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THE EFFECT OF ESG PRACTICES ON FIRMS' FINANCIAL PERFORMANCE

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

THE EFFECT OF ESG PRACTICES ON FIRMS' FINANCIAL PERFORMANCE

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In this study, we examine the effect of Environmental, Social, and Governance (ESG) practices on firms' financial performances. Using a sample of approximately 7000 firms across 41 countries from 2002 to 2019, we test whether ESG performance affects the firms' financial success. The financial performance is measured by four dependent variables: Return on Assets (ROA), Return on Equity (ROE), Earnings per Share (EPS), and Market-to-Book Ratio (MTBV). We compile the ESG data from Refinitiv Eikon and financial data from Datastream. The fixed-effects regression models are run for different samples, including 1) full sample, 2) by industry, 3) by development level, and 4) by time period. For the full sample, we report that ESG combined score positively and significantly affects firm financial performance. The environmental pillar score affects EPS and MTBV significantly positive, and social pillar score has positive and significant effect on ROA, ROE and MTBV. We do not report a significant effect of governance pillar score on the financial performance. However, the outcomes vary across different sub-samples, meaning that the relationship between ESG practices and financial performance depends on the sample that we use.

Keywords: ESG, Financial Performance, Sustainability, Sustainable Development Goals, Social Finance

ÖZET

ESG UYGULAMALARININ FİRMALARIN FİNANSAL PERFORMANSINA ETKİSİ

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Master of Science, Mühendislik Yönetimi

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Bu çalışmanın amacı, Çevresel, Sosyal ve Kurumsal Yönetişim (ESG) uygulamalarının firmaların finansal performansı üzerindeki etkisini incelemektir. 2002-2019 yılları arasında 41 ülkeden yaklaşık 7000 firmayı içeren geniş bir veri seti kullanarak, ESG performansının firmaların finansal başarısını etkileyip etkilemediği test edilmektedir. Firmaların finansal performansı dört bağımlı değişken ile ölçülmüştür; bunlar, Varlık Getirisi, Özsermaye Getiri Oranı, Hisse Başına Kar Oranı ve Piyasa-Defter Değeri Oranıdır. Çalışmada kullanılan ESG verileri Refinitiv ve şirket finansal bilgileri Datastream veritabanlarından toplanmıştır. Çalışmada kullanılan sabit etkiler modeli, 1) tüm örneklem, 2) sektöre göre, 3) gelişmişlik seviyelerine göre, 4) zaman dilimine göre çalıştırılmıştır. Tüm örneklemi içeren çalışma sonuçları ESG birleşik puanının firma finansal performansı üzerinde pozitif ve anlamlı bir etkiye sahip olduğunu göstermektedir. Çevresel bölüm puanı, Hisse Başına Kar Oranı ve Piyasa-Defter Değeri Oranını olumlu etkiler ve sosyal bölüm puanı, Varlık Getirisi, Özsermaye Getiri Oranı ve Piyasa-Defter Değeri Oranı üzerinde pozitif ve anlamlı bir etkiye sahiptir. Kurumsal yöentişim puanının finansal performans üzerinde anlamlı bir etkisi bulunmamaktadır. Öte yandan, sonuçlar farklı alt örneklemlerde değişiklik göstermektedir; bu da, ESG uygulamaları ile finansal

performans arasındaki ilişkinin kullandığımız örnekleme göre değiştiğini göstermektedir.

Anahtar Kelimeler: ESG, Finansal Performans, Sürdürülebilirlik, Sürdürülebilir Kalkınma Hedefleri, Sosyal Finans

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To My Parents…

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LIST OF ABBREVIATIONS

CSR	Corporate Social Responsibility
EPS	Earnings Per Share
ESG	Environmental, Social, Governance
MTBV	Market to Book Value
ROA	Return on Assets
ROE	Return on Equity
SDG	Sustainable Development Goals
SRI	Socially Responsible Investing

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CHAPTER 1
INTRODUCTION

The term “sustainable finance” has been gaining attention from global investors and governments worldwide in the last decade. This term is used to refer to a variety of terminologies, such as "ethical-sustainable investment", "social finance", "socially responsible investment", etc. (Drempetic, Klein and Zwergel, 2019). Regardless of the terminology, the main goal for corporations in sustainable finance is significantly different from traditional finance, which supports maximizing stakeholder value without emphasis on the effects on the planet and humanity. According to conventional thinking, management's role in the world's issues (such as global warming, habitat loss, poverty, hunger, economic inequality, etc.) is limited. Sustainable finance is a "virtue-ethical approach" and seeks multigenerational equity (Soppe, 2004; Schaltegger&Hörisch, 2017). In 2015, with the introduction of the Agenda of 2030 for sustainable development by the United Nations (UN), international attention on sustainability became stronger. In the scope of the 2030 Agenda, the UN announced 17 Sustainable Development Goals, 169 targets, and 303 indicators in total. These goals initiate future aims for humanity and the world (Rosati&Faria, 2019). Sustainable Development Goals call for action to end poverty, reduce inequality, improve health and enable economic growth worldwide, considering environmental and social issues (United Nations, 2022). Each goal combines clearly defined targets that need to be fulfilled to achieve these goals (Hák et al., 2016). Since these objectives are directly related to Environmental, Social, and Governance (ESG) concerns, the importance of ESG practices started to rise more after 2015 (Eliwa et al., 2021).

Socially Responsible Investing (SRI) is frequently used to refer to sustainable finance and considers ESG criteria in addition to financial factors while making investment decisions (Hoepner et al., 2016). Sustainable investing has recently been getting more attention and value in investors' portfolio choices (Matos, 2020). According to Bloomberg Intelligence, the investment in ESG assets is expected to hit 41 trillion US dollars by the end of 2022, considering the United States, Japan, Europe, Canada, and Australia. In addition, Global Sustainable Investment Association estimates that ESG-based assets will constitute one-third of assets managed globally in 2022 (Kishan,

2022). For investors, stockholders, and country authorities, addressing environmental, social, and governance factors is mainly vital for controlling the risk. While for businesses, it is an essential component of their competitiveness (Tarmuji et al., 2016).

Recently, with increasing interest in ethical investing, sustainability considerations in financial decision-making have become an integral part of financial market operations for capital markets (Dumas&Louche, 2016). To address sustainability issues, businesses, investors, financial companies, governments, and other parties have encouraged investment projects and sustainable finance (Cunha, 2021). Investors often evaluate ESG concerns using non-financial data on governance traits, social effects, and environmental impacts. Thus, responsible investors force businesses to be more ESG-oriented (Matos, 2020).

The term ESG integrates companies' social, economic, governance, and environmental concerns (Ahmad et al., 2021). Bassen and Kovacs (2008) define ESG measurement as the metrics that seek to identify further aspects of organizational performance not shown by financial data.

Another term that deals with responsible and sustainable investing is Corporate Social Responsibility (CSR) (Carroll, 2009; Liang&Luc, 2020). Various definitions of CSR are used in literature, but there is still no global consensus on a specific description (Turker, 2009). According to Khan (2012), CSR describes how a company displays and creates its "corporate culture" and “social conscience”. Dobers and Halme (2009) state that CSR covers companies’ environmental and social activities and includes integrating social and ecological practices into their business processes. Carroll (2009) categorizes CSR as economic and non-economic practices. Economic practices benefit the company financially, while non-economic practices include the firm's activities undertaken for the general public’s benefit.

A strand of literature investigates the effect of CSR activities on the economic performance of firms. Most of these studies adopt the ESG score of the company to proxy for the firm's CSR success as two interchangeable terms (Miralles-Quirós et al., 2018; Liang, 2020). However, these two concepts are different in their treatment of governance practices. In particular, governance issues are contained indirectly in CSR

as part of environmental and social concerns, while ESG covers governance directly. This dimension of ESG in the context of CSR remains unclear. The governance dimension in CSR literature is frequently defined only in terms of diversity and inclusion, and as a result, the involvement of minorities' rights (based on sex, ethnicity, gender preference, etc.) on the management board, as well as in corporate practices (Liang, 2020). Eventually, ESG is typically used in a broader context than CSR (Gillan et al., 2021).

The Environmental (E) component of the ESG score emphasizes the actions to protect the ecosystem. Such activities are in line with decreasing carbon emissions, using natural resources (for producing energy, water, etc.), reducing waste of materials, saving energy, ecological innovations, etc. The Social (S) component is related to the companies' attitudes toward employee relationships, human safety, health issues, customer satisfaction, etc. It encompasses, for instance, initiatives to sustain devoted employees (such as employment quality, safety, education, and training), pleased clients (such as creating high-quality goods and services that ensure clients' safety), and good citizenship within the community in which it works. Finally, the Governance (G) component mentions the behaviors of the companies, such as their management styles, following the determined rules, considering ethics, etc. It forces management to behave in the best long-term interest of stakeholders. A well-functioning board (e.g., one with an experienced, varied, and independent membership), well-designed executive compensation rules, and preventing unethical behavior like cheating and bribery are just a few examples of how to accomplish this aim (Liang, 2020).

The number of firms that have started to take the ESG score measurements into account has continued to increase daily, creating shifts in companies' business models and management activities (Xie et al., 2018). According to a recent study, more than 70% of investors consider ESG factors when making investment decisions. ESG factors can be essential to a typical investor for three reasons: greater risk-adjusted return, alignment with personal values, and possible societal benefit (Paradis&Schiehll, 2021). Since the number of companies considering ESG activities in their operations has increased, the research interest in investigating the relationship between ESG practices and corporate financial performance has gained attraction.

Drempetic et al. (2019) state that the connection has been the subject of more than 2200 academic studies. Yet, there is still no consensus on the sign and significance of the effect of ESG scores on financial success. On one hand, Duque-Grisales and Aguilera-Caracuel (2019), Deng and Cheng (2019), Nekhili et al. (2019), Broadstock et al. (2020), Ahmad et al. (2021), and Al-Hiyari and Kolsi (2021) find that ESG has a favorable effect on financial performance using various financial performance measures such as Market to Book Value (MTBV), Tobin's Q, Earnings per Share (EPS), Return on Equity (ROE), Return on Assets (ROA), stock price, etc. Moreover, Shakil (2021) reports that better ESG performance lowers both systematic and total risk.

On the other hand, some studies report lower financial performance for higher ESG scores. For instance, Nekhili et al. (2020) report a negative and significant effect on Tobin's Q. Engelhardt et al. (2021) report a negative and significant impact on cumulative stock return. There are also studies reporting that ESG has no significant effect on financial performance (Friedman, 1970; Aupperle et al.,1989; Ullman, 1989; La Torree et al.,2020; Qureshi et al., 2021).

This inconsistency in the current literature motivates us to ask the following research question: "Do ESG practices affect the firm's financial performance?". We test our hypothesis using a sample of more than 7000 firms across 41 countries from 2002 to 2019. The ESG scores are collected from the Refinitiv Eikon (formerly known as ASSET4 database), one of the world's most extensive databases for ESG data. Other alternative databases report ESG scores and sustainability data. MSCI, S&P Dow Jones, RobecoSAM, and FTSE Russell are significant ESG rating and index providers (Halbritter and Dorfleitner, 2015). In this study, we choose to compile ESG data from Refinitiv due to its reliable data source and comprehensive coverage of more than 9000 companies.

We use ROA, ROE, EPS, and MTBV as our financial performance measures in this study. These measures are widely used to test the existing literature's ESG and financial success relationship. A strand of the literature bases their findings on accounting measures of financial success ROA, ROE, and EPS (Duque-Grisales&Aguilera-Caracuel, 2019; De Lucia et al., 2020; Ahmad et al., 2021;

Kim&Li, 2021; Rossi et al., 2021). Another group of researchers uses market-based measurements such as Tobin's Q and MTBV (Miralles-Quirós et al., 2019; Nekhili et al., 2019; Nekhili et al., 2020; Ouni et al., 2020). In addition, some studies focus on the effect of ESG performance on stock volatility, stock price performance, and risk (Khan, 2019; Broadstock et al., 2020; Al-Hiyari and Kolsi, 2021).

We use fixed effects regressions to test our hypothesis and run these models for a full sample at the first stage. Then, we run the models for different industries (financial and non-financial), development levels (United States, Developed European Union, Other Developed and Emerging countries), and periods (before and after 2015). The regression results of our analysis report that ROA, ROE, EPS, and MTBV values have a positive and significant relationship with ESG combined score when we cover the full sample. The environmental score affects EPS and MTBV; the social score affects ROA, ROE, and MTBV, both significantly and positively. However, we cannot report a significant relationship between governance score and financial performance measurements. In addition, the results of our baseline model, Model (3), present different results for the industry, development level, and time period panels. For non-financial and financial firms, the relationship of ESG combined score and financial measurements shows similar results; however, this relationship differs for the ESG components. There is a positive and significant effect of ESG combined score on ROA, ROE, and MTBV in both industries. In addition, we conclude that the results differ across the development levels of countries. We report a positive impact of ESG combined score on ROA, ROE and MTBV in three development levels. Mainly, developed European Union results differentiate from the others for ESG combined score and ESG components. We also conclude that ROA, ROE, and MTBV measurements have increased with ESG combined score before 2015, yet this effect is disappeared after 2015 for ROA. Also, the impact of ESG components result in different outcomes in two time periods. Considering all these results, we conclude that sub-sample selection is critical for the findings of the regression analysis.

This study contributes to the literature in three points mainly. First, we present additional proof of the effect of ESG practices on financial performance using a large sample of firms across different countries. Considering the unclear ESG-corporate

financial performance relationship, the insufficient research on firms in emerging markets, and the impact of each of the ESG pillars on financial performance while evaluating industry sector categories (Naimy et al., 2021), this study is accomplished by considering both wide ranges of industries and regions all around the world. Our comprehensive research covers more than 7000 firms and 41 countries. Also, researchers generally emphasize the total ESG score or its three components in the existing literature. In this study, we assess ESG combined score, including ESG controversies and total ESG score, and the environmental, social, and governance pillars. Moreover, the study uses four alternative measures (ROE, ROA, EPS and MTBV). Second, we test the relationship between ESG performance and the firm's financial performance for different subsamples. Our first consideration is running our base regression model for financial and non-financial firms. The current studies argue that financial and non-financial firms may result in different outcomes since industry-specific properties might affect ESG considerations (Sassen et al., 2016). Thus, Nirino et al.(2021) recommend that researches should be distinguished between financial and non-financial industries. Then, we control for different development levels of country groups: the United States, the Developed European Union, Other Developed, and Emerging market, to observe whether the effect varies for different development levels. We also check for structural change over time. We chose 2015 as the turning point for testing this relationship since it is the year that Sustainable Development Goals were introduced. We test the ESG-financial performance relationship by covering time intervals before 2015 and after 2015. Finally, in the robustness section, we include the countries' Sustainable Development Goal scores as an additional independent variable.

The rest of the study is organized as follows: Chapter 2 presents the existing literature on the relationship between ESG practices and financial performance. Chapter 3 develops the hypothesis to be tested in this thesis and the methodology used. Chapter 4 describes the analysis sample, explains the Refinitiv database used in the study, and reports the findings of our analysis. Finally, Chapter 5 concludes by summarizing the main findings. This chapter also discusses the study's implications and limitations and identifies future research direction.

CHAPTER 2
LITERATURE REVIEW

Firms continuously modify their organizational behavior and management systems over time due to various factors, including societal pressure, systemic regulations, evolving technology, and stakeholders' expectations. On the other hand, some organizations choose to change on their own (Brockett&Rezaee, 2012). One of the most significant shifts occurred in the firms' sustainability practices during the last decade.

The development of sustainability operations triggers the CSR practices and the associated ESG activities. According to the existing literature, these terms are becoming increasingly popular among managers and policymakers (Nirino et al., 2021). Large organizations are adopting sustainable practices for waste and pollution management (Sroufe&Remani, 2018), and they are trying to improve their societal actions and public reputation (Fatemi et al., 2017). Furthermore, firms are willingly involved in CSR activities to contribute to a better society to address the three pillars and ecosystem. They aim to generate a constant relationship among sustainability stakeholders (Russo&Perrini, 2010). According to the Nielsen Global Survey on CSR in 2015, 66% of the global population tends to charge more for sustainable brands, up from 55% in 2014, and 73% of younger global consumers are prepared to pay more for sustainable offerings, up from 50% in 2014 (Eliwa et al., 2021).

Accordingly, the question of why companies engage in ESG activities and the probable implications of this engagement on firms have a long history, and the interest is growing in popularity. As a result, many organizations began to issue ESG scores to quantify the impact of environmental, social, and corporate governance factors on financial performance, resulting in various scores based on different evaluation methodologies. Some rating firms, for instance, place a premium on media disclosure; as a result, a company can get higher scores if it has transparently shared ESG data (Yoo&Managi, 2022).

In the existing literature, numerous academic and asset management experts have examined the relationship between a company's ESG profile (or CSR activities, since

ESG performance can represent it according to some studies) and its financial risk characteristics in recent years (Giese et al., 2019). However, the findings reported by these studies are mixed; therefore, there is no specific result for this relationship.

One of the criteria that studies consider to measure this effect is people's investment decisions. Over the last few decades, there has been a significant change in investing professionals' desire to be more socially responsible in their investment choices and overall portfolio composition. This change requires researchers to measure how this shift effect companies' financial performances. For example, in Europe, corporations are switching their focus away from traditional financial returns as they become more conscious of climate change and human capital challenges. Instead, investors have come to tend toward socially responsible investing choices of the global society's shifting attitudes to sustainable practices and the availability of ESG indicators.

Moreover, while the strategic value of ESG measures has been researched extensively for private organizations, the public industry is also considered. These factors reveal a positive association between ESG practices and financial metrics. Furthermore, the connection becomes more apparent when organizations invest in environmental innovation, labor efficiency, multiculturalism, and equality regulations (De Lucia et al., 2020).

On the other hand, in one of the most recent studies, there is an opposite view of the increasing popularity and importance of ESG. According to Edmans (2022), managers, investors, authorities, entrepreneurs, and even the public have the term ESG at the forefront of their minds. This concept is both very significant and unremarkable currently. Any scholar or professional, not only those with ESG in their research interests or work scope, should consider this term in detail because it is essential to long-term benefit. As a result, ESG does not require a specific name because addressing long-term factors can be considered as investing, not as ESG investing. Because it is comparable to other intangible assets that generate long-term financial and social gains, such as managerial quality, corporate culture, and creative ability. It is not accurate for companies to emphasize improving their ESG performance more than these other intangibles.

Literature uses various measures as financial performance indicators to evaluate the connection between ESG practices and financial performance (Najah&Jarboi, 2013). For instance, total return, sales growth, profit growth, net margin, and ROE are used both together and individually to achieve the final financial performance rankings (Verschoor, 1998). Other studies use firms' stock prices as the measurement for economic success (Aupperle et al.,1989; Al-Hiyari&Kolsi, 2021). Nekhili et al. (2020), Abdi et al. (2021), and Ahmad et al. (2021) consider market-based measures for calculating the financial performance in their studies, while Duque-Grisales and Aguilera-Caracuel (2019), De Lucia et al. (2020), and Rossi et al. (2021) only focus on accounting measures by using ROE and ROA. The risk level is another measurement used in the existing studies (Giese et al., 2019; Shakil, 2021). Additionally, total sales, receivable turnover, cash flows, time in inventory, time receivables, net revenue, number of consumers, and return on capital employed measures are also analyzed (Bhatti et al., 2013). Deng and Cheng (2019) and Ahmad et al. (2021) use EPS in their studies to measure the link between ESG score and financial performance. In the existing studies, generally, these financial performance indicators are divided into two categories: accounting measures and market-based measures. There is ongoing discussion over the relationship between accounting and market metrics in organizational studies, particularly about how closely they are connected, even though both are universally acknowledged as reliable indicators of business financial performance. Theoretically, academics typically view market indicators as projections of long-term financial performance, while accounting measurements are thought to represent recent or short-term financial results (Gentry&Shen, 2010). In addition to the studies that use these measures individually, many researchers evaluate these two standards in the same study (Madison&Schiehll, 2021; Nirino et al., 2021; Qureshi et al., 2021). Market metrics are sensitive to systematic risk, whereas accounting indicators are responsive to company-specific risk (McGuire et al., 1988). In this study, ROA, ROE, and EPS, classified as accounting measures in the literature, are used as the financial performance and success measurement of the firms together with MTBV, which is a market-based measure to evaluate the effect of ESG practices.

In addition, various measures are used to control the effect of ESG scores on financial performance. One of the frequently used control variables, which is leverage, is measured by using both total liabilities/total assets (Li et al., 2020; Abdi et al., 2021; Engelhardt et al., 2021) and total liabilities/total equity (Drempetic et al., 2019; Kim&Li, 2021) in the existing literature. Another commonly used control variable is the firm size, which Kim and Li (2021), Rossi et al. (2021) and Shakil (2021) calculate by using the logarithm of total assets. On the other hand, Duque-Grisales and Aguilera-Caracuel (2019) measure firm size by using logarithm of total sales. Additionally, current ratio (Nirino et al., 2021), risk measures (Chams et al., 2021; Khoury&Iskandar, 2021) GDP (Buallay, 2019; Miralles-Quirós et al., 2019) are also widely used variables in the current studies.

The methodology used in the current literature for observing the ESG-financial performance relationship also varies between the studies. Fixed-effects regression, random-effects regression, pooled OLS regression, and logistics regression are some of the preferred methods by the previous studies (Ng et al., 2020; Li et al., 2020; Bofinger et al., 2022). Different methods have been used to decide which methodology is more accurate for analyzing the data. For instance, Nguyen et al. (2019) have a random sample, including panel data, for their analysis. They apply the Hausman test on their dependent variables to compare whether fixed-effects or random-effects regression fits better to their data. They find that the fixed-effects model is better for their study, so they refuse the random-effect model. In the second stage, they apply the Lagrange Multiplier test to decide whether pooled or random-effects regression is better for the study, and as a result, pooled regression model is rejected based on the results. By considering these tests, they use fixed-effects regression during their analysis. While deciding on the methodology, endogeneity is another concept that can relate to the model selection. Endogeneity is known as a variable or change that originates within a system or a model. When a variable depends on others in the design, it is defined to be endogenic. It is similar to a secondary issue that frequently arises while resolving a primary topic; it might result in additional changes in the preceding problem while working to fix it and the emergence of a new issue (ScienceABC, 2022).

Endogeneity might inhibit researchers from achieving an accurate result. A biased relationship estimate is observed between dependent and independent variables if the explanatory variables are linked with any other factors or error terms of the model. The correlation between independent variables and another study factor should be controlled in this case. Fixed-effects regression is one of the commonly used methods that is preferred to maintain this association and achieve an unbiased result. The fixed-effects model, including firm fixed effect, is used in around 44% of the macro-oriented studies. The Hausman test is conducted in 29% of these studies. Additionally, the time-fixed effect is used individually and together with the firm-fixed impact on the current literature (Bliese, 2019).

According to current study findings, the relationship between sustainability activities (including CSR activities, ESG applications, etc.) and the firm's financial performance is inconsistent. Freidman (1970) states that if a company adopted to CSR, it would approach more charitable and could not have the proper commitment to its stockholders. According to Aupperle and Van Pham (1989), there is also no association between CSR and financial performance. Their study divides CSR into five components and measures financial performance by nine metrics. In a different research, Ullman (1985) suggests a neutral relationship between CSR and financial performance. By considering the individual components of the ESG score, Miralles-Quirós et al. (2019) and Qureshi et al. (2021) find that the social version harms Tobin's Q and the exact relationship is also valid for governance performance. Environmental performance negatively affects ROA and ROE, and governance performance negatively affects ROA and price-to-book ratio (Khoury&Iskandar, 2021). Also, there is a negative relationship between environmental and social performance and ROA and ROE (Alareeni&Hamdan, 2020). Weston and Nnadi (2021) conclude that the sustainability factor has not a significant financial advantage for the companies. However, it has some non-financial benefits like fame, more involvement in environmental activities, etc.

On the other hand, various studies achieve results as ESG/CSR performance positively affects financial performance. Bofinger et al. (2022) investigate how CSR affects firm misevaluation in the United States. Their findings show that a company's ESG profile

considerably impacts valuation: CSR improves the actual to proper firm value ratio. When the relationship between ESG and misevaluation is mentioned individually, they find that ESG increases existing overvaluation while decreasing the departure of undervalued enterprises from their actual worth. The relationship between CSR and financial performance is significant and positive in European ESG enterprises when the impact is assessed using the moderating influence of board features (Rossi et al., 2021).

In addition, other studies directly emphasize the ESG score while assessing the companies' financial performance. Kim and Li (2021) find that ESG considerations benefit business profitability, making the effect more substantial for more prominent firms. Governance has the most significant influence among the various ESG categories, especially for companies with poor management. The relationship between ESG score, market value, and EPS are positive, according to Ahmad et al. (2021), similar to the findings of Kim and Li (2021), which use ROA as a financial performance measurement. Additionally, the effect of ESG on ROA, ROE, and Tobin's Q is positive, as the same product is observed for environmental score (Buallay, 2019). Based on the study results of Al-Hiyari and Kolsi (2021), the ESG score has a significant and positive impact on the stock price. Qureshi et al. (2021) suggest that sustained higher commitment to the environmental pillar, consistent socially responsible conduct, and rationalized governance mechanisms are economic quality additive by market players for market-based financial performance (market-to-book ratio and Tobin's Q). In addition, although the relationship is mixed between ESG and financial performance for accounting-based measures (ROE and ROA), it is generally suggested that aggressively pursuing ESG initiatives can help businesses achieve better financial results.

According to the studies, the ESG-corporate financial performance relationship findings differ between each ESG pillar, corporate financial performance measures, and industry structure. For instance, accounting measures (including ROE and ROA) have no association with ESG performance; however, ESG has a positive relationship with stock return and a negative relationship with the price-to-book ratio. Furthermore, when the ESG pillars are examined separately, accounting measures have a negative

association with the environmental pillar and a positive relationship with the social component. In contrast, no significant relationship is observed on ROE, and a negative relationship is observed on ROA for the governance pillar (Khoury&Iskandar, 2021).

There are also different findings when other variables moderate the relationship between ESG and financial performance. By emphasizing employee board representation (labor and shareholder board representation), Nekhili et al. (2020) indicate that ESG performance and its components have a negative relationship with employee board representation. The same situation is also valid for labor board representation except for the social element of ESG score; it has a positive effect. When these two factors are considered as the moderating effects between ESG score and Tobin's Q, which represents firm value, all of the subcomponents of ESG are negatively associated with Tobin's Q when labor board representatives moderate the effect. However, only the environmental component negatively relates to Tobin's Q when employee shareholder board representatives become the moderator. Using the moderating influence of green innovation, Chouaibi and Chouaibi (2021) state that there is a significant beneficial association between societal and ethical practices and the market value of enterprises.

Although many studies aim to observe the relationship between ESG and financial success under ordinary conditions, some studies evaluate this relationship under unexpected situations. For instance, Engelhardt et al. (2021) examine the relationship between ESG ratings and stock performance during the COVID-19 crisis. Even though research on whether ESG is helpful in times of crisis is uncertain, they demonstrate that high ESG-rated European firms are associated with higher abnormal returns and reduced stock volatility. After portioning ESG into its constituent parts, they discover that the social score is the fundamental cause of the outcomes. Furthermore, they argue that ESG adds value in low-trust countries and nations with insufficient security legislation and weaker disclosure standards. In general, involving in ESG activities provides better stock performance and positively affects investors, especially during the pandemic.

Similarly, Broadstock et al. (2020) investigate the role of ESG performance during the global financial crisis prompted by the COVID-19 pandemic. Because of the unusual

conditions, it is a chance to ask if investors use ESG performance to predict future stock success and risk reduction. They conclude that high-ESG portfolios outperform low-ESG portfolios, and ESG performance mitigates financial risk during financial crises. Also, the role of ESG performance is reduced in 'normal' times, confirming its incremental importance.

The ESG controversy score, which evaluates how exposed a corporation is to worldwide media coverage of controversial issues related to governance, social issues, and the environment, also affects a firm's financial performance. A negative and significant association is reported between corporate scandals and financial success, considering ESG practices critical for meeting stakeholders' needs. Therefore, controversies are harmful to business performance, and ESG practices should be used to avoid disputes rather than mitigate the adverse effects of debates (Nirino et al., 2021)

Although various studies work on the impact of ESG performance on financial success, the effect of financial performance also has a possible impact on the ESG scores of the firms. Because financial materiality can help investors make better ESG-based investment decisions and economic relevance has a significant impact on organizations' ESG performance scores, as a piece of evidence, significant changes occur in organizations' ESG rankings when ESG performance is assessed using Sustainability Accounting Standard Board's (SASB) adjusted ESG performance ratings. Environmental pillar issues, mainly natural resource consumption, primarily cause the changes. The findings imply that financial materiality influences ESG scores and rankings, helping investors identify investment possibilities in companies that score well on business-critical ESG concerns (Madison&Schiehll, 2021).

The summary of the reviewed studies exited in the current literature is given in Table 1. Since there is no consensus on this topic in the existing literature, we assume that conducting new research contributes to ongoing debates in the literature. Based on the current literature, this study has three main contributions. First, we accomplish a detailed analysis using a relatively wide range of data by using ESG Combined score as our variable of interest and ROE, ROA, MTBV, and EPS as our financial performance measurements. Second, we test the relationship between ESG performance and a firm's financial performance for different subsamples based on

industry classification (economic versus non-financial firms), development levels of country groups (United States, Developed European Union, Other Developed and Emerging), and different periods (before and after 2015). Third, we control for the effect of the countries' Sustainable Development Goal scores as one of our study's independent variables.

Table 1 Literature Review Summary

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Drempetic, et al. (2019)	Journal Of Busıness Ethics	# of firms: 3828, country: USA, Japan, Britain, Canada years: 2004-2015	linear mixed-effects model and structural equation modeling	firm size, data availability	EPS/stock price, ROIC, operating profit margin, leverage, ISO 14000/EMS Certification	ESG score (dependent variable)	ESG - firm size, data availability: (+) and significant ESG - leverage, operating profit margin, EPS/stock price: insignificant ESG - ROIC: (-) and significant ESG - ISO 14000/EMS Certification: (+) and significant
Buallay (2019)	Management Of Environmenta l Quality	# of firms: 235, industry: banks, year: 2007-2016	regression analysis	ESG, ENV, SOC, and GOV disclosures	leverage, total assets, GDP, governance	ROA, ROE, Tobin's Q	ROA, ROE, Tobin's Q - ESG: (+) and significant ROA - ENV: insignificant ROA - SOC, GOV: (-) and significant ROE - ENV, SOC: (+) and significant ROE - GOV: (-) and significant Tobin's Q - ENV, SOC: (+) and significant Tobin's Q - GOV: insignificant ROA, Tobin's Q - leverage, GDP: (-), and significant ROA, Tobin's Q - total assets, governance: (+) and significant ROE - leverage, GDP, governance: (-) and significant ROE - total assets (+) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Deng and Cheng (2019)	Sustainability	# of observations: 19,254 firms: China's A-share listed companies region: China, years: 2015-2019	DID test, FE model of the static panel, GMM model of the dynamic panel to Estimate the sample	ESG score	ROA, #of directors, the shareholding ratio, cash shares to total assets, corporate sales gross profit, asset-liability ratio, government subsidies	Earning Per Share	EPS - ESG: (+) and significant EPS - ROA, corporate sales gross profit, asset-liability ratio, salary (+), and significant EPS - independent directors, cash shares to total assets, government subsidies to main business income: insignificant EPS - the shareholding ratio of the largest shareholder: (-) and significant
Giese et al. (2019)	Journal Of Portfolio Management	# of stocks: 1600, year: 2007- 2017	DCF model	ESG score	-	systematic risk idiosyncratic risk	valuation and Performance - ESG performance: (+) and significant
Jain et al.(2019)	Risks	observations: 5-year daily closing prices firms: developed and emerging market firms, including the US and Europe and other regions all around the world year: 2013-2017	Granger's causality model, ARCH-GARCH type modeling Johansen's cointegration test Vector Error Correction Model	ESG score	-	daily return (closing prices)	return - ESG: (+) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Miralles-Quirós et al. (2019)	Sustainability	# number of firms: 166, country: 31 countries, industry: commercial banks, # of stock markets: 31, year: 2010-2015	regression analysis	ESG, ENV, SOC, GOV scores	size, leverage, GDP	Tobin's Q	Tobin's Q - ESG: (+) and significant Tobin's Q - ENV, GOV: (+), and significant Tobin's Q - SOC: (-) and significant Tobin's Q - size, leverage, GDP: (-), and significant
Landi and Sciarelli (2019)	Social Responsibility Journal	# of firms: 40, country: Italy, year: 2007-2015	fixed-effects ordinary least squares regressions	ESG score	EBITDA/total equity ratio, debt/equity ratio, total asset, reinvestment rate	compound abnormal log return (CALR)	CALR - ESG score: insignificant CALR - EBITDA, total assets, reinvestment: (+) and significant CALR - debt to equity: insignificant
Duque-Grisales and Aguilera-Caracuel, (2019)	Journal Of Business Ethics	# of firms: 520, country: Latin America year: 2011-2015	regression analysis	ESG, ENV, SOC, GOV scores	firm size, GDP, leverage, country, financial slack, and international geographic diversification (moderating variables)	ROA	ROA - ESG: (-) and significant ROA - ENV, SOC, GOV: (-) and significant ROA - firm size, GDP: (+), and significant ROA - leverage: (-) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Li et al. (2020)	Sustainability	# of bonds: 315, region: China, years: 2014-2019	logistic regression model	ESG, ENV, SOC, GOV scores	leverage, profitability, growth	bond default rate	bond default rate - ENV, GOV: (+) and significant bond default rate - SOC: insignificant bond default rate - leverage: (+) and significant bond default rate - profitability, growth: (+) and significant
Broadstock et al. (2020)	Finance Research Letters	# of firms: 300, country: China, year: 2015–2020 (normal times) + Covid-19 period	regression analysis	ESG, ENV, SOC, GOV scores	firm size, leverage, industry, market-to-book ratio	% stock price return	Return - ESG: (+) and significant Return - ENV, GOV: (+) and significant Return - SOC: (-) and significant Return - leverage: (-) and significant Return - size: (-) and significant
Alareeni and Hamdan (2020)	Corporate Governance-The International Journal Of Business In Society	# of firms: 500, country: USA (S&P 500), years: 2009-2018	panel regression analysis	ESG, ENV, SOC, GOV scores	firm size, financial leverage, assets turnovers, assets growth	ROA, ROE, Tobin's Q	ROA, ROE, Tobin's - ESG: (+) and significant ROA, ROE - ENV, SOC: (-) and significant ROA, ROE, Tobin's Q - GOV: (+) and significant Tobin's Q - ENV, SOC: (+) and significant ROA, ROE, Tobin's Q - firm size, assets turnover: (+) and significant ROA, Tobin's Q - leverage, assets growth: insignificant ROE - leverage, assets growth: (+) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
La Torree et al.(2020)	Sustainability	# of firms: 46, region: Europe (Eurostoxx50), year: 2010-2018	panel analysis and multiple linear regression	ESG, ENV, SOC, GOV scores	the unemployment rate, dividend yield, inflation rate, Euribor rate	stock return	stock return - ESG index: (+) and significant stock return - ENV, SOC, GOV: insignificant
Nekhili et al.(2020)	Corporate Governance-An Internatıonal Review	# of firms: 120, region: France, years: 2007-2017	two-step system GMM estimation	ESG, ENV, SOC, GOV scores, employee directorship, labor representation, employee-shareholder representation	standalone CSR report, CSR assurance, CSR committee, the board size, board independence, board gender diversity, board meetings, CEO Duality, CEO tenure, family ownership, institutional ownership, employee ownership, leverage, ROA, R&D, Firm size, industry	Tobin's Q	ESG-Employee&Labor Board Rep.: (-) and significant ESG-Employee SH Board Rep.: (+) and significant SOC-Employee &Labor Board Rep.: (-) and significant SOC- Labor Board Rep.: (+) and significant ENV- Employee & Labor Board Rep.: (-) and significant ENV- Labor Board Rep.: (+) and significant GOV - Employee& Labor Board Rep.: (-) and significant GOV-Labor Board Rep.: (+) and significant **Moderating var: Employee board rep.** Tobin's Q-ESG, SOC, ENV, GOV: (-) and significant **Moderating var: Labor board rep.** Tobin's Q-ESG, SOC, ENV, GOV: (-) and significant **Moderating var: Employee SH board rep.** Tobin's Q- ESG, SOC, GOV: (+) and significant Tobin's Q-ENV: (-) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Ouni et al.(2020)	Sustainability	# of firms: 133, country: Canada, years 2002-2019	structural equation modeling using the bootstrap approach For mediation tests and the maximum-likelihood estimator	board gender diversity, executive gender diversity	ESG score (mediating varaible)	Tobin's Q	Tobin's Q - board gender diversity (with the mediating role of ESG): (+) and significant Tobin's Q - executive gender diversity (with the mediating role of ESG): (+) and significant
Abdi et al. (2021)	Environment Development And Sustainability	# of firms: 38 airline companies worldwide year: 2009-2019	panel data analysis	ESG, ENV, SOC, GOV scores	firm size, firm age, ROA, leverage ratio, dividend pay-out ratio	Market to Book Ratio, Tobin's Q	MTB - ESG: (+) and significant MTB - GOV: (+) and significant MTB - SOC, ENV: insignificant MTB - leverage, ROA, age, dividend pay-out ratio: insignificant MTB - size: (-) and significant Tobin's Q - ESG: (+) and significant Tobin's Q - GOV, SOC, ENV: insignificant Tobin's Q- ROA: (+) and significant Tobin's Q - size: (-) and significant Tobin's Q - leverage, age, dividend pay-out ratio: insignificant
Shakil (2021)	Resources Policy	# of firms: 70, industry: gas firms, year: 2010-2018	two-stage least squares panel regressions technique	ESG, ECO, ENV, SOC, GOV scores	MTBV, leverage, dividend yield, firm size, board gender diversity (moderator), ESG controversy (moderator)	Total risk (stock price volatility), Systematic risk (market beta)	Risk - ESG performance: (-) a significant Risk - MTBV, dividend yield, size:: (-) and significant Risk - leverage: (+) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Aslan et al. (2021)	Sustainability	# of firms: 902, country: USA, year: 2002-2017	OLS regressions	ESG, ECO, ENV, SOC, GOV scores	abnormal return, volatility	Probability of default	Credit default - ESG: (-) and significant Credit default - ENV, SOC, GOV: (-) and significant Credit default - abnormal return, volatility: (+), and significant
Kim and Li (2021)	Sustainability	# of firms: 4708, year: 1991-2013	regression analysis	ESG, ECO, ENV, SOC, GOV scores	leverage, liquidity, firm size, investment	ROA, Customized credit rating scale	ROA - ESG: (+) and significant ROA - ENV, SOC: insignificant ROA - GOV: (+) and significant ROA - size: (+) and significant Credit rating - ESG: (+) Credit rating - ENV: (-) and significant Credit rating - SOC, GOV: (+) and significant Credit rating - size: (+) and significant
Rossi et al. (2021)	Journal Of Risk And Financial Management	# of firms: 225, Region: Europe, year: 2015-2019	linear regressions with panel data	CSR	**Moderating variables:** Board size, Board Independence, CEO duality **Control variables:** Firm size, Leverage	ROA	ROA- CSR : (+) and significant 'ROA- size, leverage: insignificant The link between CSR practices and financial performance is positively moderated by board size, board independence, and CEO duality
Nirino et al. (2021)	Technological Forecasting And Social Change	# of firms: 600, region: Europe	OLS regressions	ESG controversies score	# of total employees, liquidity, leverage ratio, beta, firm size, ESG practices (moderating variable)	Tobin's Q, ROE, ROA	ROE - ROA - controversies: insignificant 'ROE - ROA - # of total employees: insignificant 'ROE - ROA - firm size: insignificant ROE - leverage: (+) and significant ROA - beta: (+) and significant Tobin's Q - controversies (-) and significant Tobin's Q -firm size: (+) and significant Tobin's Q and ROA - leverage: insignificant Tobin's Q and ROE - beta: insignificant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Chouaibi and Chouaibi (2021)	International Journal Of Ethics And Systems	# of firms: 523 regions: North America and Western Europe, year: 2005-2019	the fixed-effects panel regression model	companies' ethical score (ETH_SCO) companies' ESG scores (CSR_SCO) degree of green innovation (GRE_INN)	percentage of women on the board of directors, index of responsible governance, legal system, country corruption Index, year, industry, and country dummies	market-to-book value	MTBV - ETH_SCO, CSR_SCO, GRE_INN: (+) and significant MTBV - GOV_INDX, WOM_BD, LEG-SYS, COR_INDX: (+) and significant
Eliwa et al.(2021)	Critical Perspectives On Accounting	# of firms: 6018, country: 15 EU countries, years: 2005-2016	pooled regression analysis	ESG-performance, ESG-disclosure, ENV, SOC, GOV performance, NV, SOC, GOV disclosure	firm size, leverage, ROA, interest coverage rate	cost of debt (COD)	COD - ESG performance, ESG disclosure: (-) and significant COD - leverage, firm size, ROA, interest coverage ratio: (+) and significant COD - ENV, SOC, GOV performance: (-) and significant COD - ENV, SOC, GOV disclosure: (-) and significant COD - leverage: (+) and significant COD - firm size, ROA, interest coverage ratio: (-) and significant
Khoury and Iskandar (2021)	Estudıos De Economia Aplicada	# of firms: 108, region: East Asia, industry: Capital Goods, Commercial, Professional Services, Transportation. year: 2005-2019	regression analyses (panel data, using the fixed-effect estimation technique)	ESG, ENV, SOC, GOV scores	firm size, unsystematic risk, industry	ROA, ROE, stock return, price-to-book ratio	ROA and ROE - ESG: no relationship ROA and ROE - ENV: (-) and significant ROA and ROE - SOC: (+) and significant ROA and ROE - GOV: insignificant ROA, ROE, RET, PB - firm size: (-) and significant ROA, ROE, RET, PB - leverage: insignificant RET - ESG: (+) and significant RET - ENV: insignificant RET - SOC and GOV: (+) and significant PB - ENV and SOC: insignificant PB - GOV: (-) and significant

Article	Journal	Sample	Methodology	Independent variables	Control Variables	Financial Measurement (KPI)	Relationship
Engelhardt et al. (2021)	Sustainability	# of firms: 1452, region: Europe	OLS Regression	ESG	Tobin's Q, firm size, ROE, profitability, MTB, negative MTB, cash/assets, short-term debt/assets, long-term debt/assets	firm's cumulative raw stock return, firm's cumulative abnormal stock return	raw stock return - ESG: (-) and significant Raw stock return - size, Tobin's Q, neg. MTB, cash/assets: insignificant raw stock return - ROE, MTB: (+) and significant raw stock return - short-term debt/assets, long-term debt/assets: (-) and significant abnormal stock return - ESG: (+) and significant abnormal stock return - size, ROE, MTB, cash/assets: (+) and significant abnormal stock return - short-term debt/assets, long-term debt/assets: (-) and significant Abnormal stock return - neg. MTB, Tobin's Q: insignificant
Bofinger et al.(2022)	Journal Of Banking & Finance	# of firms: 1817, region: USA, year: 2004-2017	the fixed effects regression model	ESG score	the leverage ratio, profitability, market-to-book ratio, CAPEX, equity return volatility of stocks	misvaluation (market value of equity of company/true value approximated by the residual income model)	misvaluation - ESG: (+) and significant misvaluation - profitability and volatility: (-) and significant misvaluation - CAPEX and MTB ratio: (+) and significant
Aydoğmuş et al.(2022)	Borsa Istanbul Review	# of firms: 1720, country: 39 countries, years: 2013–2021	regression analysis	ESG combined score, ENV, SOC, and GOV scores	firm size, leverage	ROA, Tobin's Q	Tobin's Q - ESG combined: (+) and significant Tobin's Q - ENV: insignificant Tobin's Q - SOC, GOV: (+) and significant Tobin's Q - firm size, leverage: (-) and significant ROA –ESG combined: (+) and significant ROA – ENV, SOC, GOV: (+) and significant ROA - firm size: insignificant ROA-leverage: (-) and significant

CHAPTER 3
HYPOTHESIS DEVELOPMENT AND METHODOLOGY

This study investigates the effect of ESG scores on the firms' financial performance based on a sample covering around 7000 firms across 41 countries from 2002 to 2019.

3.1. HYPOTHESIS

There are two different perspectives concerning the effect of environmental, social, and governance practices on corporate financial performance. The first group discusses that ESG initiatives generate additional costs for a company and adversely affect economic performance (Palmer et al. 1995; Derwall et al. 2005; Hassel et al. 2005). The highest prices mainly belong to environmental practices, such as investments required to reduce emissions or optimize the utilization of natural resources. In particular, adopting mechanisms that use clean technologies requires considerable additional expenses. These high costs may motivate companies to stick to outdated technologies without cutting emissions, noise control, or waste treatment policies in their manufacturing, disregarding their environmental impacts (Rassier&Earnhart, 2010).

The above circumstances are covered by "resource-based theory," which asserts that a firm's internal competencies and capabilities are related to its performance, contrary to prior studies that focused on how the external environment affects industrial organization performance (Sharma et al., 2019). Several academics note that a fragmented resource-based worldview was noticeable as early as the 1930s (Priem&Butler, 2001). Because it was created within leadership, marketing, supply chain management, and corporate, the resource-based approach is multidisciplinary and has evolved (Hunt, 2013). According to the literature, research cannot result in this view being any longer valid, but there are various criticisms on the approach of this view related to its evolution (Barney, 2001; Priem&Butler, 2001). The resource-based argument assumes that businesses are profit-maximizing organizations led by rational executives engaged in different markets that are largely predictable and tending toward equilibrium. The theory supports that if a company's managers can

predict the value of a resource more accurately than their rivals can, this gives the company a competitive advantage. It opposes holistic or emergent theories that compare businesses to living things with sophisticated feedback-controlled processes (Kraaijenbrink, 2009). Considering the resource-based view, an adverse effect of ESG performance on the financial performance of the firms is expected.

Recently, the second perspective, which advocates the positive effects of ESG on financial performance, is getting more and more attention with an increasing interest in sustainability worldwide. According to this group, ESG practices play an important role in investment decisions, and good ESG practices can lead to sustainable companies and better corporate performance (Chouaibi&Chouaibi, 2021; Madison&Schiehll, 2021; Yoo&Managi, 2022). Because of the considerable and rising interest of both investors and regulators in sustainable investing and finance, the significance of ESG practices in investment decisions has increased recently. This view is argued under and highly related to the concepts of "stakeholder theory." Since 1984, the literature covering management activities has made substantial use of stakeholder theory. According to this theory, the stronger stakeholder relationship results in advantages from social responsibility and supports corporate governance and business ethics concepts. Based on this view, we expect a positive relationship between ESG performance and the firm's financial success by considering these perspectives.

The vast literature on ESG score findings is inconclusive, as discussed in Chapter 2 of this thesis. We test the below-given hypothesis in this study to present additional evidence on the effect of ESG practices and firm financial performance:

> **H_0 (Null Hypothesis):** The ESG Practices do not affect the firms' financial performances.
>
> **H_1 (Alternative Hypothesis):** The ESG Practices affect the firms' financial performances.

3.2. MODEL

Using the STATA software package, we use fixed effects regression to analyze the relationship between ESG practices and financial performance. The aim of using this model is to avoid from endogeneity effect. This is arguably the biggest and most outspread issue for the studies in empirical corporate finance, including the association between the independent variables and the error term in a model. Drawing accurate findings is incredibly difficult due to the skewed and contradictory parameter estimations that endogeneity causes (Roberts&Whited, 2013).

One of the most significant variations in techniques is whether to use fixed-effects or random-effects models. Fixed-effects models are highly preferred because they eliminate any endogeneity associated with time and higher-level elements. Dummy identifiers are used for each higher-level entity in firm-fixed effects to account for unobserved variability between entities (Bliese et al., 2019).

The regression model is as follows:

$$Financial\ Performance_{i,j,t} = \beta_0 + \beta_1(ESG_{i,j,t}) + \beta_2(control\ variables_{i,j,t})$$
$$+ firm\ fixed\ effect + year\ fixed\ effect +$$
$$year\ x\ country\ interaction + \varepsilon_t$$

The dependent variable $Financial\ Performance_{i,j,t}$ represents the financial performance of company i in country j at time t. We measure financial performance using four variables: (1) *ROA*, (2) *ROE*, (3) *EPS*, and (4) *MTBV*. As discussed in Chapter 2, the existing literature mainly uses accounting measures such as ROA, ROE, and market-based measures such as MTBV and Tobin's Q as the indicator of financial performance (Hart&Ahuja 1996; Elsayed&Paton 2005; Rassier&Earnhart 2010; Tang et al. 2012; Jain et al., 2016). Despite ROE and ROA being both indicators of a company's accounting success, they are merely options and not perfect replacements for one another. A company can raise its ROE by generating more debt, but this action would not increase its ROA (Qureshiet al., 2021). EPS is another indicator used to represent a firm's financial performance (Deng&Cheng, 2019). McGuire et al. (1988) discuss that market metrics are sensitive to systematic risk, whereas accounting

indicators are responsive to company-specific risks. Thus, to create a clearer picture of the financial performance-ESG relationship, we employ both accounting and market-based measures, as Khoury and Iskandar (2021) suggested.

The primary explanatory variable, *ESG Combined Score*, is the combination of Refinitiv ESG score and ESG Controversies overlay of the given company. We use the total *ESG Combined Score* and *Environmental, Governance, and Social Pillar Scores,* separately in our analysis.

The control variables are based on prior literature discussed in Chapter 2. We control for firm-level variables, including *Total Assets* (Kim&Li, 2021; Aydoğmuş et al., 2022) and *Leverage Ratio* (Li et al., 2020; Aydoğmuş et al., 2022). Moreover, the landscape for sustainability practices and the importance of ESG is evolving, and there are possible cultural, political, and economic differences across countries, industries, and time. For this reason, we add year and firm fixed effects into the model, together with the country*year interaction term.

All variables used in the thesis study are described in Table 2.

Table 2 Description of Variables

Variable	Description Provided by Refinitiv
Dependent Variables	
ROA	(Net Income – Bottom Line + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Average of Last Year's and Current Year's Total Assets * 100
ROE	(Net Income – Bottom Line - Preferred Dividend Requirement) / Average of Last Year's and Current Year's Common Equity * 100
MTBV	The market value of the common equity divided by the balance sheet value of the common equity in the company.
EPS	Earnings per share (The aggregation of interim period earnings).
Independent Variables	
ESG Combined Score	Combined firm score calculated by E, S and G pillars (ESG Score) with an ESG Controversies score.
E Score	The weighted average depending on the reported environmental information and the concluding three environmental category scores.
G Score	The weighted average depending on the reported governance information and the concluding three governance category scores.
S Score	The weighted average depending on the reported social information and the concluding four social category scores.
Control Variables	
Leverage Ratio	Total Debt % Total Assets
Log Total Assets	TOTAL ASSETS (U.S.$)
Industry	This variable presents the firm'a general industry classification. 01 Industrial 02 Utility 03 Transportation 04 Bank/Savings & Loan 05 Insurance 06 Other Financial
Financial	financial=0 if industry=1,2,3 financial=0 if industry=4,5,6
Country SDG	Sustainable Development Goal scores of each country
Country	41 countries from different regions
Year	2002-2019

Notes: This table includes the study variables used in both fixed-effects model and the regression model in Robustness tests.

Source: Data Glossary, ESG Metrics in Eikon & DataStream by Refinitiv

CHAPTER 4

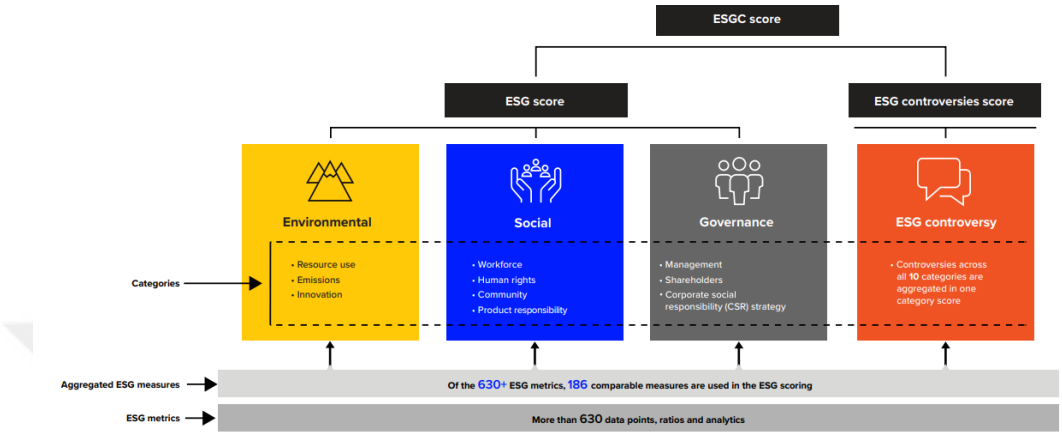
DATA AND FINDINGS

4.1. DATA AND DESCRIPTIVE STATISTICS

We collect the ESG data from the Refinitiv database. By extending back to 2002, Refinitiv is one of the most comprehensive ESG datasets in the business, covering over 80% of the global market value and approximately 600 different ESG criteria. They report relative ESG scores for more than 9000 companies taking values from the 0 to 100 range. Higher relative ESG scores represent better ESG performance. Refinitiv uses publicly available data, such as annual reports of companies, CSR reports, and information on company websites to generate ESG scores. Human force and algorithmic methods are used during the collection process to sustain a sufficient quality level for the collected data. The total ESG score consists of three main components: E, S, and G. Of these three pillar scores, environmental and social scores are compared within industries. In contrast, governance scores are compared within countries to generate the relative ESG scores. To differentiate the importance of each factor in various industries, the database puts weights on a scale of 1-10 on each metric for each sector (Refinitiv, 2022).

In Refinitiv, the E, S, and G pillar scores are composed of ten category scores. In particular, the environmental score encompasses resource use, emissions, and innovation; the social score includes workforce, human rights, community, and product responsibility; and the governance score comprises management, shareholder, and CSR strategy. The database also reports the ESG Combined Score, which combines ESG and ESG Controversies scores. ESG Controversies Score shows the company's exposure to environmental, social, and governance disputes and other lousy news events from Refinitiv. The controversy score values of the firms range between 0 to100, and firms receive a score of 100 if there are no controversies. Thus, the ESG and ESG combined scores are equal when there are no controversies. The summary of the ESG score calculation methodology is given in Figure 1. Refinitiv platform

presents ESG data for various companies from different regions and industries, and Figure 2 shows the coverage of Refinitiv data worldwide.[1]



Source: Refinitiv May 2022, Methodology

Figure 1. ESG Score Calculation Methodology

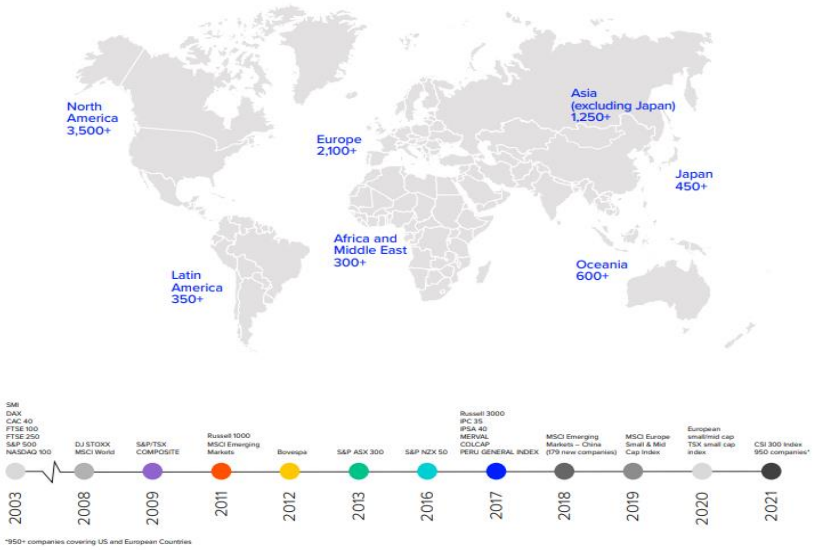


Figure 2. Global Coverage of Refinitiv Data

[1] https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

In this study, we collect the financial performance measurement data, ROA, ROE, EPS, and MTBV, from Refinitiv's Datastream. This statistical data source allows for the investigation of connections between data series. It enables users to analyze nations, regions, and sectors, makes correlation and association analysis, test trade options and investing, and use time series data accessible from the 1900s onward. The database includes financial profiles of more than 160 countries collected from their central banks and governmental, private, and public institutions (Refinitiv Datastream, 2022).

This study starts with 68,959 observations from 69 countries from 2002 to 2019. We drop the countries with ESG data for less than ten firms for at least ten years. The final sample includes 67,869 observations from 41 countries. The countries in the final selection are Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Ireland, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, Russian Federation, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Kingdom, and the United States. In addition, we convert the lowest and highest 1-percentile outliers for ROA, ROE, EPS, MTBV, leverage and total assets into missing values and use our data excluding outliers for the analysis.

We classify the countries into developed European Union, Other Developed, United States, and Emerging[2]. Table 3 shows the number of firms per year according to the development levels of countries. The number of firms with ESG data has increased from 922 in 2002 to 5,967 in 2019. The highest number of firms belongs to 2018, with 7,125 firms. Observations from other developed countries constitute the majority of the sample (39%), followed by the United States (33%), emerging markets (15%), and the developed European Union (13%).

The sample includes firms from six industries based on Refinitiv's general industry classification. The covered sectors are Industrial, Utility, Transportation,

[2]We consider "S&P Dow Jones Indices' 2021 Country Classification Consultation," (2021), in classifying the countries as developed versus emerging countries.
The European Union members are determined from : https://european-union.europa.eu/principles-countries-history/country-profiles_en

Bank/Savings & Loan, Insurance, and Other Financial. The distribution of firms over industries is presented in Table 4. Most of the data is from the Industrial sector; around 71% of the firms each year belong to this industry. This sector is followed by Other Financial, Bank/Savings&Loan, Utility, Insurance, and Transportation. The number of observations is slightly different between Table 3 and Table 4 because 0.34% of the data does not have industry information.

Three of these six industries (Industrial, Utility, and Transportation) belong to the non-financial sector. In contrast, three of them (Banks/Savings & Loan, Insurance, and Other Financial) belong to the financial industry. Literature suggests that industry-specific properties may affect ESG considerations (Sassen et al., 2016). Thus, it is recommended to distinguish between financial and non-financial industries while conducting research (Nirino et al., 2021).

Table 3 Number of Firms with ESG Data by Country Groups Over Time

Year	US	Developed EU	Other Developed	Emerging	Total
2002	436	251	213	22	**922**
2003	438	258	218	22	**936**
2004	616	344	782	25	**1,767**
2005	686	420	1,045	29	**2,180**
2006	690	422	1,065	30	**2,207**
2007	707	442	1,171	70	**2,390**
2008	900	462	1,290	216	**2,868**
2009	1,018	462	1,489	333	**3,302**
2010	1,054	474	1,719	669	**3,916**
2011	1,045	481	1,745	743	**4,014**
2012	1,032	482	1,751	825	**4,090**
2013	1,031	482	1,828	860	**4,201**
2014	1,035	495	1,883	893	**4,306**
2015	1,705	515	2,026	912	**5,158**
2016	2,440	528	2,069	953	**5,990**
2017	2,611	592	2,140	1,187	**6,530**
2018	2,656	906	2,288	1,275	**7,125**
2019	2,254	769	1,837	1,107	**5,967**
Total Obs.	**22,354**	**8,785**	**26,559**	**10,171**	**67,869**

Notes: The table shows the number of firms with ESG data based on country development levels over the years. Our data covers the years between 2002 and 2019. The last row presents the total number of observations.

Table 4 The Distribution of Firms by Industry Over Time

	Industry						
Year	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
2002	643	76	26	74	39	60	**918**
2003	651	77	26	78	40	60	**932**
2004	1,241	125	54	121	72	142	**1,755**
2005	1,548	145	65	143	88	175	**2,164**
2006	1,572	149	65	139	88	178	**2,191**
2007	1,687	171	71	151	96	196	**2,372**
2008	2,003	229	90	192	116	218	**2,848**
2009	2,326	259	102	225	123	246	**3,281**
2010	2,792	298	130	260	137	278	**3,895**
2011	2,870	297	134	265	139	291	**3,996**
2012	2,929	297	137	265	138	310	**4,076**
2013	3,012	305	139	267	140	325	**4,188**
2014	3,089	311	142	270	142	340	**4,294**
2015	3,639	353	167	340	159	489	**5,147**
2016	4,207	366	181	460	187	576	**5,977**
2017	4,619	388	205	474	189	644	**6,519**
2018	5,089	400	216	494	189	731	**7,119**
2019	4,332	259	175	435	139	623	**5,963**
Total	**48,249**	**4,505**	**2,125**	**4,653**	**2,221**	**5,882**	**67,635**

Notes: The table shows the number of firms with ESG data over the years based on Refinitiv's general industry classification. The industries are defined as follows: 1: Industrial, 2: Utility, 3: Transportation, 4: Bank/Savings & Loan, 5: Insurance, 6: Other Financial

Table 5 shows the number of firms in each country over the years. We observe the highest number of firms in the United States, constituting 33% of the total data. The numbers increase in almost every country as time passes. This means that the number of firms that report ESG practices and provide related data has grown over the years. Also, the highest number of firms existed in 2018.

Figure 3 graphs the firms' number and mean ESG scores over time in Panel A and B, respectively. Both panels show the case of the entire sample, financial and non-financial industries, in three separate graphs. In Panel A, the total number of firms with ESG score data increases over time (especially after 2014) in the full sample and financial and non-financial sub-samples. The United States shows a very similar movement with the total number of firms, which means that the shifts in the United States highly affect the entire campaign. When the 2016-2019 period is considered, the highest number of firms in the sample are from the United States, followed by other developed, emerging, and developed European Union in all graphs.

Table 5 Number of Firms in Each Country

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Australia	7	7	69	81	83	87	97	202	287	299	313	357	377	374	392	398	398	356
Austria	8	9	14	17	17	19	19	18	16	16	16	15	15	15	16	18	29	27
Belgium	15	15	18	23	23	24	26	27	28	26	27	27	28	28	28	32	48	46
Brazil	1	1	1	1	1	10	23	38	82	85	85	90	91	91	89	96	91	37
Canada	18	18	89	103	104	170	255	263	292	282	276	289	302	311	321	318	318	192
Chile	0	0	0	0	0	2	7	13	20	21	22	22	23	25	42	43	42	22
China	1	1	2	2	2	9	28	54	85	87	87	93	102	110	113	304	346	491
Colombia	0	0	0	0	0	0	1	3	8	11	11	12	12	12	20	23	21	9
Denmark	13	14	17	20	20	23	23	23	25	25	25	25	26	27	29	31	42	42
Egypt	0	0	0	0	0	0	1	2	11	11	11	11	11	10	10	11	10	2
Finland	15	15	18	24	25	25	26	27	28	28	28	29	27	26	26	29	40	37
France	49	49	65	78	79	86	90	92	96	96	95	95	98	101	101	113	157	128
Germany	38	38	53	66	67	71	79	78	81	86	85	84	89	94	98	117	182	156
Greece	16	16	18	22	22	21	21	21	20	19	18	19	18	18	18	22	24	6
Hong Kong	5	5	40	47	49	64	71	86	138	153	154	162	174	177	181	207	217	205
India	0	0	0	0	0	7	21	33	59	79	82	88	93	100	104	106	113	144
Indonesia	0	0	0	0	0	0	6	13	25	25	28	33	35	38	39	42	42	29
Ireland	7	7	9	13	13	12	13	12	13	13	14	14	14	14	13	13	19	15
Israel	1	1	1	1	1	1	2	13	14	13	14	14	15	16	18	18	17	8
Italy	25	29	37	44	43	45	50	48	48	48	48	48	48	50	49	62	103	82
Japan	27	29	223	386	391	401	401	409	412	409	403	411	417	426	430	433	440	375

Table 5 Number of Firms in Each Country (Continued)

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Malaysia	0	0	0	0	0	0	11	16	41	45	46	48	50	52	54	58	59	57
Mexico	1	1	1	1	1	7	16	18	23	25	28	30	35	34	41	45	48	22
Netherlands	21	21	26	30	30	31	31	32	33	36	39	39	39	38	42	42	61	49
New Zealand	0	0	7	10	10	10	10	10	11	12	12	16	17	49	55	59	59	52
Norway	14	14	20	23	24	23	22	21	22	22	22	22	23	26	26	31	68	58
Philippines	0	0	0	0	0	0	1	6	18	22	21	23	25	26	26	26	25	18
Poland	0	0	0	0	0	1	6	10	25	27	28	29	33	32	32	34	41	21
Portugal	5	5	5	10	12	12	12	12	12	12	11	11	11	10	11	11	15	8
Russian Federation	1	1	1	1	2	7	25	31	31	31	32	33	34	35	34	34	42	21
Singapore	0	0	28	36	36	39	44	51	50	50	51	51	50	48	48	47	44	49
South Africa	1	1	1	1	1	1	14	18	49	79	144	141	136	132	131	131	128	115
South Korea	1	1	3	3	3	9	26	40	99	105	108	108	112	120	120	134	133	26
Spain	22	23	39	44	44	47	45	45	45	46	44	45	47	47	47	51	75	52
Sweden	33	33	43	51	49	47	48	48	49	49	50	50	53	65	68	73	135	127
Switzerland	35	35	40	45	47	56	57	65	67	65	68	69	70	69	68	75	125	102
Taiwan	1	1	1	1	1	3	17	30	126	130	132	133	135	135	136	140	144	49
Thailand	0	0	0	0	0	2	5	11	22	21	25	29	33	36	38	41	45	42
Turkey	0	0	0	0	0	0	13	16	24	25	25	26	27	26	26	31	54	22
United Kingdom	105	108	262	310	317	311	305	329	327	335	330	329	326	410	410	420	469	414
United States	436	438	616	686	690	707	900	1,018	1,054	1,045	1,032	1,031	1,035	1,705	2,440	2,611	2,656	2,254
Total	**922**	**936**	**1,767**	**2,180**	**2,207**	**2,390**	**2,868**	**3,302**	**3,916**	**4,014**	**4,090**	**4,201**	**4,306**	**5,158**	**5,990**	**6,530**	**7,125**	**5,967**

Notes: This table shows the number of firms that propose ESG score data in each country

Panel B shows that there is also an increasing trend in mean ESG scores over time. The highest mean ESG scores belong to the developed European Union countries for all years except 2002 and 2003. Moreover, the mean ESG scores for the United States differentiate from the rest of the world after 2014. The United States seems to fall behind Europe, especially in later years. The high increase in the number of firms included in the United States may have boosted the decline in mean ESG scores. The better performance of European Union firms may be associated with European ESG regulations. A set of European Union regulations known as the Sustainable Finance Disclosure Regulation (SFDR) aims to improve end-investors' comprehension and comparability of the sustainability profile of funds. The European Green Deal, which seeks to have the EU achieve carbon neutrality by 2050, is in line with the SFDR and other legislation (LaForge, 2022). Singhania and Saini (2021) stated in their study that developed countries have higher ESG score values than emerging ones. This idea is valid when we compare Developed European Union and Emerging groups. However, when the Other Developed (including the US) and Emerging groups are compared, the mean ESG score is higher in emerging countries. There may be several reasons behind this result. One is that a sizeable portion of the goods and services imported into developed countries come from developing markets like Brazil, China, and India. Emerging market businesses are spending more quickly to catch up with the competition in developed economies. Therefore, during the coming years, emerging markets are expected to impact the results of ESG practices significantly, and companies from emerging countries will invest in ESG. Prior research demonstrates that emerging markets have lower levels of investor protection, allowing upper management to follow the ventures like ESG-related enterprises continually (Martins, 2022).

In addition, the means of each pillar score of the firms have increased over time, as seen in Figure 4. One of the main reasons that triggered this increase is the introduction of the Sustainable Development Goals (SDG) by the United Nations in 2015 since ESG performances contain the themes of 2030 SDGs. Strategic business objectives are increasingly linked using these SDGs (Wilburn&Wilburn, 2020). Since SDG includes various sustainability practices, it also affects the ESG scores of firms in different countries.

In our study, we also collect the SDG scores of each country between 2002-2019 from the Sustainable Development Report (2022). Each country's SDG scores are based on their overall performance on 17 SDGs, consisting of sub-indicators. The overall ranking calculates how far the country has accomplished all 17 SDGs by attaining an equal weight for each goal. The score represents a country's position relative to the aim, the lowest possible result (score of 0), and the objected score (score of 100). In other words, the result can be considered as a percentage of SDG accomplishment. For example, if a score is 100, all SDGs have been achieved successfully. The Sustainable Development Report, known initially as the SDG Index & Dashboards, evaluates various nations' performance in meeting Sustainable Development Goals worldwide. The voluntary national evaluations and the traditional SDG metrics both benefit from it. The trend arrows and dashboard show which activities are most important to take next and whether a country is on track or off track to meet its objectives and targets by 2030 based on the most recent trend data. One-third of the data comes from non-traditional sources such as research institutions, universities, and non-governmental groups, while two-thirds come from official statistics (usually UN custodian agencies).[3]

The descriptive statistics of all the study variables are given in Table 6. Before conducting the analyses in this study, we convert the lowest and highest 1-percentile outliers into missing values. The ESG combined score values change from 0 to 93.84, with a mean of 38.81 and a standard deviation of 19.04. According to the wide variability of this variable, some businesses have high ESG performance ratings, while others have lower levels of this metric. The highest mean of the three ESG pillar scores belongs to the social score, which is opposed to Tamimi and Sebastianelli (2017), who state that the governance score has the highest value among the three components. In our data, the social score is followed by a governance score with a mean of 40.74 and an environmental score with a mean of 30.14.

[3] www.sdgindex.org

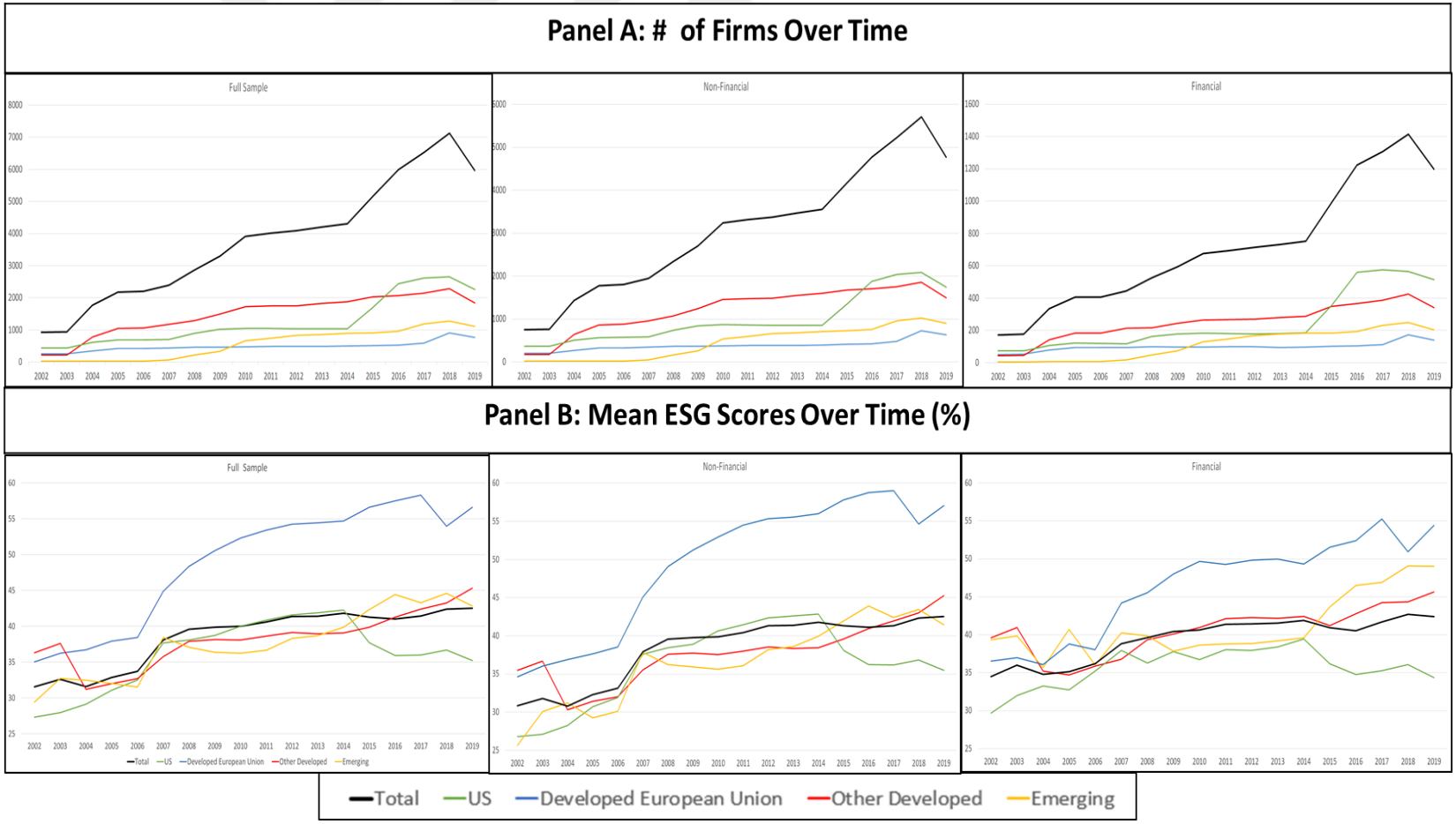


Figure 3. Number of Firms and Mean ESG Scores Over Years

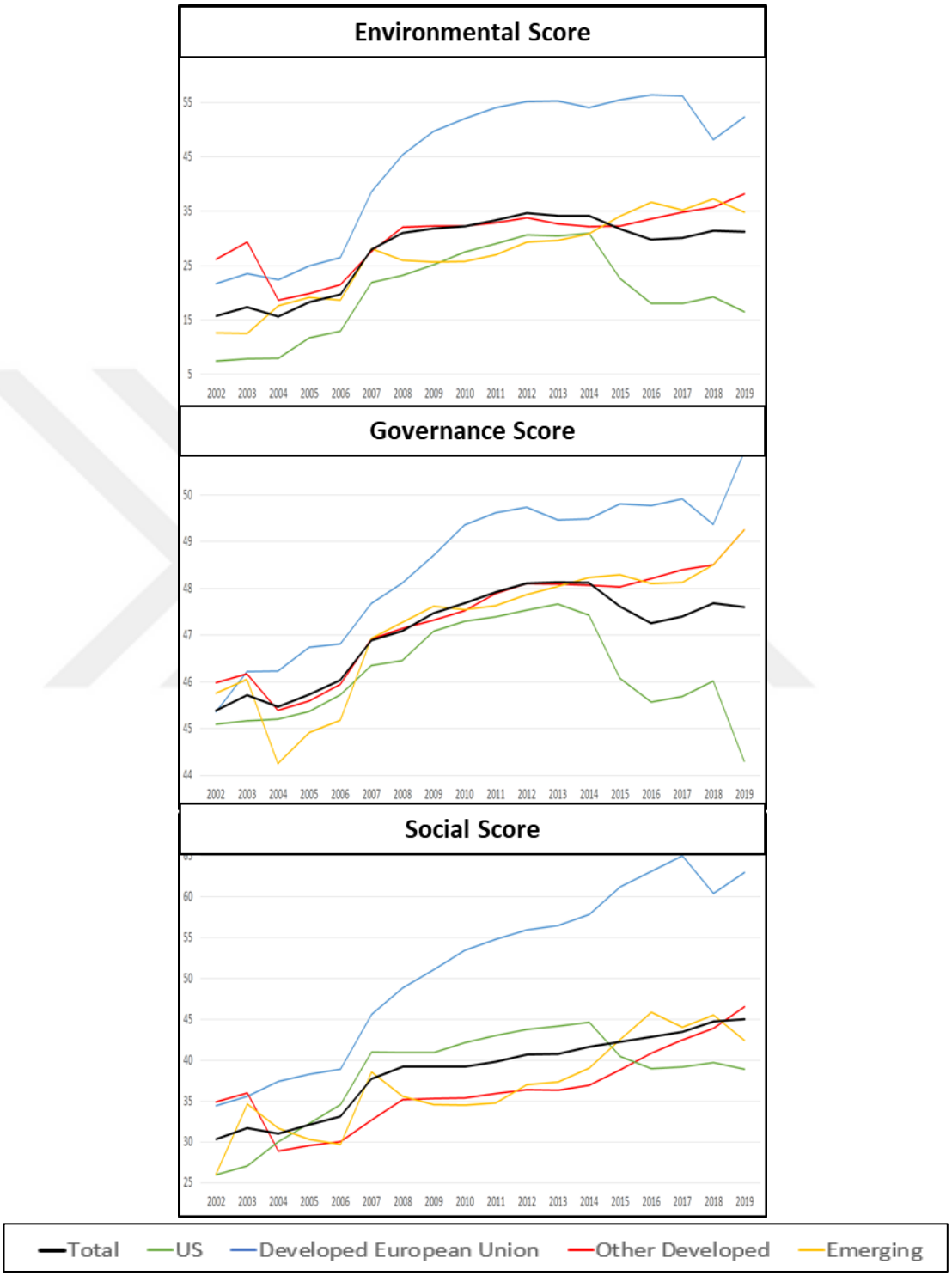


Figure 4. Mean E, S, and G Scores Over Years

We apply some practical tests before choosing the regression model for our panel data by following the approach of Nguyen et al. (2019), and the results are given in Table 7. In the first stage, we consider our sample as a random sample. Secondly, we aim to compare the random effects and fixed models by applying the Hausman test for each dependent variable In STATA. Here, the null hypothesis supports that the random effect is better and needs to be rejected if the p-value is smaller than 1%. According to the results, the fixed effect model best suits ROA, ROE, and MTBV; however, the random effects model fits better for EPS. In the third stage of our test, we apply Breusch and Pagan Lagrange Multiplier test for testing the pooled versus random effects for ROE, which has the null hypothesis that pooled regression is better, and this needs to be rejected if the p-value is smaller than 1%. The result shows that random effects regression is better for this variable. Since our whole sample is convenient for the fixed effect regression model, frequently used on panel data to eliminate individual-specific characteristics and omit bias on variables, we choose the fixed effects model by using firm fixed effect as our primary methodology. We also apply the heteroscedasticity test for the variables, and the results show heteroscedasticity for all variables.

For this reason, we use the robust option of STATA. Finally, we check for multicollinearity regarding all variables using Variance Inflation Factor analysis. We report no multicollinearity in any study variables since the mean VIF values are less than 5.

We compute some t-tests to test whether the mean values of the study variables change according to different criteria, including industry, development level, and time differences. The results of subjected t-tests are given in Table 8. Between the financial and non-financial sectors, we observe different mean values of the variables. For instance, the ROE, ESG combined score, social pillar score, and total asset values are higher in financial companies, while the other variables have relatively lower values. All of the means are significantly different from each other between these industries. For the development level of the countries, we aim to observe whether the study variable values change between emerging and developed countries. ROA, ROE, EPS, and total asset measures show higher values in emerging countries, while the mean

MTBV value is higher in developed countries. The mean differences are significant except for social pillar and leverage. Finally, the mean results also change between the periods which are before 2015 and 2015 and after. Except for EPS and governance pillar score, all mean differences significantly differ here. Since all the mean scores of the study variables, including dependent and independent variables, change according to industry, development level, period, and almost all of these differences are significant as the result of the computed t-tests, we also run our baseline model for these different panels, separately.

The Pearson correlation coefficients of the variables are given in Table 9. The variables that have Pearson correlation coefficients, which are not greater than 0.90, indicate that there is a non-multicollinearity situation, which shows the variables are not dependent on each other significantly between these variables (Hair, 2010). Most variables are positively correlated, and the ESG score and its components have a high and positive correlation, consistent with the existing literature (Verbeeten et al., 2016; Velte, 2017; Miralles-Quirós et al., 2019). ROA, ROE, and MTBV negatively correlate with a leverage ratio. Also, MTBV negatively correlates with ESG combined and environmental and governance scores.

Table 6 Summary Statistics of Variables

Variable	Obs	Mean	Std. dev.	Min	Max
Variables of Interest					
ESG Combined Score	67,869	38.81	19.04	0	93.84
E Score	67,727	30.14	28.42	0	99.06
S Score	67,869	47.41	22.68	0.14	99.38
G Score	67,725	40.74	23.01	0.05	98.63
Dependent Variables					
ROA	66,062	4.61	9.86	-71.35	35.45
ROE	64,697	10.02	21.45	-146.26	98.66
EPS	55,381	41.88	185.61	0.01	2,932.78
MTBV	64,052	2.69	2.78	-6.18	22.74
Control Variables					
Leverage	62,255	26.65	18.03	0.01	91.8
Total Assets (U.S.$)	66,229	17,000,000	38,000,000	7,263	349,000,000

Notes: This table shows the descriptive statistics of study variables.

Table 7 Practical Tests for Choosing Regression Model

Hausman Test (Fixed versus Random Effects)

Dependent Variable	Test Result	p-Value
ROA	Fixed Effect	0.000
ROE	Fixed Effect	0.000
EPS	Random Effect	0.476
MTBV	Fixed Effect	0.000

Breusch and Pagan LM test for random effects (Pooled versus Random Effect)

Dependent Variable	Test Result	p-Value
ROA	Random Effect	0.000
ROE	Random Effect	0.000
EPS	Random Effect	0.000
MTBV	Random Effect	0.000

Wald Test (Heteroskedasticity Test)

Dependent Variable	Test Result	p-Value
ROA	Heteroskedasticity	0.000
ROE	Heteroskedasticity	0.000
EPS	Heteroskedasticity	0.000
MTBV	Heteroskedasticity	0.000

Notes: Table reports the Hausman Test, Breusch and Pagan LM test, and Wald Test for four dependent variables.

Table 8 t-tests for Different Sub-samples

Variable	FULL SAMPLE (N:67869) (1)	Non-Financial (N:55,113) (2)	Financial (N:12,756) (3)	Diff. & Sign. (3-2)	Emerging (N : 10,171) (4)	Developed (N :57,698) (5)	Diff. & Sign. (5-4)	Before 2015 (N:37,099) (6)	2015 & after (N:30,770) (7)	Diff. & Sign. (7-6)
Return On Assets	4.61	4.87	3.46	-1.42***	6.55	4.27	-2.28***	5.51	3.53	-1.98***
Return On Equity	10.02	9.90	10.48	0.58***	13.51	9.38	-4.13***	11.71	7.95	-3.76***
Earnings Per Share	41.88	42.72	39	-4.17**	46.05	41.07	-4.98**	41.85	41.92	0.07
Market to Book Value	2.69	2.93	1.70	-1.23***	2.62	2.70	0.08***	2.57	2.84	0.27***
ESG Combined Score	38.81	38.66	39.50	0.84***	40.08	38.59	-1.49***	37.33	40.60	3.27***
Environment Pillar Score	30.14	31.41	24.63	-6.78***	32.15	29.78	-2.37***	29.54	30.86	1.32***
Governance Pillar Score	47.41	47.50	47.02	-0.48**	48.14	47.28	-0.86***	47.32	47.52	0.2
Social Pillar Score	40.74	40.33	42.53	2.2***	40.52	40.78	0.26	38.23	43.75	5.52***
Total Debt % Total Assets	26.65	26.96	25.31	-1.65***	26.49	26.68	0.19	26.11	27.32	1.21***
Total Assets (USD)	17,045,489	11,820,412	41,680,767	29,860,355***	18,808,334	16,732,974	-2,075,360***	19,313,177	14,343,563	-4,969,614***

Notes: The table shows the number of observations and mean values of the study variables in panels including different industries, development levels and time periods

Table 9 Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ESG Combined Score	1.00										
(2) Environment Pillar	0.81	1.00									
(3) Governance Pillar	0.66	0.39	1.00								
(4) Social Pillar	0.85	0.70	0.40	1.00							
(5) ROA	0.09	0.08	0.07	0.05	1.00						
(6) ROE	0.10	0.08	0.07	0.08	0.83	1.00					
(7) EPS	0.02	0.05	-0.01	-0.01	-0.01	-0.01	1.00				
(8) MTBV	-0.02	-0.07	-0.03	0.02	0.14	0.18	-0.03	1.00			
(9) Leverage	0.00	0.03	-0.01	0.02	-0.06	-0.07	-0.02	0.00	1.00		
(10) Total Assets ($)	0.22	0.24	0.16	0.24	-0.02	0.03	0.05	-0.09	-0.01	1.00	
(11) Country_SDG	0.11	0.17	0.02	0.09	-0.08	-0.08	0.05	-0.06	0.00	0.05	1.00

Notes: The Pearson correlation coefficients represent the relationship between study variables.

4.2. MULTIVARIATE ANALYSIS

We run six fixed effects regression models using the model developed in Section 3.2 of this thesis for each alternative dependent variable. Sections 4.2.1, 4.2.2, 4.2.3, and 4.2.4 show the regression results for dependent variables ROA, ROE, EPS, and MTBV, respectively.

Model (1) measures the effect of ESG combined score on financial performance with a firm fixed effect but without any control variables. Model (2) controls the same model for previously shown firm-level control variables, including leverage ratio and total assets. In Model (3), since many of the conditions belong to different countries and years change between each other, we also include country and year fixed effects by adding an interaction term (country*year) into the equation. We present standard errors calculated using the robust option of STATA regressions, which takes the heterogeneity and lack of normality into account without changing the point estimate. The robust standard errors are given in parentheses.

In the first stage, we run three regressions for two Panels. Panel A includes ESG combined scores as the primary explanatory variable, while Panel B has E, S, and G scores individually. We choose Model (3) of these three models as our base model since it contains all the control variables and country*year interaction terms. Then, we run our base model for different industries, development levels, and time intervals.

We test the significance of the results at the levels 1%, 5%, and 10%, represented by ***, **, and *, respectively. The six regression models (three for ESG combined score and three for E, S, and G score) are run four times for each dependent variable in STATA software.

4.2.1. Fixed Effect Regressions- Dependent Variable: ROA

We run the three main regression models to test our hypothesis. In Panel A, our main variable of interest is ESG combined score, and in Panel B, we test the effect of each ESG component individually. The results of the regressions are given in Table 10. Model (1) and Model (2) results show that the ESG combined score has a significant

and negative effect on ROA, which is in line with Duque-Grisales and Aguilera-Caracuel (2019). This effect becomes positive and significant when we add the year-fixed effect and country*year interaction term in Model (3). In Panel B, The impact of environmental and social pillar scores are negative and significant based on Model (1) and Model (2); however, their effect turns insignificant for the environmental pillar and positive for the social pillar in Model (3).

On the other hand, the governance pillar score has no significant effect in all models. We also report that larger firms have higher ROA, consistent with Kim and Li (2021), and higher leverage leads to lower ROA for both Panel A and Panel B. The coefficients of both control variables are statistically significant except for the firm size coefficient in Panel A of Model (2).

We run our base model, Model (3), including all the control variables with interaction term, firm, and year fixed effects for Panel A and Panel B, which include financial and non-financial firms, respectively, and present our results in Table 11. Some of the outcomes differ between the two types of companies. ESG combined score shows a positive and significant relationship for both industries. However, the environmental pillar score effect is positive for financial companies, while this effect turns negative and insignificant for non-financial companies. Therefore, applying environmental practices increases financial performance while it shows no impact on the financial performance of non-financial firms. Regarding the control variables, firm size and leverage effects are negative for financial firms. We also observe a negative impact of leverage on the ROA; however, the firm size effect is significantly positive in non-financial firms.

We construct four panels for different development levels of countries. Panel A, B, C, and D represent the United States, the developed European Union, and other developed and emerging countries; the outcomes are shown in Table 12. The base model is run for different development levels of the countries to observe the effect of ESG combined score on ROA in each of the four development levels. As expected, the results differ according to the development level of countries. In Panel A, ESG combined score, and ROA relationship is significantly positive, as well as the social and governance pillar scores. Only the environmental component shows no effect on

ROA. ESG combined score has a significantly positive impact on ROA in other developed and emerging countries.

Additionally, all ESG components have an insignificant effect on ROA for Panel B and Panel C. In Panel D, only the environmental component affects ROA positively. The firm size affects ROA positively for the other developed countries, while this effect is negative in emerging development levels. There is no observed effect of firm size in the United States and the developed European Union. For the leverage, the relationship is significantly negative in all development levels.

We also ran our base model separately before and after 2015, which are included in Panels A and B and reported in Table 13. Before 2015, ESG combined score had a positive and significant effect on ROA, but this effect became insignificant after 2015. The proposal of Sustainable Development Goals in 2015 may cause this. The more companies apply ESG practices in their management strategies, the less effect of ESG score can be observed. The social pillar score's impact was significantly positive before 2015, which turned insignificant after this year. However, environmental and governance pillar scores have no effect before 2015 and after 2015. Control variables also have different results for these two time periods. Firm size and ROA did not have a relationship before 2015, but they related positively after 2015. This means more prominent companies have started to get more financial benefits after this year. The effect of the leverage ratio, on the other hand, remains harmful for two-time intervals.

Table 10 Firm Fixed Effect Regressions- Dependent Variable: ROA (Full Sample)

Dependent Variable: ROA	**Variable of Interest: ESG Combined Score**			**Variable of Interest: E, S, G Pillar Scores**		
VARIABLES	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
ESG Combined Score	-0.020***	-0.016***	0.017***			
	[0.002]	[0.003]	[0.003]			
Environment Pillar Score				-0.020***	-0.017***	0.001
				[0.002]	[0.002]	[0.002]
Social Pillar Score				-0.008***	-0.007***	0.008***
				[0.003]	[0.003]	[0.003]
Governance Pillar Score				0.003	0.001	0.001
				[0.002]	[0.002]	[0.002]
Log. of Total Assets		0.111	0.470***		0.299**	0.492***
		[0.112]	[0.138]		[0.118]	[0.138]
Total Debt % Total Assets		-0.153***	-0.146***		-0.152***	-0.146***
		[0.005]	[0.005]		[0.005]	[0.005]
Constant	5.442***	7.884***	0.81	5.470***	5.094***	0.757
	[0.092]	[1.671]	[2.113]	[0.112]	[1.754]	[2.119]
Observations	64,960	59,149	59,107	64,831	59,036	58,994
Adjusted R-squared	0.5526	0.5115	0.5321	0.5549	0.5134	0.5328
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes
Country*Year Interaction	No	No	Yes	No	No	Yes
F	81.71	310.7	273.1	86.13	205	157.6

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 11 Fixed Effect Regressions- Dependent Variable: ROA (By Industry)

Dependent Variable: ROA	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.018***		0.010*	
	[0.003]		[0.006]	
Environment Pillar Score		-0.004		0.013***
		[0.003]		[0.004]
Social Pillar Score		0.008***		0.004
		[0.003]		[0.006]
Governance Pillar Score		0.003		-0.005
		[0.002]		[0.004]
Log. of Total Assets	0.595***	0.632***	-0.365	-0.397*
	[0.155]	[0.156]	[0.225]	[0.224]
Total Debt % Total Assets	-0.152***	-0.152***	-0.081***	-0.081***
	[0.006]	[0.006]	[0.010]	[0.010]
Constant	-0.541	-0.732	11.208***	11.938***
	[2.349]	[2.355]	[3.655]	[3.645]
Observations	48,686	48,584	10,388	10,377
Adjusted R-squared	0.5431	0.5439	0.4343	0.4349
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	239.1	138.2	24.65	17.1

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 12 Firm Fixed Effect Regressions- Dependent Variable: ROA (By Development Level)

Dependent Variable: ROA	United States		Developed European Union		Other Developed		Emerging	
VARIABLES	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
ESG Combined Score	0.025***		0.007		0.014***		0.017***	
	[0.006]		[0.006]		[0.005]		[0.006]	
Environment Pillar Score		-0.003		-0.001		0.001		0.011**
		[0.004]		[0.005]		[0.004]		[0.005]
Social Pillar Score		0.009*		0.006		0.010**		-0.003
		[0.006]		[0.006]		[0.004]		[0.006]
Governance Pillar Score		0.009**		-0.002		-0.004		0.003
		[0.004]		[0.004]		[0.003]		[0.004]
Log. of Total Assets	-0.015	0.007	-0.052	-0.025	1.270***	1.296***	-0.705**	-0.693*
	[0.233]	[0.234]	[0.294]	[0.295]	[0.229]	[0.230]	[0.358]	[0.359]
Total Debt % Total Assets	-0.120***	-0.119***	-0.119***	-0.119***	-0.175***	-0.176***	-0.150***	-0.150***
	[0.009]	[0.009]	[0.013]	[0.013]	[0.009]	[0.009]	[0.013]	[0.013]
Constant	7.093*	6.936*	8.970**	8.741*	-11.018***	-11.072***	20.793***	20.952***
	[3.625]	[3.633]	[4.546]	[4.563]	[3.460]	[3.474]	[5.509]	[5.518]
Observations	18,985	18,952	7,943	7,942	23,173	23,099	9,006	9,001
Adjusted R-squared	0.6235	0.6247	0.4616	0.4614	0.4242	0.4247	0.6021	0.6018
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Interaction	No	No	Yes	Yes	Yes	Yes	Yes	Yes
F	63.75	36.48	33.75	19.62	138.9	83.02	69.82	41.27

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 13 Firm Fixed Effect Regressions- Dependent Variable: ROA (Before-After 2015)

Dependent Variable: ROA	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.018***		0	
	[0.004]		[0.005]	
Environment Pillar Score		0.002		-0.005
		[0.003]		[0.005]
Social Pillar Score		0.012***		-0.01
		[0.004]		[0.006]
Governance Pillar Score		0		-0.001
		[0.003]		[0.004]
Log. of Total Assets	0.128	0.129	2.371***	2.412***
	[0.190]	[0.189]	[0.381]	[0.381]
Total Debt % Total Assets	-0.166***	-0.166***	-0.178***	-0.178***
	[0.008]	[0.008]	[0.011]	[0.011]
Constant	7.193**	7.323**	-27.264***	-27.231***
	[2.946]	[2.945]	[5.750]	[5.751]
Observations	32,890	32,779	25,850	25,845
Adjusted R-squared	0.4888	0.4904	0.6544	0.6547
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	158.8	93.17	91.77	56.73

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

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4.2.2. Fixed Effect Regressions- Dependent Variable: ROE

In the second stage, we run the three regressions for testing the effect of independent and control variables of ROE and report our results in Table 14. In Panel A, our primary variable of interest is ESG combined score, and in Panel B, we test the effect of each ESG component on ROE individually. The ESG combined score significantly and negatively impacts ROE in Model (1) and Model (2). However, this effect becomes positive and significant, consistent with Nirino et al. (2021) in Model (3). Regarding the Panel B outcomes, environmental and social scores significantly negatively affect ROE in Model (1) and Model (2).

In contrast, these effects turn insignificant for the environmental pillar score and positive for the social pillar score in Model (3). The governance score has an insignificant effect in all three models. For ROE, firm size positively impacts ROE results; however, leverage ratio has a negative and significant effect on ROE significantly for both Panel A and B.

We run the base regression model by the industry for non-financial and financial firms covered by Panel A and B, respectively. The results are shown in Table 15. ESG combined score positively and significantly affects ROE for both types of firms. The governance score has an insignificant effect on both industries. The coefficient of the environmental score is insignificant in non-financial companies, while the impact is significantly positive for financial ones. This means that emphasizing environmental concerns makes firms achieve financial success. Although the social pillar score positively affects ROE in non-financial companies, it has no effect in the financial sector. Therefore, emphasizing social activities makes the non-financial sector gain financial benefits. For the control variables, the outcomes are different from each other. Firm size does not show any significant effect in financial companies, while it increases ROE in non-financial ones. On the other hand, the leverage ratio shows a negative and significant impact for both types of firms.

Table 14 Firm Fixed Effect Regressions- Dependent Variable: ROE (Full Sample)

Dependent Variable: ROE	Variable of Interest: ESG Combined Score			Variable of Interest: E, S, G Pillar Scores		
VARIABLES	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
ESG Combined Score	-0.038***	-0.033***	0.061***			
	[0.006]	[0.007]	[0.008]			
Environment Pillar Score				-0.048***	-0.046***	0.006
				[0.005]	[0.006]	[0.006]
Social Pillar Score				-0.016**	-0.016**	0.029***
				[0.007]	[0.007]	[0.008]
Governance Pillar Score				0.008	0.004	0.003
				[0.005]	[0.005]	[0.005]
Log. of Total Assets		0.746***	1.851***		1.327***	1.913***
		[0.284]	[0.353]		[0.298]	[0.354]
Total Debt % Total Assets		-0.359***	-0.351***		-0.360***	-0.353***
		[0.016]	[0.016]		[0.016]	[0.016]
Constant	11.611***	9.512**	-11.630**	11.909***	1.07	-11.677**
	[0.242]	[4.195]	[5.388]	[0.287]	[4.412]	[5.403]
Observations	63,572	57,719	57,678	63,435	57,606	57,565
Adjusted R-squared	0.4276	0.4028	0.431	0.4297	0.4043	0.4309
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes
Country*Year Interaction	No	No	Yes	No	No	Yes
F	41.1	183.8	183.5	62.57	124.9	102.6

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 15 Firm Fixed Effect Regressions- Dependent Variable: ROE (By Industry)

Dependent Variable: ROE	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.058***		0.045***	
	[0.009]		[0.015]	
Environment Pillar Score		-0.003		0.027***
		[0.008]		[0.010]
Social Pillar Score		0.030***		0.009
		[0.009]		[0.015]
Governance Pillar Score		0.003		-0.004
		[0.006]		[0.011]
Log. of Total Assets	2.200***	2.291***	0.069	0.042
	[0.405]	[0.406]	[0.619]	[0.621]
Total Debt % Total Assets	-0.371***	-0.372***	-0.230***	-0.232***
	[0.018]	[0.018]	[0.027]	[0.027]
Constant	-15.863***	-16.185***	13.042	14.503
	[6.081]	[6.098]	[10.217]	[10.245]
Observations	47,211	47,109	10,431	10,420
Adjusted R-squared	0.4429	0.4429	0.3705	0.37
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	154.1	85.98	25.08	15.51

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

The four panels, Panel A, Panel B, Panel C, and Panel D, represent the United States, the Developed European Union, and Other Developed and Emerging countries, respectively, in Table 16. In all development groups, ESG combined score significantly positively affects ROE. The environmental pillar score shows no significant impact in the United States, the Developed European Union, and other developed countries, but the effect is significantly positive in emerging ones. This means emphasizing environmental practices can increase the ROE of the firms in emerging markets. The ESG components have no significant effect on ROE based on the results of European Union countries. The social pillar score affects ROE only in the United States and other developed countries. The governance score does not show any significant effect in none of the development levels. Regarding the results of control variables, bigger firm size decreases ROE only in the United States; in other groups, it makes ROE increases. Finally, ROE falls as the leverage ratio increases in all development levels.

The periods before and after 2015 are represented by Panel A and Panel B, respectively. The outcomes are shown in Table 17. The ESG combined score shows a significant and positive effect for both periods. Environmental and governance pillar scores do not affect ROE in any period. However, the social pillar score makes ROE increases before 2015, while this effect turns insignificant after 2015. In both periods, more prominent companies have higher ROE values as ESG combined score value and its components increase. The leverage effect remains negative and significant both before 2015 and after 2015.

Table 16 Firm Fixed Effect Regressions- Dependent Variable: ROE (By Development Level)

Dependent Variable: ROE	United States		Developed European Union		Other Developed		Emerging	
VARIABLES	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
ESG Combined Score	0.069***		0.030*		0.062***		0.061***	
	[0.017]		[0.018]		[0.012]		[0.018]	
Environment Pillar Score		0.008		-0.013		0.004		0.035**
		[0.013]		[0.015]		[0.010]		[0.015]
Social Pillar Score		0.034**		0.019		0.034***		0.008
		[0.016]		[0.017]		[0.012]		[0.018]
Governance Pillar Score		0.012		0.006		-0.004		-0.01
		[0.011]		[0.013]		[0.008]		[0.012]
Log. of Total Assets	-1.220*	-1.215*	2.250**	2.354**	3.859***	3.958***	1.962**	1.984**
	[0.625]	[0.626]	[0.920]	[0.923]	[0.538]	[0.540]	[0.876]	[0.877]
Total Debt % Total Assets	-0.250***	-0.252***	-0.278***	-0.278***	-0.457***	-0.460***	-0.352***	-0.351***
	[0.030]	[0.030]	[0.037]	[0.037]	[0.025]	[0.025]	[0.037]	[0.037]
Constant	33.498***	33.871***	-17.885	-18.784	-41.311***	-41.583***	-10.803	-9.761
	[9.581]	[9.592]	[14.452]	[14.491]	[8.104]	[8.137]	[13.511]	[13.450]
Observations	18,080	18,047	7,846	7,845	22,790	22,716	8,962	8,957
Adjusted R-squared	0.4673	0.4677	0.371	0.3707	0.3932	0.3925	0.482	0.4816
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Interaction	No	No	Yes	Yes	Yes	Yes	Yes	Yes
F	36.16	19.9	19.87	12.12	125.3	72.49	34.52	19.46

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 17 Firm Fixed Effect Regressions- Dependent Variable: ROE (Before-After 2015)

Dependent Variable: ROE	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.055***		0.042***	
	[0.011]		[0.016]	
Environment Pillar Score		0.007		0
		[0.008]		[0.014]
Social Pillar Score		0.039***		-0.012
		[0.010]		[0.016]
Governance Pillar Score		0.002		-0.003
		[0.007]		[0.012]
Log. of Total Assets	1.010**	1.030**	6.116***	6.266***
	[0.497]	[0.498]	[0.999]	[0.999]
Total Debt % Total Assets	-0.382***	-0.384***	-0.482***	-0.482***
	[0.022]	[0.022]	[0.033]	[0.033]
Constant	3.46	3.51	-73.792***	-73.619***
	[7.723]	[7.733]	[14.945]	[14.979]
Observations	32,215	32,104	25,079	25,074
Adjusted R-squared	0.4236	0.4243	0.5637	0.563
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	108.6	63.89	72.9	42.22

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

4.2.3. Fixed Effect Regressions- Dependent Variable: EPS

We run our models for EPS to measure the effect of ESG combined score and its relative pillars on financial performance. In Table 18, for Panel A, which includes the ESG combined score as the primary variable of interest, results show that the ESG combined score significantly affects the value EPS positively for all models. Regarding Panel B, environmental and social pillar scores increase EPS when we do not include any control variables, while governance score does not affect EPS significantly. In Model (2), only the social pillar score significantly affects EPS, and in Model (3), EPS is impacted considerably only by the environmental pillar score. Firm size affects EPS positively, and leverage affects it negatively, and both coefficients are significant.

Table 19 reports the results for different industries (financial and non-financial), which are included in Panels A and B. We report an insignificant effect of ESG combined score on EPS for both financial and non-financial industries. The impact of environmental score differs between both sectors, and while it does not affect financial companies' EPS, it improves EPS positively in non-financial firms. The effect is also different in the two industries for the social score. It affects EPS negatively and significantly in non-financial firms, while the impact is insignificant in financial firms. The governance score does not have a significant effect on both industry. For the control variables, more prominent firms and firms with lower leverage have a significant advantage among others for both sectors.

Different development levels, which are United States, Developed European Union, Other Developed, and Emerging, represented by Panel A, Panel B, Panel C, and Panel D, have different outcomes shown in Table 20. In all four development groups, ESG combined score shows an insignificant effect on EPS. The relationship between ESG pillar scores and EPS results is also insignificant in the United States, developed European Union, and emerging countries. In other developed groups, only environmental score positively and significantly affects EPS. The firm size coefficient is positive and significant for all four development levels. On the other hand, leverage significantly negatively affects EPS for other developed and emerging countries. In contrast, in the other panels, results show no correlation between leverage and EPS.

The results for different periods are given in Table 21. Panel A contains the results of the baseline model before 2015, and Panel B has the outcomes of 2015 and after. The ESG combined score results are insignificant for both periods. Also, social and governance values are the same for two different periods. Only environmental score coefficients change over time; before 2015, EPS increased as the environmental score rose; however, this effect disappeared after 2015. Also, firm size affects EPS positively, while leverage ratio negatively affects EPS.

Table 18 Firm Fixed Effect Regressions- Dependent Variable: EPS (Full Sample)

Dependent Variable: EPS	**Variable of Interest: ESG Combined Score**			**Variable of Interest: E, S, G Pillar Scores**		
VARIABLES	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
ESG Combined Score	0.319***	0.125***	0.081**			
	[0.029]	[0.033]	[0.035]			
Environment Pillar Score				0.083***	0.005	0.052*
				[0.028]	[0.030]	[0.029]
Social Pillar Score				0.189***	0.098**	-0.02
				[0.037]	[0.038]	[0.039]
Governance Pillar Score				0.032	0.01	0.01
				[0.024]	[0.026]	[0.023]
Log. of Total Assets		15.857***	17.213***		15.852***	17.272***
		[1.361]	[1.661]		[1.399]	[1.666]
Total Debt % Total Assets		-0.433***	-0.330***		-0.434***	-0.331***
		[0.057]	[0.053]		[0.058]	[0.053]
Constant	28.861***	-200.259***	-222.365***	29.639***	-199.808***	-221.264***
	[1.193]	[20.444]	[25.923]	[1.480]	[21.171]	[26.005]
Observations	54,182	49,481	49,442	54,074	49,399	49,360
Adjusted R-squared	0.8283	0.8258	0.8411	0.8284	0.8258	0.8411
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes
Country*Year Interaction	No	No	Yes	No	No	Yes
F	118.5	84.2	48.64	37.15	49.34	29.24

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 19 Firm Fixed Effect Regressions- Dependent Variable: EPS (By Industry)

Dependent Variable: EPS	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.048		0.05	
	[0.038]		[0.095]	
Environment Pillar Score		0.077**		-0.064
		[0.032]		[0.072]
Social Pillar Score		-0.082*		0.117
		[0.042]		[0.096]
Governance Pillar Score		0.013		-0.005
		[0.025]		[0.051]
Log. of Total Assets	17.779***	17.833***	12.204***	12.314***
	[1.847]	[1.853]	[3.122]	[3.144]
Total Debt % Total Assets	-0.371***	-0.371***	-0.219	-0.221
	[0.052]	[0.052]	[0.186]	[0.186]
Constant	-224.669***	-223.361***	-158.514***	-161.485***
	[28.544]	[28.622]	[49.915]	[50.471]
Observations	40,180	40,106	9,209	9,201
Adjusted R-squared	0.8377	0.8378	0.8864	0.8863
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	49.63	31.11	5.306	3.239

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 20 Firm Fixed Effect Regressions- Dependent Variable: EPS (By Development Level)

Dependent Variable: EPS	**United States**		**Developed European Union**		**Other Developed**		**Emerging**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	-0.005		0.042		0.102		0.201	
	[0.009]		[0.063]		[0.075]		[0.123]	
Environment Pillar Score		-0.002		0.061		0.098*		0.021
		[0.007]		[0.037]		[0.059]		[0.120]
Social Pillar Score		-0.004		0.015		-0.106		0.169
		[0.008]		[0.053]		[0.077]		[0.146]
Governance Pillar Score		-0.006		-0.018		0.033		-0.051
		[0.006]		[0.046]		[0.046]		[0.088]
Log. of Total Assets	2.064***	2.079***	17.697***	17.610***	29.262***	29.487***	16.647***	16.688***
	[0.522]	[0.530]	[5.882]	[5.849]	[3.207]	[3.236]	[3.911]	[3.928]
Total Debt % Total Assets	-0.021	-0.02	-0.041	-0.043	-0.722***	-0.726***	-0.384**	-0.377**
	[0.014]	[0.014]	[0.092]	[0.092]	[0.117]	[0.118]	[0.177]	[0.179]
Constant	-28.082***	-28.011***	-275.305***	-274.613***	-356.722***	-356.712***	-212.544***	-210.343***
	[7.921]	[7.990]	[93.666]	[93.746]	[49.203]	[49.600]	[59.288]	[59.818]
Observations	15,420	15,395	6,753	6,753	19,162	19,110	8,107	8,102
Adjusted R-squared	0.8165	0.8165	0.5752	0.5751	0.8417	0.8417	0.8497	0.8496
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Interaction	No	No	Yes	Yes	Yes	Yes	Yes	Yes
F	6.28	4.486	3.16	2.014	40.61	25.18	7.64	5.346

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 21 Firm Fixed Effect Regressions- Dependent Variable: EPS (Before-After 2015)

Dependent Variable: EPS	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.061		0.022	
	[0.037]		[0.074]	
Environment Pillar Score		0.073**		-0.031
		[0.031]		[0.071]
Social Pillar Score		-0.008		0.058
		[0.038]		[0.084]
Governance Pillar Score		-0.011		-0.042
		[0.024]		[0.059]
Log. of Total Assets	16.151***	16.133***	14.457***	14.481***
	[2.436]	[2.444]	[3.447]	[3.447]
Total Debt % Total Assets	-0.297***	-0.298***	-0.238***	-0.237**
	[0.074]	[0.074]	[0.092]	[0.092]
Constant	-209.505***	-208.193***	-176.719***	-175.667***
	[38.751]	[38.878]	[53.369]	[53.297]
Observations	28,021	27,938	20,943	20,941
Adjusted R-squared	0.8706	0.8706	0.882	0.882
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	25.5	15.65	9.531	5.854

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The methodology used in the models is fixed-effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

4.2.4. Fixed Effect Regressions- Dependent Variable: MTBV

We run the same models by using MTBV as the dependent variable. Table 22 shows the results of the three regression models for the total sample of our data. We measure the effect of the ESG combined score and each pillar score in Panel A and B, respectively. According to the outcomes, ESG combined score has a significantly positive effect on MTBV in Model (2) and Model (3), while this effect is negative in Model (1). This means the relationship between these two variables is negative without any other controls; however, when we control the association for the firm size and leverage and add firm fixed effect and interaction term, the relationship turns positive.

Table 23 presents the results for the tested relationship using our baseline model by industry. Considering both types of industries, ESG combined score is positive and significant. Both environmental and social pillar scores cause a considerable increase in non-financial companies, while the governance pillar score does not affect MTBV. Environmental pillar score also increases MTBV significantly in financial companies; on the other hand, the remaining pillar scores do not have any significant effect. In the scope of the two industries, firm size and leverage coefficients show opposite signs. MTBV decreases as firm size increases, meaning that smaller companies have a financial advantage in both financial and non-financial industries. Leverage has a positive effect on MTBV for both types of companies.

We report the outcomes for different development levels, represented by Panel A, B, C, and D in Table 24. The ESG combined and environmental scores present positive and significant effects in all development-level groups, except for developed European Union countries. The coefficients of the social pillar score are significantly positive only for the United States and other developed countries. In addition, the governance score increases MTBV in three development groups, excluding emerging countries. We observe an insignificant impact of control variables in the developed European Union. In other development groups, firm size shows a negative and significant effect, while leverage positively and significantly impacts MTBV.

Table 22 Firm Fixed Effect Regressions- Dependent Variable: MTBV (Full Sample)

Dependent Variable: MTBV	Variable of Interest: ESG Combined Score			Variable of Interest: E, S, G Pillar Scores		
VARIABLES	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
ESG Combined Score	-0.002***	0.004***	0.006***			
	[0.001]	[0.001]	[0.001]			
Environment Pillar Score				-0.005***	-0.002***	0.002***
				[0.001]	[0.001]	[0.001]
Social Pillar Score				0.002***	0.004***	0.005***
				[0.001]	[0.001]	[0.001]
Governance Pillar Score				-0.001	0	-0.001
				[0.001]	[0.001]	[0.001]
Log. of Total Assets		-0.484***	-0.546***		-0.468***	-0.548***
		[0.030]	[0.035]		[0.030]	[0.035]
Total Debt % Total Assets		0.019***	0.019***		0.019***	0.019***
		[0.002]	[0.002]		[0.002]	[0.002]
Constant	2.751***	9.474***	10.366***	2.753***	9.241***	10.393***
	[0.026]	[0.438]	[0.524]	[0.031]	[0.450]	[0.526]
Observations	62,909	56,860	56,826	62,785	56,759	56,725
Adjusted R-squared	0.6574	0.6623	0.6816	0.658	0.6624	0.6817
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes
Country*Year Interaction	No	No	Yes	No	No	Yes
F	9.075	111.3	110.1	28.27	70.95	69.57

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 23 Firm Fixed Effect Regressions- Dependent Variable: MTBV (By Industry)

Dependent Variable: MTBV	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.006***		0.005***	
	[0.001]		[0.001]	
Environment Pillar Score		0.001*		0.002***
		[0.001]		[0.001]
Social Pillar Score		0.005***		0.001
		[0.001]		[0.001]
Governance Pillar Score		-0.001		0
		[0.001]		[0.001]
Log. of Total Assets	-0.612***	-0.612***	-0.235***	-0.237***
	[0.039]	[0.039]	[0.082]	[0.081]
Total Debt % Total Assets	0.021***	0.021***	0.007**	0.007**
	[0.002]	[0.002]	[0.003]	[0.003]
Constant	11.427***	11.426***	5.173***	5.293***
	[0.573]	[0.575]	[1.325]	[1.328]
Observations	46,597	46,503	10,194	10,187
Adjusted R-squared	0.6702	0.6703	0.7397	0.7396
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	103.5	65.19	8.89	5.071

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively

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Before 2015 and 2015 and after, different periods are covered in Panel A and B and have different outcomes shown in Table 25. The ESG combined score and social pillar score show significantly favorable effects on MTBV in both periods. However, environmental and governance pillar scores do not propose any development on MTBV. We report positive and significant coefficients covering both periods for the governance score. The effect of firm size is critical and negative, while leverage affects MTBV significantly positively both before and after 2015.

Table 24 Firm Fixed Effect Regressions- Dependent Variable: MTBV (By Development Level)

Dependent Variable:			**Developed**					
MTBV	**United States**		**European Union**		**Other Developed**		**Emerging**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.005***		0		0.009***		0.005***	
	[0.002]		[0.002]		[0.001]		[0.002]	
Environment Pillar Score		0.003*		0		0.002**		0.004**
		[0.001]		[0.001]		[0.001]		[0.002]
Social Pillar Score		0.007***		0.002		0.005***		0.002
		[0.002]		[0.002]		[0.001]		[0.002]
Governance Pillar Score		-0.003**		-0.003**		0.001*		0
		[0.001]		[0.001]		[0.001]		[0.001]
Log. of Total Assets	-0.925***	-0.942***	-0.137	-0.127	-0.368***	-0.361***	-0.639***	-0.645***
	[0.072]	[0.072]	[0.092]	[0.093]	[0.045]	[0.045]	[0.093]	[0.094]
Total Debt % Total Assets	0.043***	0.043***	0.005	0.005	0.008***	0.008***	0.008**	0.008**
	[0.003]	[0.003]	[0.004]	[0.004]	[0.002]	[0.002]	[0.004]	[0.004]
Constant	16.233***	16.469***	4.567***	4.457***	7.288***	7.216***	12.121***	12.230***
	[1.099]	[1.096]	[1.416]	[1.417]	[0.670]	[0.673]	[1.426]	[1.435]
Observations	17,913	17,882	7,688	7,687	22,376	22,312	8,849	8,844
Adjusted R-squared	0.6608	0.6613	0.6826	0.6829	0.6408	0.6407	0.7793	0.7793
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*Year Interaction	No	No	Yes	Yes	Yes	Yes	Yes	Yes
F	86.07	57.88	0.971	1.88	36.49	19.83	17.99	11.35

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 25 Firm Fixed Effect Regressions- Dependent Variable: MTBV (Before-After 2015)

Dependent Variable: MTBV	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.004***		0.003*	
	[0.001]		[0.002]	
Environment Pillar Score		0.001		0
		[0.001]		[0.001]
Social Pillar Score		0.004***		0.003**
		[0.001]		[0.001]
Governance Pillar Score		-0.001		-0.001
		[0.001]		[0.001]
Log. of Total Assets	-0.700***	-0.698***	-0.628***	-0.627***
	[0.053]	[0.054]	[0.094]	[0.094]
Total Debt % Total Assets	0.018***	0.018***	0.020***	0.020***
	[0.002]	[0.002]	[0.003]	[0.003]
Constant	12.931***	12.897***	11.680***	11.682***
	[0.820]	[0.821]	[1.394]	[1.394]
Observations	31,608	31,507	24,855	24,852
Adjusted R-squared	0.6789	0.679	0.8016	0.8016
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Year Interaction	Yes	Yes	Yes	Yes
F	63.22	40.28	19.49	12.33

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The methodology used in the models is fixed effects. ***, **, and * shows the statistical significance levels at 1%, 5% and 10%, respectively.

Table 26 summarizes the fixed effects regression result of our analysis. In this table, the results are Model (3), selected as the baseline model, which exists for the entire sample. We report that the financial performance measures increase with the ESG combined score for the total sample, and the effect is significant. These results are in line with Alareeni and Hamdan (2020), Buallay (2019), and Deng and Cheng (2019). For the environmental score, the effect is insignificant for ROA and ROE; however, this impact is significantly positive for EPS, which is in line with Ahmad et al. (2021) and MTBV. The social practices make ROA, ROE, and MTBV values higher as the coefficient is significant and positive. The governance pillar score does not show any significant result for the full sample.

The results of our baseline model, Model (3), submit varying results for different panels. In non-financial firms, ESG combined score, and financial performance measurements have a significant and positive relationship, consistent with Buallay (2019) and Ahmad et al. (2021), while this relationship is not substantial for EPS. These results are also valid for financial firms. The coefficients of ESG components differ from each other across these two industries. For instance, the environmental score does not affect ROA and ROE in non-financial firms, while this effect is positive for financial ones. Also, the environmental score-MTBV relationship is positive and significant in both industries, although no impact exists on EPS. The results of non-financial companies show that all dependent variables increase as the social pillar score increases in non-financial firms. In contrast, we cannot observe any significant effect of this component in financial ones. The governance score does not show any considerable coefficient in both industry type.

In addition, we conclude that the results and considerations vary across the development levels of countries. ROA, ROE, and MTBV values increase significantly in the United States as the ESG combined score increases, consistent with the results of Alareeni and Hamdan (2020), who measure the same effect in the United States. This relationship is also valid for other developed and emerging countries. We observe significantly positive effects of environmental pillar score on MTBV in the United States; EPS and MTBV in other developed countries; ROA, ROE, and MTBV in emerging countries. Social pillar score does not significantly affect financial

performance measures in the developed European Union and emerging countries; however, it affects ROA, ROE, and MTBV significantly in the other development levels. Finally, ROA and MTBV values increase related to governance score increase in the United States, and we observe the same growth for MTBV in other developed countries.

We also conclude that financial performance measurements have increased with ESG combined score before 2015 except for EPS, yet this effect disappeared for ROE after 2015. The environmental score increases EPS before 2015 but turns insignificant after that year. This is also valid for the social score regarding ROA and ROE, but the positive effect does not change for MTBV before 2015 and after. The governance score does not impact the financial performance measures in both periods.

Table 26 Fixed Effect Regressions Summary Table

Panel A: Coefficients and Significance of Combined ESG Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.017***	0.018***	0.010*	0.025***	0.007	0.014***	0.017***	0.018***	0
ROE	0.061***	0.058***	0.045***	0.069***	0.030*	0.062***	0.061***	0.055***	0.042***
EPS	0.081**	0.048	0.05	-0.005	0.042	0.102	0.201	0.061	0.022
MTBV	0.006***	0.006***	0.005***	0.005***	0	0.009***	0.005***	0.004***	0.003*

Panel B: Coefficients and Significance of Environmental Pillar Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.001	-0.004	0.013***	-0.003	-0.001	0.001	0.011**	0.002	-0.005
ROE	0.006	-0.003	0.027***	0.008	-0.013	0.004	0.035**	0.007	0
EPS	0.052*	0.077**	-0.064	-0.002	0.061	0.098*	0.021	0.073**	-0.031
MTBV	0.002***	0.001*	0.002***	0.003*	0	0.002**	0.004**	0.001	0

Panel C: Coefficients and Significance of Social Pillar Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.008***	0.008***	0.004	0.009*	0.006	0.010**	-0.003	0.012***	-0.01
ROE	0.029***	0.030***	0.009	0.034**	0.019	0.034***	0.008	0.039***	-0.012
EPS	-0.02	-0.082*	0.117	-0.004	0.015	-0.106	0.169	-0.008	0.058
MTBV	0.005***	0.005***	0.001	0.007***	0.002	0.005***	0.002	0.004***	0.003**

Panel D: Coefficients and Significance of Corporate Governance Pillar Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.001	0.003	-0.005	0.009**	-0.002	-0.004	0.003	0	-0.001
ROE	0.003	0.003	-0.004	0.012	0.006	-0.004	-0.01	0.002	-0.003
EPS	0.01	0.013	-0.005	-0.006	-0.018	0.033	-0.051	-0.011	-0.042
MTBV	-0.001	-0.001	0	-0.003**	-0.003**	0.001*	0	-0.001	-0.001

Notes: This table summarizes ESG score coefficients from tables 10 to 25.

4.3. ROBUSTNESS TESTS

We perform a series of tests to check the robustness and see how well-supported our conclusions are under various conditions. First, we aim to study the relationship for country fixed effect also. The countries are omitted in the fixed effects regression, so we run eight models with different control variables and the same independent and dependent variables. In this analysis, we control for a year and country effects by including year and country fixed effects instead of firm. The regression analysis for financial performance measures ROA, ROE, EPS, and MTBV are available in Appendices A, B, C, and D, respectively.

Model (1) measures the effect of the total ESG combined score on financial performance without any control variable. Model (2) controls for previously shown firm-level control variables, including leverage ratio and the logarithm of total assets. In Model (3), we add a financial dummy and country and year controls into the equation. By using the dummy variables, we test whether the results differ between financial and non-financial companies. We replace the country variable with the country SDG score in Model (4) variable to observe how SDG scores of the countries affect firm financial performance. We test the significance of the results at the levels 1%, 5%, and 10%, represented by ***, **, and *, respectively. The eight regression models (four for ESG combined score and four for E, S, and G score) are run four times for each dependent variable in STATA software.

Regarding ROA, Tables 27-30 in Appendix A show the results achieved by running the regressions by total sample, industry, development level, and time. According to the ROA results in Table 27, ESG combined score shows a significant positive impact on ROA in three models, except for Model (1), which presents a negative coefficient. Also, environmental and governance scores positively affect ROA in all four models. The social pillar score displays a negative and significant effect on ROA in Model (1) and a significantly positive effect in Model (3) and Model (4). The firm size has a significant positive impact in Model (2) and Model (3), while it shows insignificant results in Model (4). Leverage affects ROA significantly negatively in all of the models. The financial dummy displays a significant effect again for ROA and country SDG score.

Table 28 shows some of the results are different for the two industries. ESG combined score affects ROA significantly positively for both sectors. Environmental pillar score increases ROA in non-financial firms, while this effect is insignificant in financial ones. Reversely, the social score has no impact in non-financial companies, while it positively affects ROA in financial ones. The governance pillar score increases ROA in non-financial firms but decreases ROA in financial ones. Firm size coefficients also differ from each other in the two industries, but leverage results in the same significance level and coefficient, which is negative, for the two sectors.

In Table 29, we report a positive and significant relationship between ESG combined score and ROA in all four development levels. Environmental score results in a significantly positive coefficient in the United States, while negative in other developed countries. Social pillar score affects ROA positively in all of the country groups except for the United States. Governance score significantly and positively affects ROA in the United States and other developed countries, while this effect is negative in the developed European Union. Although firm size and ROA have a positive relationship in the United States, this relationship is negative in developed European Union and emerging ones. Leverage results are the same for all of the significant and negative panels.

We report significantly positive coefficients for ESG combined score for before and after 2015 in Table 30. Environmental and governance pillar score do not affect ROA before 2015, but these effects turns into positive after this year. Also, the positive effect of the social pillar score turns into negative after 2016. Firm size also has different results for these two time periods, while the leverage effect is identical. Finally, financial variables impact a significant coefficient for both periods.

The results for ROE are given in Appendix B. Tables 31-34 show the results by total sample, industry, development level, and period. In Table 31, We observe that ESG combined score and ROE have a positive and significant relationship, which does not change by including additional control variables in the models. Based on Model (1), Model (3), and Model (4), the environmental score has a positive and significant effect on ROE, while this effect is insignificant in Model (2). The social and governance pillar scores significantly positively affect ROE for all models. Firm size, calculated

by the logarithm of total assets, has a positive and significant impact on firm financial performance. The other control variable, leverage, negatively and significantly impacts the dependent variable in all eight models. We observe that the results would differ according to a firm's existing financial or non-financial industry. Also, ROE changes as the country's SDG scores change.

Table 32 shows that ESG combined score and social pillar score positively affect ROE in two industries. Environmental governance pillars increase ROE and firm size in non-financial firms, yet the impact is different in financial ones. Leverage results in negative and significant coefficients in both types of industries.

In Table 33, ESG combined score, and ROE relationship is positive in all of the development groups, as well as the social pillar score, which only shows an insignificant effect in the United States. Environmental pillar score affects ROE negatively in other developed ad emerging countries different than other development groups. Also, the effect of governance score is positive in the United States and other developed countries, while it is negative in the developed European Union. Firm size does not show any significant effect in developed European Union countries, unlike the other groups. The increase in leverage makes ROE decrease in all countries. Financial variables present negative coefficients in all development levels except for emerging countries.

In Table 34, the coefficient of the ESG combined score is positive and significant in both periods. Environmental and governance scores have no significant effect on ROE before 2015; however, these effects become positive and significant after 2015, as well as firm size. Oppositely, the social pillars score positively impacts ROE before 2015, while the effect turns insignificant after that year. ROE decreases as leverage increases in both periods. Finally, we report that industry difference significantly affects ROE before 2015 but has no significant effect after this year.

In Appendix C, EPS results exist. Tables 35-38 present the results by full sample, industry, development level, and period. In Table 35, we observe a positive and significant relationship between the ESG combined score and EPS for the entire sample in Model (1) and Model (3). In the second panel, results show that

environmental score positively affects EPS while this effect is negative for the governance pillar in all four models. The social pillar score makes EPS decrease significantly except for Model (3). The social and governance pillar scores show a negative and significant impact except for Model (3). Firm size affects the EPS positively, while this effect is negative and significant for leverage. When the financial dummy is used together with the SDG score in Model (4), its effect is negative and significant in the model. Finally, country SDG has a positive and significant impact on EPS.

Table 36 presents a negative relationship between EPS and ESG combined scores in non-financial companies. In contrast, this link turns positive in financial ones, and these results are also valid for social pillar scores. The environmental score does not have a significant effect in both industries. Governance score decreases EPS in non-financial firms, while it does not affect EPS in the other industry group. Firm size and leverage affect EPS positively and negatively in non-financial industries, but this impact is insignificant in financial ones.

In Table 37, we observe the adverse and significant effects of ESG combined score and social pillar score in the United States and developed European Union countries. In contrast, these effects are insignificant in other groups. EPS increases by environmental pillar score increase in developed European Union and emerging countries but decreases in the United States. We do not observe any significant effect of governance score except in emerging countries. Firm size results are identical in all groups, while leverage result is different only in developed European Union countries. Finally, financial dummy coefficients are significant except for the developed European Union.

Table 38 presents insignificant results for ESG combined score and governance pillar score in both periods. Environmental and social pillar score effects are significant before 2015, but they both become insignificant in the second period. EPS increases as firm size increase, but it decreases with leverage after 2015.

The MTBV results are given in Appendix D. Tables 39-42 propose the results by total sample, industry, development level and time period. In Table 39, we observe

significant effects between ESG combined score and MTBV, and this effect is negative only in Model (1). The environmental and governance score negatively impacts EPS, while this effect is positive and significant for social performance. In this case, we observe a negative and significant impact of firm size on MTBV, which means bigger companies are less likely to have better financial performances. The leverage negatively and significantly affects financial performance. The financial dummy shows adverse and significant effects on MTBV and the SDG score.

In Table 40, we observe significant results in all study variables. ESG combined score and social pillar score positively affect MTBV, while this effect is negative for environmental, governance pillar score, and firm size for both industries. Leverage positively affects non-financial companies, but it negatively affects MTBV in financial companies.

Table 41 report that ESG combine score and social pillar score positively affect MTBV in all of the development levels. Environmental score makes MTBV decrease in all panels except for United States, and governance score has negative effect in United States while it has positive impact in other developed group. According to results, bigger firms have less likely to have higher MTBV, but this tendency is different for leverage in different development levels. Financial dummy results in negative and significant coefficients in all panels except for emerging countries.

In Table 42, again ESG combined score and social pillar score have positive coefficients in both periods, while the environmental pillar score negatively affects MTBV. The insignificant effect of the governance pillar score turns significantly negative after 2015. The firm size makes MTBV decrease significantly, but it increases by leverage increases. Finally, financial variable negatively and significantly affects MTBV in both periods.

Table 43 summarizes the results of the regressions given in Tables 27-42.

Secondly, we measure the leverage by total liabilities divided by total equity instead of by total assets to see whether leverage calculation methods make the outcomes different. The results show that the effect of both ESG combined score and ESG components do not change by this variable.

Finally, we use the total ESG score as our variable of interest instead of the ESG combined score to observe the effect of this variable since the ESG controversies score is not included in the total ESG score. The regression outcomes are the same as the previous models. Therefore, the unreported results show that the results are robust.

CHAPTER 5
CONCLUSION

5.1. IMPLICATIONS OF THE STUDY

Investment experts' interest in adopting more socially responsible choices about the selection of assets and the overall composition of their portfolios has sharply increased over the past several decades. Due to this increase, we aim to observe the companies' ESG scores and financial performance relationships in different countries and industries.

Our study analyses the effects of businesses' high and low ESG performance on their financial results. The firms' financial performances are calculated using ROA, ROE, EPS, and MTBV. By choosing these four measurements, we evaluate the ESG score's effect on accounting and market-based measures.

In our study, we run the fixed-effects regression models for different samples, including 1) full sample, 2) different industries (financial and non-financial), 3) different development levels of countries (United States, Developed European Union, Other Developed and Emerging countries), 4) different periods (2015 and 2015 and after). The fixed effects regression results indicate varying results across full samples and sub-samples. We observe an overall positive relationship between ESG combined score and financial performance measurements for the full sample. The ROA, ROE, EPS, and MTBV values increase with the ESG combined score, and the effect is significant for the full sample. The impact of the environmental score is significantly positive on EPS and MTBV. Also, we propose a significantly positive impact of the social score on financial performance measurements except for EPS. We cannot observe any significant effect of governance practices on financial performance. In addition, the results of our baseline model, Model (3), present different results for the industry, development level, and time period panels, as given in Section 4.2.1, 4.2.2, 4.2.3, and 4.2.4. According to these results, we conclude that the effect of ESG practices varies depending on the sample used. Although the observed relationship between ESG combined score and financial performance measures are identical in non-financial and financial firms, the ESG components result in different outcomes. Regarding the development levels of countries and two different periods, we report

varying results of the tested relationship for ESG combined score and ESG components.

Moreover, Section 4.3 of this study also runs regression models for robustness using the same sample and sub-samples but using country and year fixed effects instead of firm fixed effects. The models show significantly different results from the firm fixed-effect regression models, meaning that the results vary across different methodologies.

Considering the study outcomes, we can conclude that ESG practices can be a strategic tool for companies to improve their financial performance. ESG not only helps reduce the world's environmental, social, and governance problems but also supports companies' financial success.

5.2. LIMITATIONS AND FURTHER RESEARCH

This study uses a wide range of data, including firms from 41 countries between 2002 and 2019. However, our sample does not include the data from 2020, during which the Covid-19 pandemic started spreading worldwide. The pandemic has caused a rapid market-wide financial collapse that affects the entire year of 2020 (Broadstock et al., 2020). In addition, there is conflicting evidence in the literature about the link between a company's CSR efforts and its financial success while a period of crisis (Engelhardt et al., 2021). For this reason, collecting the 2020 data and applying the same study to observe the results during the Covid-19 pandemic may be supportive.

In addition, various kinds of databases can achieve ESG score and financial data. Our research only includes Refinitiv ESG data to complete our analysis. However, the results may vary across different datasets since they use different methodologies. Also, although we select the Refinitiv database as our data collection source in this study, some issues exist in Refinitiv. Berg et al. (2021) report some broad differences in the historical data of Refinitiv. They test whether the data changes between different downloading years. The same sample data covering a particular period is downloaded in two additional years, and they observe rewritings on ESG scores. These changes cause shifts in the classification of firms into ESG quantiles. Therefore, the study outcomes may change over time even if the same sample data is used. Also, they find that this issue is an ongoing situation, not a case that is happened only once.

Therefore, for robustness purposes, a similar study may be conducted to observe if the relationship between ESG and financial performance is the same by using a dataset collected from different sources.

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APPENDICES

Appendix A. Regressions (Robustness) for ROA

Table 27 Regressions (Robustness)-Dependent Variable: ROA (Full Sample)

Dependent Variable: ROA	**Variable of Interest: ESG Combined Score**				**Variable of Interest: E, S, G Pillar Scores**			
VARIABLES	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
ESG Combined Score	-0.003***	0.033***	0.036***	0.048***				
	[0.001]	[0.002]	[0.002]	[0.002]				
Environment Pillar Score					0.025***	0.016***	0.014***	0.017***
					[0.002]	[0.002]	[0.002]	[0.002]
Social Pillar Score					-0.007***	0.003	0.008***	0.018***
					[0.003]	[0.002]	[0.003]	[0.002]
Governance Pillar Score					0.022***	0.013***	0.012***	0.010***
					[0.002]	[0.002]	[0.002]	[0.002]
Log. of Total Assets		0.090**	0.110***	0.058		0.062*	0.077*	0.014
		[0.035]	[0.038]	[0.037]		[0.036]	[0.040]	[0.038]
Total Debt % Total Assets		-0.044***	-0.043***	-0.040***		-0.044***	-0.043***	-0.041***
		[0.002]	[0.002]	[0.002]		[0.002]	[0.002]	[0.002]
financial			-1.757***	-1.477***			-1.575***	-1.266***
			[0.076]	[0.075]			[0.082]	[0.083]
Country_SDG				-0.131***				-0.134***
				[0.007]				[0.007]
Constant	2.802***	3.312***	1.421**	12.464***	3.111***	3.777***	1.990***	13.579***
	[0.026]	[0.563]	[0.695]	[0.847]	[0.106]	[0.566]	[0.719]	[0.880]
Observations	64,052	60,312	60,312	56,728	65,939	60,204	60,204	56,622
Adjusted R-squared	0.0004	0.0137	0.0592	0.0393	0.0084	0.0145	0.059	0.039
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	No	Yes	Yes

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 28 Regressions (Robustness)- Dependent Variable: ROA (By Industry)

Dependent Variable: ROA	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.031***		0.011***	
	[0.002]		[0.003]	
Environment Pillar Score		0.004**		0.004
		[0.002]		[0.003]
Social Pillar Score		0.001		0.012***
		[0.003]		[0.004]
Governance Pillar Score		0.017***		-0.004*
		[0.002]		[0.003]
Log. of Total Assets	0.661***	0.713***	-0.629***	-0.664***
	[0.049]	[0.052]	[0.054]	[0.056]
Total Debt % Total Assets	-0.074***	-0.074***	-0.027***	-0.026***
	[0.003]	[0.003]	[0.004]	[0.004]
Constant	-5.775***	-6.483***	10.922***	11.651***
	[0.837]	[0.887]	[1.008]	[1.053]
Observations	49,645	49,548	10,665	10,654
Adjusted R-squared	0.0781	0.0774	0.2123	0.2133
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 29 Regressions (Robustness)- Dependent Variable: ROA (By Development Level)

Dependent Variable: ROA	United States		Developed European Union		Other Developed		Emerging	
VARIABLES	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
ESG Combined Score	0.058***		0.014***		0.030***		0.026***	
	[0.004]		[0.004]		[0.003]		[0.004]	
Environment Pillar Score		0.039***		0.005		-0.008***		0.005
		[0.004]		[0.004]		[0.003]		[0.004]
Social Pillar Score		-0.021***		0.020***		0.026***		0.018***
		[0.006]		[0.005]		[0.004]		[0.005]
Governance Pillar Score		0.033***		-0.012***		0.007**		-0.003
		[0.004]		[0.004]		[0.003]		[0.003]
Log. of Total Assets	1.028***	0.948***	-0.518***	-0.566***	0.031	0.071	-1.385***	-1.392***
	[0.083]	[0.087]	[0.067]	[0.070]	[0.057]	[0.060]	[0.065]	[0.067]
Total Debt % Total Assets	-0.014***	-0.016***	-0.059***	-0.059***	-0.049***	-0.049***	-0.069***	-0.069***
	[0.005]	[0.005]	[0.006]	[0.006]	[0.004]	[0.004]	[0.005]	[0.005]
financial	-1.817***	-1.266***	-1.390***	-1.263***	-0.960***	-1.067***	-1.597***	-1.512***
	[0.126]	[0.141]	[0.186]	[0.192]	[0.142]	[0.149]	[0.167]	[0.176]
Constant	-13.693***	-12.200***	11.933***	12.960***	2.910***	2.227**	32.125***	32.505***
	[1.408]	[1.480]	[1.114]	[1.118]	[1.029]	[1.073]	[1.449]	[1.477]
Observations	19,417	19,387	8,089	8,088	23,419	23,347	9,387	9,382
Adjusted R-squared	0.0721	0.0762	0.1022	0.1051	0.0604	0.0601	0.1818	0.1812
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 30 Regressions (Robustness)- Dependent Variable: ROA (Before-After 2015)

Dependent Variable: ROA	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.032***		0.038***	
	[0.002]		[0.003]	
Environment Pillar Score		0.002		0.028***
		[0.002]		[0.003]
Social Pillar Score		0.027***		-0.018***
		[0.003]		[0.005]
Governance Pillar Score		0.003		0.023***
		[0.002]		[0.003]
Log. of Total Assets	-0.462***	-0.502***	0.617***	0.590***
	[0.044]	[0.045]	[0.061]	[0.064]
Total Debt % Total Assets	-0.054***	-0.054***	-0.026***	-0.027***
	[0.003]	[0.003]	[0.004]	[0.004]
financial	-2.307***	-2.242***	-0.825***	-0.559***
	[0.105]	[0.112]	[0.112]	[0.120]
Constant	10.748***	11.423***	-7.266***	-6.516***
	[0.789]	[0.813]	[0.993]	[1.011]
Observations	33,243	33,138	27,069	27,066
Adjusted R-squared	0.095	0.0961	0.0509	0.0527
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is ROA. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectivel

Appendix B. Regressions (Robustness) for ROE

Table 31 Regressions (Robustness)- Dependent Variable: ROE (Full Sample)

Dependent Variable: ROE	**Variable of Interest: ESG Combined Score**				**Variable of Interest: E, S, G Pillar Scores**			
VARIABLES	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
ESG Combined Score	0.117***	0.066***	0.079***	0.107***				
	[0.004]	[0.004]	[0.005]	[0.005]				
Environment Pillar Score					0.029***	0.001	0.012***	0.014***
					[0.004]	[0.004]	[0.005]	[0.005]
Social Pillar Score					0.032***	0.037***	0.032***	0.062***
					[0.005]	[0.005]	[0.006]	[0.005]
Governance Pillar Score					0.043***	0.020***	0.021***	0.016***
					[0.004]	[0.004]	[0.004]	[0.004]
Log. of Total Assets		1.186***	1.071***	0.951***		1.222***	1.104***	0.960***
		[0.074]	[0.082]	[0.080]		[0.075]	[0.085]	[0.082]
Total Debt % Total Assets		-0.108***	-0.106***	-0.102***		-0.109***	-0.107***	-0.104***
		[0.006]	[0.006]	[0.006]		[0.006]	[0.006]	[0.006]
financial			-1.748***	-1.075***			-1.670***	-0.988***
			[0.185]	[0.181]			[0.197]	[0.197]
Country_SDG				-0.270***				-0.263***
				[0.017]				[0.017]
Constant	5.439***	-7.926***	-10.663***	11.868***	5.801***	-8.376***	-10.790***	11.711***
	[0.206]	[1.141]	[1.581]	[1.958]	[0.226]	[1.155]	[1.623]	[2.048]
Observations	64,697	58,914	58,914	55,338	64,569	58,806	58,806	55,232
Adjusted R-squared	0.0108	0.0218	0.059	0.044	0.0091	0.0212	0.0577	0.0428
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	No	Yes	Yes

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 32 Regressions (Robustness)- Dependent Variable: ROE (By Industry)

Dependent Variable: ROE	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.077***		0.033***	
	[0.006]		[0.008]	
Environment Pillar Score		0.011*		-0.023***
		[0.005]		[0.007]
Social Pillar Score		0.020***		0.040***
		[0.007]		[0.009]
Governance Pillar Score		0.025***		0.006
		[0.005]		[0.007]
Log. of Total Assets	1.675***	1.768***	0.069	0.168
	[0.107]	[0.114]	[0.140]	[0.143]
Total Debt % Total Assets	-0.138***	-0.138***	-0.100***	-0.099***
	[0.009]	[0.009]	[0.010]	[0.010]
Constant	-18.392***	-19.267***	6.527**	4.544
	[1.918]	[2.011]	[2.790]	[2.876]
Observations	48,194	48,097	10,719	10,708
Adjusted R-squared	0.0665	0.0651	0.1012	0.1012
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 33 Regressions (Robustness)- Dependent Variable: ROE (By Development Level)

Dependent Variable: ROE	United States		Developed European Union		Other Developed		Emerging	
VARIABLES	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
ESG Combined Score	0.155***		0.044***		0.046***		0.057***	
	[0.011]		[0.012]		[0.007]		[0.010]	
Environment Pillar Score		0.090***		-0.004		-0.034***		-0.025**
		[0.010]		[0.011]		[0.007]		[0.010]
Social Pillar Score		-0.007		0.059***		0.045***		0.069***
		[0.013]		[0.014]		[0.008]		[0.012]
Governance Pillar Score		0.053***		-0.029***		0.016***		-0.009
		[0.009]		[0.010]		[0.006]		[0.008]
Log. of Total Assets	2.303***	2.106***	-0.085	-0.052	1.337***	1.534***	-1.549***	-1.468***
	[0.170]	[0.177]	[0.180]	[0.185]	[0.131]	[0.135]	[0.152]	[0.156]
Total Debt % Total Assets	-0.051***	-0.057***	-0.126***	-0.125***	-0.126***	-0.125***	-0.143***	-0.142***
	[0.011]	[0.011]	[0.017]	[0.017]	[0.010]	[0.010]	[0.013]	[0.013]
financial	-1.879***	-0.585	-2.150***	-2.228***	-1.628***	-2.083***	1.808***	1.497***
	[0.324]	[0.364]	[0.484]	[0.497]	[0.322]	[0.336]	[0.403]	[0.427]
Constant	-32.256***	-27.978***	9.356***	9.973***	-15.358***	-18.486***	44.151***	43.232***
	[3.018]	[3.173]	[2.872]	[2.898]	[2.499]	[2.571]	[3.521]	[3.576]
Observations	18,532	18,501	7,997	7,996	23,040	22,969	9,345	9,340
Adjusted R-squared	0.0638	0.0648	0.0654	0.0669	0.0764	0.0766	0.077	0.0775
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 34 Regressions (Robustness)- Dependent Variable: ROE (Before-After 2015)

Dependent Variable: ROE	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.072***		0.085***	
	[0.006]		[0.007]	
Environment Pillar Score		-0.001		0.029***
		[0.006]		[0.008]
Social Pillar Score		0.058***		-0.004
		[0.007]		[0.010]
Governance Pillar Score		0.006		0.039***
		[0.005]		[0.007]
Log. of Total Assets	0.143	0.133	1.949***	2.026***
	[0.101]	[0.103]	[0.129]	[0.133]
Total Debt % Total Assets	-0.139***	-0.140***	-0.065***	-0.066***
	[0.008]	[0.008]	[0.009]	[0.009]
financial	-2.729***	-2.738***	-0.249	-0.107
	[0.271]	[0.286]	[0.256]	[0.272]
Constant	5.244***	5.775***	-25.178***	-25.219***
	[1.834]	[1.879]	[2.139]	[2.177]
Observations	32,581	32,477	26,333	26,329
Adjusted R-squared	0.0734	0.0732	0.0552	0.054
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is ROE. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Appendix C. Regressions (Robustness) for EPS

Table 35 Regressions (Robustness)-Dependent Variable: EPS (Full Sample)

Dependent Variable: EPS	**Variable of Interest: ESG Combined Score**				**Variable of Interest: E, S, G Pillar Scores**			
VARIABLES	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
ESG Combined Score	0.165***	-0.076	-0.021	-0.325***				
	[0.048]	[0.051]	[0.043]	[0.062]				
Environment Pillar Score					0.824***	0.727***	0.056*	0.637***
					[0.037]	[0.040]	[0.031]	[0.045]
Social Pillar Score					-0.782***	-0.845***	-0.062	-0.970***
					[0.049]	[0.050]	[0.041]	[0.053]
Governance Pillar Score					-0.134***	-0.194***	-0.046*	-0.200***
					[0.040]	[0.041]	[0.027]	[0.044]
Log. of Total Assets		8.189***	4.479***	11.238***		7.860***	4.493***	10.592***
		[0.582]	[0.471]	[0.657]		[0.597]	[0.510]	[0.689]
Total Debt % Total Assets		-0.357***	-0.132***	-0.421***		-0.354***	-0.135***	-0.410***
		[0.047]	[0.033]	[0.050]		[0.047]	[0.033]	[0.050]
financial			-3.209*	-14.789***			-2.81	-7.661***
			[1.672]	[2.518]			[1.773]	[2.613]
Country_SDG				2.164***				1.792***
				[0.158]				[0.161]
Constant	35.275***	-73.722***	-68.627***	-296.294***	55.085***	-50.199***	-66.920***	-241.397***
	[2.053]	[8.723]	[8.092]	[17.015]	[2.497]	[9.236]	[8.726]	[18.360]
Observations	55,381	50,713	50,713	47,473	55,281	50,637	50,637	47,399
Adjusted R-squared	0.0003	0.0049	0.5371	0.011	0.0081	0.0125	0.5365	0.0181
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	No	Yes	Yes

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 36 Regressions (Robustness)- Dependent Variable: EPS (By Industry)

Dependent Variable: EPS	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	-0.150***		0.516***	
	[0.048]		[0.107]	
Environment Pillar Score		0.044		0.052
		[0.034]		[0.080]
Social Pillar Score		-0.161***		0.382***
		[0.047]		[0.095]
Governance Pillar Score		-0.074**		0.097
		[0.029]		[0.061]
Log. of Total Assets	6.122***	6.386***	-1.405	-1.789
	[0.584]	[0.657]	[1.135]	[1.255]
Total Debt % Total Assets	-0.169***	-0.175***	-0.041	-0.049
	[0.044]	[0.044]	[0.066]	[0.066]
Constant	-90.958***	-92.716***	23.138	30.596
	[8.527]	[9.628]	[28.444]	[30.771]
Observations	41,196	41,128	9,515	9,507
Adjusted R-squared	0.5415	0.5408	0.5931	0.5931
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 37 Regressions (Robustness)- Dependent Variable: EPS (By Development Level)

Dependent Variable: EPS	United States		Developed European Union		Other Developed		Emerging	
VARIABLES	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
ESG Combined Score	-0.099***		-0.102**		0.066		-0.02	
	[0.029]		[0.045]		[0.089]		[0.119]	
Environment Pillar Score		-0.034***		0.103**		0.052		0.294***
		[0.013]		[0.042]		[0.059]		[0.112]
Social Pillar Score		-0.047***		-0.240***		0.005		-0.072
		[0.012]		[0.086]		[0.080]		[0.128]
Governance Pillar Score		-0.023		0.005		-0.03		-0.258***
		[0.017]		[0.047]		[0.057]		[0.082]
Log. of Total Assets	1.492***	1.695***	2.608***	2.736***	7.020***	7.075***	3.478***	2.459**
	[0.452]	[0.526]	[0.843]	[0.904]	[0.994]	[1.046]	[1.172]	[1.247]
Total Debt % Total Assets	-0.021**	-0.017*	0.178**	0.167**	-0.197**	-0.200**	-0.448***	-0.447***
	[0.010]	[0.009]	[0.076]	[0.073]	[0.078]	[0.079]	[0.080]	[0.081]
financial	-2.722***	-3.353***	-3.424	-3.683	-18.758***	-18.691***	28.586***	33.262***
	[0.711]	[0.927]	[2.477]	[2.529]	[3.215]	[3.284]	[6.876]	[7.470]
Constant	-15.586***	-18.933***	-37.261***	-37.461***	-126.853***	-125.158***	86.466	109.934
	[6.044]	[7.166]	[13.584]	[13.819]	[14.891]	[16.090]	[148.118]	[148.741]
Observations	15,862	15,839	6,910	6,910	19,454	19,406	8,487	8,482
Adjusted R-squared	0.0036	0.0039	0.0231	0.0245	0.605	0.6042	0.3324	0.3333
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 38 Regressions (Robustness)-Dependent Variable: EPS (Before-After 2015)

Dependent Variable: EPS	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	-0.051		0.048	
	[0.057]		[0.064]	
Environment Pillar Score		0.065*		0.068
		[0.039]		[0.048]
Social Pillar Score		-0.117**		0.008
		[0.054]		[0.062]
Governance Pillar Score		-0.039		-0.041
		[0.036]		[0.041]
Log. of Total Assets	3.652***	3.766***	4.461***	4.264***
	[0.675]	[0.730]	[0.622]	[0.676]
Total Debt % Total Assets	-0.002	-0.005	-0.245***	-0.248***
	[0.048]	[0.048]	[0.043]	[0.043]
financial	-1.376	-0.956	-4.372*	-3.67
	[2.419]	[2.541]	[2.252]	[2.407]
Constant	-59.025***	-58.647***	-65.721***	-62.222***
	[10.674]	[11.641]	[9.148]	[9.684]
Observations	28,437	28,363	22,276	22,274
Adjusted R-squared	0.5403	0.5391	0.5441	0.5441
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is EPS. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Appendix D. Regressions (Robustness) for MTBV

Table 39 Regressions (Robustness)-Dependent Variable: MTBV (Full Sample)

Dependent Variable: MTBV	**Variable of Interest: ESG Combined Score**				**Variable of Interest: E, S, G Pillar Scores**			
VARIABLES	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
ESG Combined Score	-0.003***	0.013***	0.014***	0.013***				
	[0.001]	[0.001]	[0.001]	[0.001]				
Environment Pillar Score					-0.017***	-0.008***	-0.004***	-0.010***
					[0.001]	[0.001]	[0.001]	[0.001]
Social Pillar Score					0.019***	0.022***	0.019***	0.024***
					[0.001]	[0.001]	[0.001]	[0.001]
Governance Pillar Score					-0.004***	0	-0.001*	-0.002***
					[0.001]	[0.001]	[0.001]	[0.001]
Log. of Total Assets		-0.413***	-0.394***	-0.354***		-0.410***	-0.399***	-0.333***
		[0.008]	[0.010]	[0.009]		[0.008]	[0.010]	[0.009]
Total Debt % Total Assets		0.006***	0.004***	0.006***		0.006***	0.004***	0.005***
		[0.001]	[0.001]	[0.001]		[0.001]	[0.001]	[0.001]
financial			-0.810***	-0.825***			-0.842***	-0.967***
			[0.023]	[0.022]			[0.024]	[0.024]
Country_SDG				-0.051***				-0.045***
				[0.002]				[0.003]
Constant	2.802***	8.368***	7.558***	11.768***	2.607***	8.178***	7.687***	10.932***
	[0.026]	[0.122]	[0.184]	[0.256]	[0.028]	[0.122]	[0.187]	[0.268]
Observations	64,052	58,072	58,072	54,512	63,935	57,974	57,974	54,416
Adjusted R-squared	0.0004	0.0513	0.1236	0.0783	0.0176	0.0637	0.129	0.0926
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	No	Yes	Yes
F	24.47	889.3	144.4	262.2	394.2	657.5	141.5	260.9

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 40 Regressions (Robustness)-Dependent Variable: MTBV (By Industry)

Dependent Variable: MTBV	**Non-Financial**		**Financial**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.016***		0.010***	
	[0.001]		[0.001]	
Environment Pillar Score		-0.003***		-0.003***
		[0.001]		[0.001]
Social Pillar Score		0.020***		0.009***
		[0.001]		[0.001]
Governance Pillar Score		-0.001**		0.003***
		[0.001]		[0.001]
Log. of Total Assets	-0.461***	-0.486***	-0.164***	-0.156***
	[0.012]	[0.013]	[0.018]	[0.019]
Total Debt % Total Assets	0.009***	0.009***	-0.003**	-0.002**
	[0.001]	[0.001]	[0.001]	[0.001]
Constant	8.159***	8.585***	3.746***	3.544***
	[0.226]	[0.233]	[0.330]	[0.344]
Observations	47,586	47,495	10,486	10,479
Adjusted R-squared	0.111	0.1176	0.1119	0.1131
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 41 Regressions (Robustness)-Dependent Variable: MTBV (By Development Level)

Dependent Variable: MTBV	United States		Developed European Union		Other Developed		Emerging	
VARIABLES	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
ESG Combined Score	0.025***		0.007***		0.011***		0.014***	
	[0.002]		[0.001]		[0.001]		[0.002]	
Environment Pillar Score		0.001		-0.008***		-0.007***		-0.003**
		[0.001]		[0.001]		[0.001]		[0.001]
Social Pillar Score		0.033***		0.013***		0.013***		0.014***
		[0.002]		[0.002]		[0.001]		[0.002]
Governance Pillar Score		-0.008***		0		0.004***		0.001
		[0.001]		[0.001]		[0.001]		[0.001]
Log. of Total Assets	-0.436***	-0.487***	-0.387***	-0.372***	-0.290***	-0.275***	-0.690***	-0.688***
	[0.021]	[0.021]	[0.022]	[0.022]	[0.014]	[0.014]	[0.026]	[0.026]
Total Debt % Total Assets	0.014***	0.013***	-0.007***	-0.006***	0.003***	0.003***	-0.011***	-0.011***
	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]	[0.002]
financial	-1.132***	-1.068***	-0.811***	-0.854***	-0.721***	-0.784***	0.094*	0.076
	[0.046]	[0.052]	[0.047]	[0.050]	[0.032]	[0.033]	[0.055]	[0.060]
Constant	9.308***	10.307***	7.809***	7.544***	6.124***	5.751***	13.539***	13.485***
	[0.349]	[0.358]	[0.352]	[0.366]	[0.258]	[0.260]	[0.482]	[0.487]
Observations	18,394	18,364	7,830	7,829	22,622	22,560	9,226	9,221
Adjusted R-squared	0.0905	0.1114	0.159	0.164	0.108	0.1118	0.1711	0.1721
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 42 Regressions (Robustness)-Dependent Variable: MTBV (Before-After 2015)

Dependent Variable: MTBV	**Before 2015**		**After 2015**	
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
ESG Combined Score	0.012***		0.018***	
	[0.001]		[0.001]	
Environment Pillar Score		-0.001*		-0.006***
		[0.001]		[0.001]
Social Pillar Score		0.013***		0.026***
		[0.001]		[0.001]
Governance Pillar Score		0.001		-0.003***
		[0.001]		[0.001]
Log. of Total Assets	-0.378***	-0.390***	-0.417***	-0.415***
	[0.012]	[0.012]	[0.016]	[0.016]
Total Debt % Total Assets	0.004***	0.004***	0.003***	0.003***
	[0.001]	[0.001]	[0.001]	[0.001]
financial	-0.620***	-0.620***	-1.024***	-1.076***
	[0.029]	[0.030]	[0.037]	[0.038]
Constant	7.400***	7.604***	7.526***	7.490***
	[0.221]	[0.224]	[0.242]	[0.248]
Observations	31,944	31,849	26,128	26,125
Adjusted R-squared	0.1267	0.1294	0.1278	0.1371
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is MTBV. The explanatory variables are explained in Table 2. The regressions are run for robustness check. The robust standard errors are given in parentheses. ***, **, and * represents the statistical significance levels at 1%, 5% and 10%, respectively.

Table 43 Regressions (Robustness) Summary Table

Panel A: Coefficients and Significance of Combined ESG Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.036***	0.031***	0.011***	0.058***	0.014***	0.030***	0.026***	0.032***	0.038***
ROE	0.079***	0.077***	0.033***	0.155***	0.044***	0.046***	0.057***	0.072***	0.085***
EPS	-0.021	-0.150***	0.516***	-0.099***	-0.102**	0.066	-0.02	-0.051	0.048
MTBV	0.014***	0.016***	0.010***	0.025***	0.007***	0.011***	0.014***	0.012***	0.018***

Panel B: Coefficients and Significance of Environmental Pillar Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.014***	0.004**	0.004	0.039***	0.005	-0.008***	0.005	0.002	0.028***
ROE	0.012***	0.011*	-0.023***	0.090***	-0.004	-0.034***	-0.025**	-0.001	0.029***
EPS	0.056*	0.044	0.052	-0.034***	0.103**	0.052	0.294***	0.065*	0.068
MTBV	-0.004***	-0.003***	-0.003***	0.001	-0.008***	-0.007***	-0.003**	-0.001*	-0.006***

Panel C: Coefficients and Significance of Social Pillar Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.008***	0.001	0.012***	-0.021***	0.020***	0.026***	0.018***	0.027***	-0.018***
ROE	0.032***	0.020***	0.040***	-0.007	0.059***	0.045***	0.069***	0.058***	-0.004
EPS	-0.062	-0.161***	0.382***	-0.047***	-0.240***	0.005	-0.072	-0.117**	0.008
MTBV	0.019***	0.020***	0.009***	0.033***	0.013***	0.013***	0.014***	0.013***	0.026***

Panel D: Coefficients and Significance of Corporate Governance Pillar Score

Dependent Variable	Full Sample	Non-Financial	Financial	United States	Developed European Union	Other Developed	Emerging Market	Before 2015	After 2015
ROA	0.012***	0.017***	-0.004*	0.033***	-0.012***	0.007**	-0.003	0.003	0.023***
ROE	0.021***	0.025***	0.006	0.053***	-0.029***	0.016***	-0.009	0.006	0.039***
EPS	-0.046*	-0.074**	0.097	-0.023	0.005	-0.03	-0.258***	-0.039	-0.041
MTBV	-0.001*	-0.001**	0.003***	-0.008***	0	0.004***	0.001	0.001	-0.003***

Notes: This table presents a summary of ESG score coefficients from tables 27 to 42.