe of 45000 panel data firm-year observations. We filter for companies with ESG scores in Refinitiv database and end up with 1720 companies with 14043 firm-year observations. Table 1 provides a summary of the data.

Table 1
Sample data.

	Initial Sample Universe from Bloomberg	Companies with an ESG score in Refinitiv
Sample Period	2013–2021	2013–2021
Number of Companies	5000	1720
Number of Countries	65	39
Total Observations	45000	14043
Number of Observations by Region		
EAP - East Asia and Pacific Region	16317	6406
ECA - Europe and Central Asia Region	7569	2453
LAC - Latin America and the Caribbean Region	1080	54
MENA - Middle East and North Africa Region	1080	61
N_AMR - North America Region	16812	4808
SA - South Asia Region	1809	234
AFR - Sub-Saharan Africa Region	306	27
USA	15479	4460
China	6885	3132

Source: Bloomberg and Refinitiv.

3.1.1. Dependent variables

Many researchers prefer Tobin's Q to measure firm value (Atan et al., 2019; Dalal & Thaker, 2019; Saygili et al., 2021; Giannopoulos et al., 2022; Naeem et al., 2022). Similarly, many researchers use Return on Assets (ROA) as a proxy for profitability (Naeem et al., 2022; Saygili et al., 2021; Giannopoulos et al., 2022). We obtain both variables from Bloomberg.

Tobin's Q is the ratio of market value of a firm to its intrinsic value. In other words, the market value of the firm divided by the replacement cost of its assets. It helps to determine whether a company is overpriced or underpriced. Analysts frequently use the following formula to calculate Tobin's Q since it is challenging to determine the replacement cost of total assets:

Tobin's Q = (Equity Market Value + Liabilities Market Value)/(Equity Book Value + Liabilities Book Value).

Analysts and market professionals prefer to use Return on Assets (ROA) as a measure of profitability. It shows how successfully the firm uses its resources to generate profit. Higher ROA is desirable and indicates the efficiency of the firm in managing its balance sheet. The following formula calculates ROA:

ROA = Net Income / Total Assets

3.1.2. Independent variables

Paper uses four independent variables namely ESG combined score, Environment score, Social score, and Governance score. All ESG scores are from Refinitiv. Many researchers prefer to use Refinitiv ESG scores in their papers (Duque-Grisales & Aguilera-Caracuel, 2021; Chairani & Siregar, 2021; Giannopoulos et al., 2022; Naeem et al., 2022).

Refinitiv provides one of the most extensive ESG datasets in the market, with data going back to 2002. It assesses ESG performance of the firms across 10 themes and 3 pillars with more than 600 criteria.

Three pillars and their themes are as follows: Environment (emissions, innovation, and resource usage), Social (human rights, workforce, product responsibility and community), and Governance (shareholders, management, and CSR Strategy). Refinitiv gather most of the data from public sources such as business websites, annual reports and other company reports. They also obtain some of the data directly from the company. They audit and standardize this data and prepare ESG scores.

Table 2
Refinitiv ESG score range.

Score Range	Description
From 0 till 25	Scores in this range imply poor relative ESG performance and insufficient transparency in the public disclosure of relevant ESG data.
From 26 till 50	Scores in this range imply satisfactory relative ESG performance and moderate transparency in the public disclosure of relevant ESG data.
From 51 till 75	Scores in this range imply good relative ESG performance and above average transparency in the public disclosure of relevant ESG data.
From 76 till 100	Scores in this range imply excellent relative ESG performance and high degree transparency in the public disclosure of relevant ESG data.

Source: Refinitiv.

Table 2 provides description of Refinitiv ESG score range (Refinitiv, 2022).

Refinitiv updates its database every week. They update ESG news and controversies continuously and reported ESG data once a year (Refinitiv, 2022).

3.1.3. Control variables

We select Size and Leverage as control variables (Stock and Watson (2015); Atan et al., 2019; Giannopoulos et al., 2022; Naeem et al., 2022). Table 3 provides a summary of all variables.

3.2. Descriptive statistics

The dataset consists of 1720 firms from 2013 to 2021 with a total 14043 firm year observations. We get dependent and control variables (Tobin's Q, ROA, Size, and Leverage) from Bloomberg. We get independent variables (ESG_CS, ENV, SOC, and GOV) from Refinitiv.

Table 4 provides descriptive statistics. The mean for Tobin's Q is 2.567 and the mean for ROA is 5.313%. Tobin's Q above one suggests the stock is overvalued. We may therefore infer the majority of the firms in our dataset are overvalued. In general, the greater the ROA, the more effectively the firm generates profits. Normally, a ROA of 5% or above is desirable. With a mean ROA of 5.3%, most of the companies in the dataset seem to be quite efficient in generating profits. ESG

Table 3
Summary of variables.

Dependent Variables	Description/Formula
TQ - Tobin's Q	Equity Market Value + Liabilities Market Value/Equity Book Value + Liabilities Book Value
ROA - Return on Assets	Net Income/Total Assets
Independent Variables	
ESG_CS - ESG Combined Score	Refinitiv score
ENV - Environment Score	Refinitiv score
SOC - Social Score	Refinitiv score
GOV - Governance Score	Refinitiv score
Control Variables	
Log_TASST - Size	Logarithm of Total Assets
TDTA - Leverage	Total Debt/Total Assets

Table 4
Descriptive statistics.

	N	Mean	St. Dev	Min	Median	Max
Dependent Variables						
TQ	14043	2.567	2.963	0.263	1.640	80.938
ROA	14018	5.313	11.413	−167.531	4.527	236.781
Independent Variables						
ESG_CS	14043	38.256	25.855	0.000	40.104	94.506
ENV	14043	34.285	31.715	0.000	28.020	99.211
SOC	14043	40.454	29.756	0.000	40.201	98.628
GOV	14043	43.008	29.035	0.000	46.315	99.376
Control Variables						
Log_TASST	14043	10.230	2.626	1.550	9.723	21.269
TDTA	14043	0.246	0.203	0.000	0.221	3.892

mean scores are as follows: ESG Combined Score 38.256, Environment Score 34.285, Social Score 40.454 and Governance Score 43.008. Governance and Social averages are higher than Environment. In terms of control variables, the mean is 10.230 for Size and 24.6% for Leverage respectively. It is worth mentioning that leverage ratio seems reasonable for most of the companies with the exception of a few cases where a company has coniderably more debt than its assets (e.g., the highest being Domino's Pizza with 389%). Additionally, we also note that the standard deviation for each variable is within the predicted range.

3.3. Methodology

We use two models to investigate research objectives of the study, one for Tobin's Q and one for ROA. Many researchers used Tobin's Q and ROA as dependent variables (Giannopoulos et al., 2022; Naeem et al., 2022 among others). Many papers use Size and Leverage as control variables, including Giannopoulos et al., 2022 and Naeem et al., 2022. We use a separate model for each independent variable (ESG_CS, ENV, SOC, and GOV) due to correlation between them. We run the following eight models to estimate results.

$$TQ_{it} = \beta_0 + \beta_1 ESG\_CS_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$TQ_{it} = \beta_0 + \beta_1 ENV_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$TQ_{it} = \beta_0 + \beta_1 SOC\_CS_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$TQ_{it} = \beta_0 + \beta_1 GOV\_CS_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$ROA_{it} = \beta_0 + \beta_1 ESG\_CS_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$ROA_{it} = \beta_0 + \beta_1 ENV_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$ROA_{it} = \beta_0 + \beta_1 SOC\_CS_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

$$ROA_{it} = \beta_0 + \beta_1 GOV\_CS_{it} + \beta_2 \log(TASST)_{it} + \beta_3 TDTA_{it} + \varepsilon_{it}$$

where TQ_{it} and ROA_{it} are dependent variables, ESG_CS_{it} , ENV_{it}, SOC_{it}, GOV_{it} are independent variables, $\log(TASST)_{it}$, $TDTA_{it}$ are control variables and ε_{it} is the error term for firm i in period t.

Table 5
Pearson correlation matrix.

	TQ	ROA	ESG_CS	ENV	SOC	GOV	Log_ TASST	TDTA
TQ	1							
ROA	0.378	1						
ESG_CS	−0.104	0.051	1					
ENV	−0.164	0.044	0.853	1				
SOC	−0.089	0.017	0.918	0.814	1			
GOV	−0.090	0.056	0.834	0.627	0.695	1		
Log_TASST	−0.324	−0.026	0.275	0.395	0.226	0.224	1	
TDTA	−0.141	−0.131	0.054	0.059	0.064	0.048	0.042	1

*All Pearson coefficients are statistically significant at 0.01 level.

4. Results

We report Pearson correlation matrix, test results and regression results in this section.

4.1. Correlation results

Table 5 provides the Pearson correlation matrix for each variable. As the table shows, there is no correlation between ESG scores and Tobin's Q and ESG scores and ROA; however, ESG scores are highly correlated among themselves. This is not surprising because Refinitiv uses individual ENV, SOC, GOV scores to calculate ESG_CS. We run a different model for each individual ESG score to mitigate this correlation problem. We also see from the table that there is some correlation between Tobin's Q and ROA. This is not surprising as well because both ratios reflect financial performance of the company. There is also slight correlation between all ESG scores (particularly ENV) and Size (LOG_TASST) indicating the bigger the company, the higher their ESG scores. We confirm there is no multicollinearity after removing the highly correlated independent variables from the model and checking that all variables in the model have VIF (variance inflation factor) ratios below 10.

4.2. Test results

We use Augmented Dickey-Fuller (ADF) test to determine whether the data is stationary. We conclude all variables are stationary and useable in their original form in the model without any transformation.

Before we run the panel data regressions, we first determine which panel data model is the most suitable. There are three types of static linear panel data models: pooled, random effects and fixed effects. We apply relevant tests to arrive at the most suitable model for our analysis.

First, we compare pooled and fixed effects. We use F test for individual effects and find that fixed effects is more suitable compared to pooled model.

Second, we compare pooled and random effects. We use Breusch-Pagan Lagrange Multipler test and find that random effects is more suitable compared to pooled model.

Finally, we compare fixed effects and random effects. We use Hausman test and find that fixed effects is more suitable compared to random effects for both TQ and ROA. Table 6 reports the results of the Hausman test.

Table 6
Hausman test.

Dependent Variable	Test Result	Chi-Square Statistic	p-Value
Tobins's Q	Fixed effects	73.826	6.466e-16
ROA	Fixed effects	28.127	3.415e-06

We then apply Breusch-Pagan LM test and Pesaran CD test to check for cross sectional dependence in the error terms. We find there is cross sectional dependence in the model. However, it is not a factor complicating our research design because we have a panel with short time series and large cross-sectional units (short T, large N).

We use Breusch-Godfrey/Wooldridge test to check for serial correlation. We find there is serial correlation in the model. While serial correlation may be a complicating factor in macro panels with long time series, it is not a major issue in micro panels with short time series.

Finally, we use Breusch-Pagan test to check for heteroskedasticity and we find there is heteroskedasticity in the model.

To summarize, we have cross sectional dependence in the model, but because our panel data structure is short T (9 years) and large N (1720 companies), it does not cause complication in results. We also have heteroskedasticity and serial correlation in the model. To fix these problems, we run White robust correction (vcovHC) known as the sandwich estimator.

We finally run our fixed effects models after the above steps. Each firm in our data has its own “fixed” characteristics that change very little over time. Fixed effects model controls for all firm-specific observable or unobservable features that do not change much over time and thereby mitigates omitted variable bias.

4.3. Regression results

Tables 7 and 8 present the results of the regression models. We conduct all tests and regressions in R.

As seen in Table 7, ESG combined score (ESG_CS) and Social score (SOC) both have a coefficient of 0.008 whereas Governance score (GOV) has a coefficient of 0.004. These findings may indicate that the impact of ESG_CS and SOC are twice the impact of GOV on firm value. When we compare ESG scores and control variables, the results indicate that the impact of company size on firm value is −0.498, which is

Table 7
Tobin's Q Fixed Effects Regression Results

Table shows the results of the fixed effects regression analysis between the ESG independent variables, control variables and the Tobin's Q as dependent variable. The dependent variable is from Bloomberg database. ESG variables are from Refinitiv database. Robust standard errors specified under variable coefficients.

	Dependent Variable: Tobin's Q			
	1	**2**	**3**	**4**
ESG_CS	0.008***			
	(0.002)			
ENV		0.002		
		(0.002)		
SOC			0.008***	
			(0.002)	
GOV				0.004**
				(0.002)
Log_TASST	−0.498***	−0.469***	−0.507***	−0.479***
	(0.064)	(0.063)	(0.059)	(0.062)
TDTA	−0.920**	−0.906**	−0.935**	−0.907**
	(0.443)	(0.440)	(0.442)	(0.442)
Observations	14,043	14,043	14,043	14,043

*p < 0.1; **p < 0.05; ***p < 0.01.

roughly 60 times more than the impact of ESG combined score in absolute value terms. Additionally, the impact of leverage on firm value is approximately twice the impact of company size.

We find that ESG combined score (ESG_CS) has a positive and highly significant relationship with the firm value. In terms of individual ESG scores, both the Social score (SOC) and Governance score (GOV) have highly significant positive relationships. However, Environment score (ENV) has no significant relationship with the firm value.

Control variables Size (Log_TASST) and Leverage (TDTA) both have a negative and highly significant relationship with Tobin's Q. The literature on the effect of size and leverage on firm value is mixed. Hirdinis (2019) found negative relationship between firm size and firm value. According to Niresh and Velnampy (2014), there is a negative correlation between firm size and profitability. Ibrahim and Isiaka (2020) and Yuwono and Aurelia (2021) found significant negative effect of leverage on firm value.

Table 8
Return on Assets Fixed Effects Regression Results

Table shows the results of the fixed effects regression analysis between the ESG independent variables, control variables and the ROA as dependent variable. The dependent variable is from Bloomberg database. ESG variables are from Refinitiv database. Robust standard errors specified under variable coefficients.

	Dependent Variable: ROA			
	1	**2**	**3**	**5**
ESG_CS	0.049***			
	(0.008)			
ENV		0.038***		
		(0.008)		
SOC			0.031***	
			(0.008)	
GOV				0.031***
				(0.006)
log(TASST)	0.112	0.098	0.176	0.199
	(0.248)	(0.247)	(0.236)	(0.248)
TDTA	−6.893***	−6.903***	−6.899***	−6.817***
	(1.761)	(1.764)	(1.754)	(1.760)
Observations	14,043	14,043	14,043	14,043

*p < 0.1; **p < 0.05; ***p < 0.01.

Based on the results, we determine the model between the firm value and ESG score as follows:

Firm Value (Tobin's Q) = 0,008*ESG_CS (ESG Combined Score) - 0,498*Log_TASST (Logarithm of Total Assets) - 0,920*TDTA (Total Debt to Total Assets).

As seen in Table 8, the impact of ESG_CS on profitability is 0.049, which is roughly 1.3 times more than the impact of ENV, SOC and GOV scores. Among the three individual ESG scores, ENV has a slightly higher impact on profitability with a coefficient of 0.038. When we compare individual ESG scores and control variables, the results indicate that the impact of company size on profitability is 0.112, which is roughly twice the impact of the ESG combined score. The impact of leverage on profitability is approximately six times the impact of company size in absolute value terms.

We find that ESG combined score (ESG_CS) has a positive and highly significant relationship with ROA. Social score (SOC), Governance score (GOV), and Environment score (ENV) all have a positive and highly significant relationship with ROA.

Despite no relationship between ENV and firm value, we see highly significant and positive relationship between ENV and profitability. This result indicates that profitability might be more efficient than firm value in reflecting the company's Environment performance.

Based on the results, we determine the model between profitability and ESG score as follows:

Return on Assets (ROA) = 0,049*ESG_CS (ESG Combined Score) - 6893*TDTA (Total Debt to Total Assets).

5. Conclusion

The purpose of the paper is to analyze the impact of ESG performance on firm value and profitability. Sample data covers 1720 firms from 2013 to 2021. We use panel data fixed effects model for both firm value and profitability as dependent variables.

Based on the results of the four models where firm value was the dependent variable; we find that ESG combined score (ESG_CS) has a positive and highly significant relationship with the firm value. Social (SOC) and Governance (GOV) have highly significant positive relationships with firm value as well. However, Environment (ENV) has no relationship with firm value. From a theoretical point of view, these results support stakeholder theory except the Environment (ENV) score.

One reason we see no relationship between environment and firm value could be that environment related actions may be taking longer time to produce results for firms compared to social or governance related actions. In fact, some of the environment related projects could take years to complete before their outcome could have an impact on firm value. Another reason could be high investment costs associated with

environment action. Governance and social scores could be faster and less costly to achieve. We also note that the mean of the environment score is lower than the mean of governance and social scores in descriptive statistics. This could be also an indication of the slower and more costly progress in this ESG metric.

Based on the results of the four models where profitability was the dependent variable; we find that ESG combined score (ESG_CS) has a positive and highly significant relationship with profitability. Environment (ENV), Social (SOC) and Governance (GOV) all have highly significant positive relationships with profitability as well. From a theoretical point of view, these results support the stakeholder theory, in line with the findings of several researchers in the extant literature.

Shareholders, investors, creditors, governments, and other stakeholders expect the firms to do more on ESG. When they meet and exceed these expectations, the market most likely rewards them. The positive link between ESG_CS, firm value and profitability is likely an indication of this.

The research period between 2013 and 2021 witnessed much volatility in the markets due to Covid-19 and geopolitical turmoil. Whelan et al. (2021), in their meta-analysis indicated that ESG investing appears to provide downside protection, especially during social or economic crisis. Considering the results of our study, there may be implications for investors to be attracted to companies with high ESG scores either as single share or in the form of Exchange Traded Funds (ETFs) for their investment portfolios.

Our findings provide evidence for corporate managers to justify mobilizing more resources for ESG. We also provide evidence for policy makers to develop more policy measures in support of ESG. The dynamics behind this link between ESG performance, firm value and profitability could be interesting for future research. We recommend focusing on specific analysis of the causal factors triggering the impact of ESG on financial performance. For example, how action on emissions, innovation, resource usage, human rights, workforce, product responsibility, community, shareholders, management, and coporate social responsibility strategy affect financial performance.

Declaration

We submit this article in response to World Federation of Exchanges (WFE) call for papers dated June 13, 2022, inviting all member exchanges to submit academic papers on ESG.

The authors are Borsa İstanbul A. Ş staff. The opinions are personal and do not necessarily express the views of Borsa İstanbul A.Ş.

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