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When Does ESG Become Valuable? The Impact of ESG Ratings on Profitability and Market Value of Companies

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Abstract

This study examines the impact of ESG (environmental, social, and governance) performance on corporate profitability and market value. Using a dataset of microeconomic panel data of 7,353 ESG-rated companies worldwide combined with macroeconomic data, fixed-effect regression models reveal that high ESG performance negatively impacts profitability, as measured by return on assets (ROA), but increases market value. This negative impact on profitability is particularly pronounced for companies with higher market value, indicating that companies may sacrifice short-term profitability to achieve higher market valuations. Conversely, the positive impact on market value appears to be particularly significant for companies with below-average traditional performance metrics. These findings contribute to a broader understanding of the dual impact and the trade-off between costs and benefits of ESG and suggest that while ESG engagement may reduce immediate financial returns, it enhances long-term market position and value.

1. Introduction

In response to various financial crises and changing stakeholder demands, companies have increasingly focused on improving the quality of their corporate governance and implementing sustainable and socially responsible corporate practices in recent decades (Zheng et al., 2023; Velte, 2017). Several authors have already found that this commitment by companies can influence their success in a variety of ways, but the effect can also be influenced by diverse factors and the environment (Friede et al., 2015; Kim and Li, 2021; Boubakri et al., 2021). This paper aims to expand the research strand on the effects of environmental, social and governance (ESG) engagement through a comprehensive analysis. Since the

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increased interest in sustainability, there have been a variety of publications on the impact of corporate sustainability engagement on corporate performance, most of them providing evidence of the impact of sustainability scores on corporate performance indicators (Friede et al., 2015). Earlier research suggests increased efficiency of companies in the long term, which should have a positive impact on their growth and profits. We use a global dataset covering multiple industries and both developed and emerging markets, which allows us to capture regional and market-based differences in the impact of ESG. In contrast to previous studies that focus on specific regions or sectors, our analysis provides a broader and more granular perspective on how ESG strategies affect both profitability and market value. This paper thus shows the trade-off that companies have to make between the costs and benefits of ESG strategies.

However, the impact of sustainable engagement may have potentially changed in recent years, due to changing regulatory requirements, changing market economic factors, and the long-term impact of sustainability strategies. In general, there are two potential impacts of ESG engagement within firms in the literature. First, ESG strategies may incur costs and thus worsen the financial performance of firms. ESG activities thus reflect agency issues and are not in the best interest of shareholders (Gillan et al., 2021; Buchanan et al., 2018). Second, ESG engagement can ensure that profitability (Xiao et al., 2018) and firm value are positively impacted due to long-term growth strategies, more effective resource utilization, and innovative management practices (Gregory et al., 2013). Furthermore, improved ESG performance also leads to reduced capital costs or alternative financing options and (Gregory et al., 2013; Wong et al., 2021; Chava, 2014), moreover, a reduction in operational risks and greater stability (Chiaramonte et al., 2022). It has already been shown that the impact and relevance of ESG is influenced by various factors and macroeconomic conditions. For example, the size of the company has an influence on the possibilities of implementing ESG strategies in the company (Kim and Li, 2021; Boubakri et al., 2021). Above all, regulatory conditions, GDP and key interest rates vary greatly around the world and thus also ensure a different impact of ESG (Boubakri et al., 2021). In addition, companies around the world can vary widely in their choice of tools and measures to obtain and increase ESG scores. Despite differences in framework conditions, companies worldwide are increasingly investing in ESG strategies. Therefore, it is particularly important to examine how the impact of ESG engagement on company metrics is influenced by micro- and macroeconomic factors.

Crises and stakeholder demands have contributed to companies seeing an increased need to invest in ESG issues in order to survive in the market in the long term (Zheng et al., 2023). Therefore, a better understanding of the different modes of impact of these investments is an important topic in the context of current market developments. This is also emphasized by the fact that European companies are even

more influenced by regulations than the US and the rest of the world (Boubakri et al., 2021).

Despite the extensive literature on the impact of ESG engagement on corporate performance, ambiguities and conflicting results remain, particularly with regard to the different impacts on companies' profitability and market value. While some studies postulate positive long-term effects on financial performance through ESG engagement, others argue that the costs of such strategies may exceed the potential benefits.

This study looks at the various effects of ESG ratings on company profitability and company value. A company that actively invests in ESG strategies should be able to offset the costs of these investments in the long term through positive effects such as increased efficiency or reputation (Lins et al., 2017; Jiao, 2010) without lowering its performance and ESG rating. However, ESG strategies and associated changes come at a cost. In this case, the investments may lead to a reduction in company performance, especially in the short term.

This paper contributes to the academic debate by providing a detailed analysis of the impact of ESG ratings on the profitability and market value of companies worldwide. Specifically, ROA was used as a measure of profitability and market value as a measure of enterprise value. We use a comprehensive dataset of 7,353 ESG-rated companies for the period from 2011 to 2021. The study fills a gap in the existing literature by not only examining the general impact of ESG strategies, but also differentiating the analysis by company size, leverage, sectors and regional differences. This provides a deeper understanding of the conditions under which ESG engagements can be either value-enhancing or costly for companies. Specifically, this paper makes four contributions to the literature on the impact of ESG activities: First, it contributes to the understanding of the relationship between ESG and ROA and market value by showing that while ESG ratings positively influence the market value of companies, they are often associated with a reduction in profitability. This finding expands the understanding of how ESG engagement can potentially lead to market mispricing. Second, the paper shows the variability of the impact of ESG scores on profitability and market value in different contexts. The results show that ESG has a stronger negative impact on profitability in developed markets, while in emerging markets this impact is less significant. This provides new insights into the importance of regulatory and market differences. Third, this study contributes to the identification of significant moderating effects of ESG engagement. It is shown that ESG strategies have a negative impact on profitability, especially for medium-sized companies, while large companies can benefit from ESG engagement due to their greater visibility in the market. Fourthly, the work offers practical implications for corporate strategies and political decisions. It shows that, despite potential short-term costs, ESG investments can increase market value in the long term, making them an

important consideration for companies seeking to improve their standing with investors.

It also fills an important research gap regarding the inconsistent consideration of macroeconomic factors and the changing regulatory environment in previous studies. In addition, this work provides new insights into how ESG exposures perform differently in different market environments, which is particularly relevant for developed and emerging markets. The structure of the paper is as follows. Section 2 provides a comprehensive literature review, followed by the development of hypotheses. Section 3 describes the data and methods used, and Section 4 presents the descriptive statistics and empirical results and confirms these results in the robustness analysis in Section 5. Section 6 contains the conclusion.

2. Literature Review

In general, there are two main theories in the literature to explain the impact of sustainable investments on corporate performance: first, the stakeholder theory (Velte, 2017) and second, the shareholder theory (Bofinger et al., 2022; Deng et al., 2013). Within these theories, there are three main approaches to analyze whether corporate performance is affected by ESG engagement. (1) measuring the impact of ESG ratings on corporate profitability metrics, (2) measuring the impact of ESG ratings on corporate value, (3) measuring the impact of ESG ratings on stock mispricing. In addition, there are various macro- and micro-economics factors and determinants on the mode of action that are discussed in the literature.

Fundamentally, ESG engagement affects both a company's stakeholders and its shareholders. Therefore, there are basically two impact directions of ESG activities, but their effects are subject to controversial views. On the one hand, Friedman's shareholder theory postulates that the sole purpose of a company's actions should be to maximize shareholder wealth. Any voluntary investments, such as investments in ESG strategies, may lead to increasing costs without directly affecting profits, thus reducing profitability and consequently the value of the firm (Bofinger et al., 2022; Deng et al., 2013). In addition, Kuo et al. (2021) argue that relatively large investments in ESG can negatively impact the core business function and thus reduce firms' short-term performance. In contrast, when viewed from the perspective of Freeman's stakeholder theory, companies are responsible for addressing stakeholder interests and concerns, which include growing interest in ESG issues. The theory postulates that stakeholder satisfaction (e.g., through ESG engagement) leads to indirect returns through increased value implication. However, to meet stakeholder expectations and interests in ESG over the long term, corporate sustainability management is necessary. This sustainability management can also be effectively used as a communication tool with stakeholders and shareholders, and transparent ESG reporting and corporate social responsibility (CSR) activities can improve the company's reputation in the interest of stakeholders (Velte, 2017). Better corporate

reputation leads to alignment of stakeholder and shareholder interests (Bofinger et al., 2022) and focusing on stakeholder concerns can support corporate operations through increased allocation of resources by stakeholders (Deng et al., 2013). Thus, this theory suggests that ESG investments are not made at the expense of shareholders, but for the benefit of stakeholders and shareholders, as improved corporate reputation can also lead to higher performance (Brammer and Pavelin, 2006; Carmeli, 2007) and higher firm value (Jain et al., 2016) and increased transparency reduces the information asymmetry between companies and investors (Sheikh, 2019).

In order to quantify the impact of ESG performance, numerous studies have already examined the influence of ESG on corporate financial performance or profitability (Friede et al., 2015; Gillan et al., 2021; Sassen et al., 2016). Many studies conclude that ESG engagement can have a positive long-term impact on corporate profitability, such as by serving the interests of a broad group of stakeholders (Ramírez-Orellana et al., 2023), by benefiting from a stabilizing effect (Chiaramonte et al., 2022), through increasing corporate efficiency and productivity, and reducing the cost of capital (Gregory et al., 2013; Sheikh, 2019; Chava, 2014; Goss and Robert, 2011). In 2015, Clark et al. showed in their research that a good level of sustainability reduces companies' cost of capital 90% of the time and increases operational efficiency 88% of the time. Dimson et al. (2015) argue that companies with strong social and environmental policies have better corporate governance and financial reporting, which can positively affect key factors of corporate financial performance. Kim and Li studied the relationship between various individual ESG categories and corporate financial performance and found a positive effect on corporate profitability, especially for large companies (Kim and Li, 2021). Gao and Zhang (2015) concluded in their study that ESG is an independent quality dimension and can be useful for corporate valuation. Conversely, some studies argue for a negative impact of ESG on financial performance because the benefits of ESG engagement do not exceed its costs (Champagne et al., 2021; Cornell and Damodaran, 2020). Di Giuli and Kostovetsky (2014) reported that higher ESG ratings negatively affect future stock returns and corporate return on assets, and Shahbaz et al. (2020) found similar results. Cornell and Damodaran (2020) suggested that while some companies benefit from social engagement, for most, the associated costs exceed the benefits. In addition, Hoang et al. (2020) emphasized that the correlation between ESG and financial performance varies depending on the time frame considered. In 2012, Humphrey et al. concluded that corporate social performance ratings have no impact on risk-adjusted firm performance and idiosyncratic risk, and therefore there would be no significant costs or benefits (Humphrey et al., 2012).

Overall, the results of previous studies show a very mixed picture of the influence of ESG on the profitability of companies, the results are contradictory and

difficult to compare (Nega and Diala-Nettles, 2018). While the studies with positive correlations often justify them with stakeholder theory, the opposing studies mostly attribute their negative results to the fact that the benefits of ESG engagement do not exceed its costs and can thus lead to unstable financial results (Champagne et al., 2021; Cornell and Damodaran, 2020). For this reason, we hypothesise the following.

> ***H1.*** *A high ESG rating of a company does not ensure higher profitability of the company due to the associated costs of implementing ESG strategies.*

Studies examining the impact of ESG on company value argue that ESG ratings can serve as an important purchase criterion for shareholders and are therefore an important determinant of company performance on the stock market (Ramírez-Orellana et al., 2023; Becker et al., 2022; El Ghoul and Karoui, 2020; Boubakri et al., 2021; Blomqvist and Stradi, 2022). It is also assumed that companies that invest in ESG have a larger investor base (Sheikh, 2019). This thesis is supported by increasing inflows into ESG funds compared to non-ESG funds (Alda, 2020; Becker et al., 2022). According to Lins et al. (2017), the reason for this comparatively high attractiveness may lie in the better growth and higher effectiveness of companies with a high CSR rating or, for example, in lower capital costs (Wong et al., 2021; Sheikh, 2019). Paolone et al. (2021) showed that investors' perceptions are directly influenced by companies' CSR performance and therefore companies with high ESG ratings can achieve higher stock returns and profitability, resulting in a higher market value. In 2010, Jiao concluded that stakeholder well-being due to ESG engagement creates intangible value (reputation and human capital) and thus increases company value (Jiao, 2010). This effect does not appear to be regionally limited, as both El Ghoul et al. (2017) and Boubakri et al. (2021) have shown that sustainable engagement is also rewarded by higher company values on the financial markets in emerging markets and countries with weak market institutions. Another factor that speaks in favor of a positive influence of ESG on company value is the assumption that companies with a high ESG commitment are perceived as less risky (Starks, 2009), which means that investors expect a lower risk premium and thus hold the shares for longer (Sheikh, 2019). ESG engagement thus has an insurance-like character (Godfrey, 2005). On the other hand, Buchanan et al. (2018) warn that the subsequent costs of overinvesting in ESG can lead to a greater decline in company value. Based on the mentioned literature and the ongoing trend in ESG compliant investments, we hypothesize the following:

> ***H2.*** *A high ESG rating positively influences market value, reflecting investor perceptions and increased company reputation.*

The third strand of literature suggests that ESG is associated with market inefficiencies, which can lead to a difference between the true company value and the capital market valuation (Bofinger et al., 2022). It can be assumed that there is an information asymmetry in the market between investors and companies, on the one hand, about whether they operate sustainably according to the ESG rating, and on the other hand, about the value and impact of these ESG strategies on financial performance and company value. Information asymmetries in the market generally lead to increased mispricing of stocks (Li, 2020). In addition, market efficiency could be affected by the fact that the investment universe for companies with high sustainability exposure is limited (El Ghoul and Karoui, 2020) and yet the demand for sustainable investments within this limited universe is increasing (Bofinger et al., 2022). This effect is further reinforced by the fact that, according to Starks et al. (2017), institutional investors in particular are increasingly investing in companies with high ESG ratings and ignoring negative short-term signals from these companies, leading to the third hypothesis:

> **H3.** ESG rating influences the mispricing of companies through a differential impact on profitability and market value.

Furthermore, not only do ESG ratings influence different company metrics differently, but conversely, these metrics can also influence ESG impacts. For example, company size affects how much is invested in ESG, whether policy requirements apply and whether ESG has a significant impact on performance (Kim and Li, 2021). In addition, it has already been shown that there is a strong relationship between the profitability of companies and their market valuation (Ramírez-Orellana et al., 2023). Although previous studies have shown mixed results on the impact of ESG on corporate profitability (Gillan et al., 2021; Friede et al., 2015), stakeholders generally associate ESG engagement with rising share prices in the future (Tzouvanas and Mamatzakis, 2021). Increased market confidence in a company, for example through high profitability and good economic results, can increase its market value (Chava, 2014). Such an implicit increase in value through trust and reputation is also attributed to ESG engagement (Jain et al., 2016), which may lead to the conclusion that for particularly profitable and therefore trustworthy companies, the impact of ESG engagement on company value could be particularly strong. On the other hand, previous studies show that ESG engagement can have a positive effect on investor perception, especially for companies whose other traditional parameters are less positive. For example, it was found that a high ESG score lowers the cost of capital, especially for highly indebted companies (Alves and Meneses, 2024). Together with the fact that ESG ratings can tempt investors to give less weight to traditional financial ratios (Becker et al., 2022; Huang et al., 2020; Rzeźnik et al., 2021), it is not necessarily the case that a high ESG score only has a

positive impact on particularly profitable companies. we derive the following two hypotheses from this:

H4. *The impact of ESG on profitability varies depending on market value, with larger companies experiencing more pronounced effects.*

H5. *A higher profitability of the companies does not ensure a stronger influence of ESG on the market value*.

3. Data and Methods

This sample includes data from 7,353 listed companies with an ESG rating, covering the period from 2011 to 2021. The study uses annual data for all variables, including ESG scores, financial ratios (e.g. ROA, market value) and macroeconomic indicators. This choice ensures the consistency of the dataset and is in line with Refinitiv's annual update frequency of ESG scores. This comprehensive coverage also allows us to consider both micro- and macroeconomic influences, which sets our study apart from earlier work that focused on fewer regions and less diverse data sets. The selection of companies and countries was based on the composition of the MSCI ACWI indices. Companies from 41 countries are represented in the final sample. This results in an unbalanced panel with a maximum of 80,883 observations per company-year. The sample is diversified in terms of the economic sectors included. It comprises ten sectors using the GICS classification: Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Health Care, Information Technology, Communication Services, Utilities and Real Estate. In the original sample, all companies from the financial industry (GICS Sector 40) were filtered out due to their specific regulations in comparison to companies in other sectors. This broad geographic and temporal scope differentiates our study from the existing literature, some of which focuses on a smaller, more regionally and sectorally limited sample.

The ESG score published by Refinitiv Eikon (formerly Thomson Reuters ASSET4 ESG) is used in this study. This ESG data has been empirically validated and can be considered objective, verifiable and systematic (Flammer, 2021; de la Fuente et al., 2022). For the remaining financial data, Datastream is used in Refinitiv's Eikon platform. All macroeconomic information comes from Datastream, the database of the Federal Reserve Bank of St. Louis, the Eurostat database, the World Bank database and the central banks. All final microeconomic variables except the ESG variable were winsorized at the 1% and 99% levels. Variables that are not comparable due to the absolute figures in different currencies were processed using z-standardization per country. This also solves the problem of size distortion between the different countries. The sample was also adjusted for non-liquid

companies, i.e. companies that have no total return and whose total return does not change over more than three months.

The focus of the study is mainly on the relationship of the ESG score to profitability and company value. Return on assets (ROA) is used to assess the profitability of companies. ROA is a comprehensive measure of how effectively a company uses its assets to generate earnings, making it a suitable indicator of financial performance. The higher the ROA in %, the stronger the financial performance of the companies (Alareeni and Hamdan, 2020). ROA has already been used for measuring firms' financial outcomes in ESG research (Zhang and Lucey, 2022; Cornett et al., 2016; Galant and Cadez, 2017; Azmi et al., 2021). In addition, following the work of Ramirez-Orellana et al. (2023) and Galant and Cadez (2017), the market value (MV) of the company as an indicator of firm value is used.

In order to avoid potential endogeneity problems such as measurement errors in the explanatory variable, omitted variables or reverse causality (Bofinger et al., 2022), selected control variables were included that have already been largely discussed in the literature in connection with profitability, market value or ESG, as described above. At the company level, factors such as cash flow, total debt, number of employees, beta, market-to-book ratio, capital expenditures, leverage ratios, sales, investment ratio, dividend performance, interest expense and EBITDA are used for control. Among others, market-to-book ratio is used to control for the growth component in a firm's valuation (Bofinger et al., 2022), while beta is used in the analysis because it is a measure of systematic risk (Velte, 2017). Firm size is measured using the logarithm of the number of employees. This size variable is included because previous studies have shown that firm size can have a large impact on stakeholder interest in ESG activities (Velte, 2017) and that an advantage of size can generally have an impact on production, advertising, capital markets and profitability (Nega and Diala-Nettles, 2018). Total debt reflects the total amount of debt of the company, and thus the level of financial risk (Shin et al., 2022). Capital expenditures could already be identified as a significant influencing factor for mispricing of companies in previous studies, therefore these are also included (Bofinger et al., 2022). Leverage on capital refers to the use of debt to finance or fund investments and is also considered, as the prudent use of debt can increase profitability, but also poses significant risks if debt levels become too high. The leverage effect of companies can lead to lower available cash flow for investments in, for example, ESG strategies if debt payments and interest rates are too high (Naeem et al., 2022; Nega and Diala-Nettles, 2018).

To mitigate the problem of possible reverse causality between the dependent variables and the ESG score, the ESG variable was lagged by one year, following Alves and Meneses (2024), Bofinger et al. (2022), Sheikh (2019) and Kong (2023), among others. The reason for this is the assumption that the ESG score could be

influenced by the profitability of companies and their size, as large and profitable companies may invest more in ESG (Drempetic et al., 2019). The lagged ESG score thus ensures that the financial performance does not influence the ESG score in the same year. Furthermore, the two variables capital expenditures and market to book value were lagged by one year. Since capital expenditure, which can also include ESG investments, cannot have a direct impact on profitability and market valuation, but only after a delay, it makes sense to use the delayed values. The variable market to book value was delayed in order to avoid the direct dependence on market value and the resulting endogeneity problems. By using a lagged market to book value, it is possible to examine how the market-to-book value of the company in the previous period influences the current market value.

In addition, company-specific data were augmented with macroeconomics datasets. These macroeconomics data include various indicators of the level of development and the size of the national economies (GDP growth rate, inflation rate and interest rate) (Shin et al., 2022; Azmi et al., 2021). Furthermore, the political environment of the country is controlled for, using the variable politic stability. Previous studies have already shown that the degree of democracy and political stability can have an influence on the ESG performance of companies, and that this relationship can be moderated by corporate profitability in particular (Mooneeapen et al., 2022). Table A1 in the Appendix contains the descriptive statistics for the variables used in this study. For example, the average ESG score of the companies is 43.10 points. The table also shows that many of the companies were only ESG rated within the study period, which is reflected in the relatively low number of observations. The average company in the sample has an ROA of 5.14%, a capital leverage ratio of 33.63% and a dividend yield of 1.78%. Furthermore, tables A2 and A3 show the geographical distribution of the companies and the breakdown by sector. This shows, among other things, that the majority of the companies analyzed come from the USA, UK, European countries and Japan. The Industrials, Health Care and Consumer Discretionary sectors also dominate. Table A4 also contains the precise definition and derivation of the variables used.

3.1 Methods

The structure of the panel data enables the use of a fixed-effects regression model to investigate the relationship between ESG and profitability and market value. Therefore, in the equations below, the dependent variables are ROA and Market Value, which quantify a firm's profitability on the one hand and firm value on the other (Zhang and Lucey, 2022). The model also includes firm and time fixed effects to counter potential endogeneity problems. It utilizes the fact that firm and time fixed effects control for unobserved heterogeneity that is either firm-specific or time-invariant. The time (year) fixed effects are included to control for global macroeconomic changes, such as the decline in global interest rates (Alves and

Meneses, 2024). In addition, industry-specific factors are included in the regressions by clustering the standard errors at the GICS sector level. This approach is motivated by research showing that the impact of ESG on financial ratios can vary by industry (Bruna et al. 2022). The regressions were estimated with annual time dummies. The base estimate is specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 esgscore_{it-1} + \mu_i + \theta_t + \varepsilon_{it} \quad (1.1)$$

$$MV_{it} = \beta_0 + \beta_1 esgscore_{it-1} + \mu_i + \theta_t + \varepsilon_{it} \quad (1.2)$$

The main independent variable is the esgscore representing the Refinitiv ESG Score of a company i at time t-1. We hypothesize that high ESG performance promotes firm value but not profitability. In addition, firm fixed effects μ of a company i and time effects θ for a year t are added in this first regression. ε denotes the error term in the regression model for company i at time t clustered at the GICS sector level to account for intra-industry correlations, ensuring robust inference.

Second, firm-specific microeconomics variables are assumed to influence the impact of ESG performance and also directly affect firms' financial performance.

$$ROA_{it} = \beta_0 + \beta_1 esgscore_{it-1} + \sum_{j=1}^{n} \beta_2 micro_{it} + \sum_{j=1}^{n} \beta_3 micro_{it-1} + \mu_i + \theta_t + \varepsilon_{it} \quad (2.1)$$

$$MV_{it} = \beta_0 + \beta_1 esgscore_{it-1} + \sum_{j=1}^{n} \beta_2 micro_{it} + \sum_{j=1}^{n} \beta_3 micro_{it-1} + \mu_i + \theta_t + \varepsilon_{it} \quad (2.2)$$

Therefore, the second set of variables, denoted micro, represents selected microeconomics indicators (e.g., beta, cash flow, sales per share, leverage on capital, dividend yield) for a company i at time t and also two selected lagged microeconomic indicators (capital expenditures and market to book value) for a company i at time $t-1$.

In addition, profitability and firm value, as well as the effects of ESG engagement on them, are likely to be influenced by macroeconomics at the country level.

$$ROA_{it} = \beta_0 + \beta_1 esgscore_{it-1} + \sum_{j=1}^{n} \beta_2 micro_{it} + \sum_{j=1}^{n} \beta_3 micro_{it-1} + \sum_{j=1}^{n} \beta_4 macro_{ct} + \mu_i + \theta_t + \varepsilon_{it} \quad (3.1)$$

$$MV_{it} = \beta_0 + \beta_1 esgscore_{it-1} + \sum_{j=1}^{n} \beta_2 micro_{it} + \sum_{j=1}^{n} \beta_3 micro_{it-1} + \sum_{j=1}^{n} \beta_4 macro_{ct} + \mu_i + \theta_t + \varepsilon_{it} \quad (3.2)$$

The last group of variables, macro, comprises macroeconomics determinants (GDP growth rate, the inflation, the interest rate and the political stability) for a country c at time t.

To determine the moderating effect of performance measures on the impact of ESG performance, the third regression model is applied separately after grouping the sample into three levels of profitability (ROA) and three levels of market value of firms to determine the moderating effect of performance measures on the impact of ESG performance. Dividing the sample by ROA level makes sense because companies with different ROA values represent different degrees of operational efficiency and may have more resources to invest in ESG initiatives and use them as a tool to minimize risk in the long term. In contrast, companies with low ROA may have constraints in allocating resources to non-core activities such as ESG but use ESG practices to strengthen their reputation and market positioning. For low ROA companies, ESG performance can thus be a way to attract a different investor base (Sheikh, 2019). The subdivision into 3 groups is based on the formation of percentiles. Categorizing companies by market value is done because market value reflects investors' perception of a company's value and companies with a high market value often have greater visibility and therefore an impact on how ESG performance affects valuation. In addition, companies with a higher market value usually have more access to capital, which enables investment in ESG strategies and can therefore lead to a greater impact of ESG performance (Orlitzky, 2001; Lepoutre and Heene, 2006). The subdivision into 3 groups is based on the formation of percentiles.

The robustness analysis distinguishes between small, medium-sized and large companies. The classification is set according to the literature to the total assets (z-standardized) of the companies (Sheikh, 2019; Bruna et al., 2022; Azmi et al., 2021). This robustness check is conducted to confirm and extend the results of the subdivision by market value, to further investigate whether the effect of ESG on profitability is stable when companies are subdivided by size according to total assets, and to show what effect ESG has on market value when they are subdivided by total

assets. Total assets are used as an indicator of company size, as these reflect the total wealth of a company and thus provide information on the financial possibilities and securities of companies of different sizes. Including the potential impact of company size on ESG impact is relevant as larger companies typically have more resources, including financial and human capital, to invest in ESG initiatives (Orlitzky, 2001; Lepoutrue and Heene, 2006). However, larger companies often have more complex business operations that may require more structured and formalized ESG strategies, while smaller companies have simpler operations and less formal ESG frameworks. Large companies are also subject to more stringent regulatory transparency requirements and scrutiny, particularly in Europe (Drempetic et al., 2019; Naeem et al., 2022; Boubakri et al., 2021). This may influence the approach to ESG compliance and reporting and result in an excessive number of large companies achieving high ESG scores. In addition, the analysis distinguishes between two distinct periods to account for significant regulatory and policy changes over time: 2012-2016; This period marks the initial phase of ESG regulation and reporting requirements, characterized by the establishment and early adoption of ESG standards (Eccles et al., 2012) and also the signing of the Paris Agreement in 2015, which significantly increased global focus on ESG-related policies and practices (UN, 2022). 2017-2021; This period is marked by intensified ESG regulatory frameworks and the influence of the COVID-19 pandemic, which brought heightened attention to sustainability and corporate responsibility issues (Gangi et al., 2022). In this robustness check, the period 2011 was excluded from the investigations in order to examine equal and thus comparable periods of 5 years each. In addition, the sample was subdivided by sector in order to adequately take into account the heterogeneity between different sectors. The subdivision was made according to the approach of Bruna et al. (2022) into sensitive sectors (utilities, oil and gas, industry and basic materials) and non-sensitive sectors (all other sectors). This subdivision makes it possible to analyze industry-specific differences in the relevance of ESG factors, regulatory framework conditions and stakeholder expectations (Ramirez-Orellana, 2023; Bruna et al., 2022). Furthermore, the analysis distinguishes between developed and emerging countries, to highlight the influence of regional differences and requirements. Developed countries generally have more stringent ESG regulations and reporting requirements, which can influence how firms in these regions engage with ESG practices (Zhang and Lucey, 2022). Emerging markets might have less developed regulatory frameworks, leading to different ESG dynamics (Martins, 2022). Firms in developed countries might have more resources and infrastructure to invest in ESG initiatives, while firms in emerging markets might face more significant financial and operational constraints (Martins, 2022). Also Stakeholders in developed countries might have higher expectations regarding ESG performance (Zhang and Lucey, 2022), influencing how firms prioritize and report their ESG activities. The classification of countries into developed and emerging markets is

based on the MSCI market classification of 2022. Finally, the sample is additionally subdivided according to the companies' leverage, measured in leverage per capital, in order to examine how the financial structure influences the relationship between ESG performance and financial results. The subdivision into 3 groups is based on the formation of percentiles. These subdivisions are made because it must be assumed that companies with different levels of debt have different costs of capital. Highly leveraged companies generally have higher debt servicing costs, which can affect investments in ESG initiatives and thus show whether highly indebted companies can still benefit from ESG investments (Hennessy and Whited, 2005). On the other hand, companies with lower debt levels have more financial flexibility and capacity to invest in ESG strategies without endangering their financial stability (Sheikh, 2019). In addition, the literature emphasizes that better ESG performance can also reduce the cost of capital (Priem and Gabellone, 2022; Gregory et al., 2013; Sheikh, 2019; Chava, 2014; Goss and Roberts, 2011). Debt also influences a company's risk profile. Highly leveraged companies are generally considered riskier and their ESG performance may influence investor perception and risk assessment differently than low leveraged companies (Goss and Roberts, 2011). Highly leveraged companies could use ESG investments to mitigate perceived risks (Chava, 2014; Alves and Meneses, 2024).

By examining these groups separately, the study aims to provide a nuanced understanding of how ESG performance impacts financial outcomes under varying conditions of firm size, regulatory periods, regional development, and industry sensitivity. This approach allows for a more detailed analysis of the moderating effects and ensures the robustness of the findings across different contexts. The statistical analyses in this study were performed using the software STATA 17. The empirical results are presented in the following section.

4. Results

4.1 ESG and Firm Profitability and Market Value: Baseline Regression

Table 1 show the first three regression models resulting from the addition of microeconomic and macroeconomic variables. While only the influence of the ESG score is taken into account in the first model (1), microeconomic indicators in particular are added in the second step (2) and selected macroeconomic influencing variables in the third step (3). The results in table 1 show the regression results with the dependent variable ROA. It can be seen here that the overall ESG score of the companies examined appears to have a significantly negative influence on profitability in all models (1) to (3). More precisely, this influence is most pronounced in regression model 2, without macroeconomic variables, with -0.010 at a 1% significance level, but only the ESG score in model (1) and the ESG score in overall model (3) have a negative influence at a 5% significance level. This means

that the negative effect of ESG remains stable even when corporate and macroeconomic indicators are added. These results indicate that increased ESG engagement of companies does not lead to increased profitability. Other control variables in table 1 have the expected signs: For example, cash flow, investment ratio, EBITDA and market to book value are positively related to profitability as the coefficients are all positive and significant. This influence is stable across models (2) and (3). On the other hand, beta, capital expenditures, corporate leverage and total debt appear to have a negative impact on ROA (Zhang and Lucey, 2022). Investments (e.g. also in ESG strategies) can therefore certainly improve profitability as long as they are not too highly leveraged. As the number of employees is used as a proxy for firm size, companies with more employees seem to have a slightly worse ROA. In addition, a high dividend yield seems to worsen the ROA, which may be linked to the associated capital outflow and thus fewer potential new investments. In the macroeconomic environment of model (3), the GDP growth rate appears to have a positive effect on profitability, while excessive political stability tends to have a negative impact. This influence can be explained by the fact that countries with high political stability may tend to adopt more complex and extensive rules and regulations, such as the ESG regulations in Europe, which can lead to higher costs for companies based there (Drempetic et al., 2019; Naeem et al., 2022; Boubakri et al., 2021) in implementing these regulations and, for example, compliance costs, without increasing profits. As a result, companies in growing economies with less sluggish governments are more profitable. The results we found are in line with the results of previous studies (Di Giuli and Kostovetsky, 2014; Cornell and Damodaran, 2020). Di Giuli and Kostovetsky (2014) also found, among others, a negative relationship between a higher CSR rating and corporate ROA. However, our paper differs significantly because we consider a broader data set of 7,353 companies worldwide, and not just data from the United States. In addition, the time period we have chosen, 11 years, is considerably longer and updates the existing results in the literature. In addition, we take into account various moderating factors such as debt, sectors and macroeconomic variables, which have not been thoroughly addressed in previous research. This allows us to determine the nuanced effects of ESG. We hereby confirm our hypothesis 1.

The results in table 1 also show the influence of the selected independent variables on the dependent variable market value. The overall ESG value of the analyzed companies has a strongly significant positive impact on the market value of the companies in all models (4)-(6). The coefficient of the ESG score is 0.001 in all three models, while the significance level improves from model (4) at 5% to 1% in models (5) and (6), suggesting that a high ESG score has a constant positive influence on company valuation on the stock market. These results confirm the second hypothesis and thus also existing results from Ramírez-Orellana et al. (2023). However, the research by Ramírez-Orellana et al. (2023) focused on the positive

influence of ESG on the corporate value of oil and gas companies using a PLS-SEM model. Our research includes companies from all sectors, except the financial sector, in order to gain a more comprehensive view of the influence of ESG on market value. Looking at the influence of the other control variables in the models (5) and (6), it becomes clear that the influence appears to be stable and, furthermore, compared to the results from the models (1-3) in table 1, the sign and thus also the effect only changes for a few variables. The models (4-6) show that a high beta, a high debt ratio, the dividend yield and the interest costs have a negative influence on the market value. In contrast, sales per share, market to book value and EBITA appear to have a positive influence on market value. Compared to the results in models (1-3) in table 1, it is noticeable here that the signs have changed for the micro-variables number of employees and total debt, and both variables are now strongly positively significant. These results are consistent with the findings from the literature, which on the one hand find a positive correlation between market value and company size, which correlates with the number of employees, for example, and on the other hand link larger companies with higher debt (Sheikh, 2019). When the macroeconomic determinants are added in model (6), the GDP growth rate still appears to have a positive influence on market value, while political stability is now also positively significant. This can be explained by the fact that companies based in politically stable countries, such as industrialized countries, exude more security and confidence for investors, as well as low volatility and thus risk. The development of the economy there, and therefore of the companies, is more predictable.

Based on the results of the first table, it can be said that hypothesis 3 can also be confirmed that ESG engagement can tend to lead to mispricing on the market, as ESG can have a positive influence on the development of market value by rewarding investors, despite a reduction in the profitability of companies and thus a deterioration in the fundamental performance indicator. An explanation for this divergent impact of ESG can be found by looking at formulas for calculating company values, such as the discounted cash flow model. ESG investments can indeed reduce a company's profitability and thus its available cash flow (Clayman et al., 2012), while at the same time disproportionately reducing the average cost of capital (Gregory et al., 2013; Sheikh, 2019; Chava, 2014; Goss and Robert, 2011) and thus the discount factor. As a result, a lower cost of capital leads to a higher present value of a company (Clayman et al., 2012). Thus, as shown in our results, ESG engagement can simultaneously have a negative impact on ROA while increasing the company's value. These results are consistent with the findings of previous studies (Bofinger, 2022). However, Bofinger et al. (2022) examined this influence on possible mispricing in the market by using two different mispricing measures for companies in the US. We extended these findings by examining the contrarian influence of ESG on fundamentals and valuation in markets worldwide, including emerging markets. In addition, we included the influence of

macroeconomic variables, since data from more than one country and region were examined.

Table 1 Impact of ESG Score on Profitability and Market Value, Fixed Effects Model, 2011-2021

	Dependent Variable: roa			*Dependent Variable: market value*		
	Total Sample			*Total Sample*		
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
ESG score	-0.013**	-0.010***	-0.011**	0.001**	0.001***	0.001***
	(0,006)	(0,003)	(0,003)	(0,000)	(0,000)	(0,000)
Beta		-0.342**	-0.279*		-0.015**	-0.012**
		(0,128)	(0,148)		(0,005)	(0,004)
Capital expenditures		-1.456***	-1.611***		0,043	0,042
		(0,251)	(0,257)		(0,027)	(0,032)
Cashflow		0.145**	0.161***		0.000	0.000
		(0,048)	(0,041)		(0,000)	(0,000)
Leverage on capital		-0.072***	-0.069***		-0.002***	-0.001***
		(0,010)	(0,009)		(0,000)	(0,000)
Number of employees		-0.727**	-0.809**		0.078***	0.074***
		(0,298)	(0,330)		(0,017)	(0,017)
Sales per share		0,472	0,534		0.055*	0.050*
		(0,401)	(0,450)		(0,027)	(0,026)
Investment ratio		10.997***	10.968***		0,01	-0,006
		(2,861)	(3,339)		(0,074)	(0,072)
Dividend yield		-0.079***	-0.100***		-0.019***	-0.018***
		(0,021)	(0,028)		(0,003)	(0,003)
Market to book value		0.406***	0.399***		0.021***	0.020***
		(0,043)	(0,045)		(0,001)	(0,001)
EBITDA		7.732***	7.789***		0.387***	0.380***
		(0,672)	(0,592)		(0,050)	(0,051)
Interest expense on debt		-0,241	-0,285		-0.135***	-0.140***
		(0,393)	(0,470)		(0,024)	(0,019)
Total debt		-2.379***	-2.507***		0.176***	0.174***
		(0,509)	(0,633)		(0,030)	(0,034)
GDP growth rate			0.136***			0.003***
			(0,039)			(0,000)
Inflation rate			0,023			0,001
			(0,053)			(0,003)
Interest rate			0,059			-0,003
			(0,037)			(0,005)
Political stability			-0.762*			0.038**
			(0,403)			(0,014)
Constant	6.132***	12.092***	11.263***	-0.150***	-0.732***	-0.640***
	(0,419)	(2,203)	(2,822)	(0,021)	(0,153)	(0,130)

Notes: Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

4.2 ESG and Market Value: Effect of Profitability

Table 2 shows the results of a fixed-effects model with all microeconomic and macroeconomic variables. Here, the entire sample is first (1) divided into the companies with the 33.33% lowest market value, (2) with the 33.33% middle market value and (3) with the 33.33% highest market value in the three specifications, and the dependent variable is ROA. The results show that the ESG score has a negative impact on the profitability of companies with a medium and high market value, i.e. medium and large companies, respectively. In particular, for companies with medium market value, the coefficient is -0.021 at a 1% significance level, which is more significant than for the highest rated companies in the market. In the specifications (1), the influence of the ESG score variable is not significant. In addition, the results clearly show that the influence of the control variables on profitability can change depending on the company value. Even if the signs of the coefficients and their significance level remain stable for some variables across all three models, such as the influence of capital expenditures, cash flow, debt ratio, EBITDA and market to book value, this does not apply to all control variables. For example, the variable beta is only significantly negative for the companies with the highest market value, while the dividend yield only has a negative influence on ROA for companies with an average market value. For companies with a low market value, it is noticeable that although total debt is insignificant, interest expenses and leverage ratio are negatively significant. This can be explained by the fact that smaller companies have less debt overall, but high capital costs have a particularly negative impact on profitability. In addition, the influences of the macro variables are almost exclusively insignificant for companies with low market valuations, except for the inflation rate. This in turn suggests that the smaller the company, the less important the macroeconomic environment is for profitability. The results could suggest that ESG engagement in small companies is not strong enough to have a significant impact on profitability, or that ESG investments here are smaller and therefore have less impact on profitability. However, this is different for large companies with high market value, as they can invest more financial resources in ESG (Kim and Li, 2021; Orlitzky, 2001). Our results are consistent with those of Kim and Li (2021), in the sense that they also found that firm market value affects the effect of ESG on profitability. However, they found that there is a positive impact of ESG on profitability, especially for firms with high market value. Our contribution, however, differs significantly because the data set (S&P Capital IQ – Compustat database), the time period (1991-2013) and the ESG score (MSCI) are all different. It can be assumed that until 2013, lower demands were placed on investments in ESG, both in terms of the amount and the transparency, than after the start of the regulatory requirements. While the basic negative impact of ESG on profitability is consistent with studies such as Di Giuli and Kostovetsky (2014) and Cornell and Damodaran (2020), our analysis provides

new insights by showing that this effect is more pronounced for companies with higher market value. This suggests that the impact of ESG varies with market conditions and firm size. Our study shows that the regulatory burden on larger companies can exacerbate the short-term costs of ESG, leading to lower profitability.The results confirms hypothesis 4 that the effect of ESG on profitability varies depending on market value and is stronger for larger companies.

4.3 ESG and Profitability: Effect of Market Value

Table 2 also contains the results of a fixed-effects model with all microeconomic and macroeconomic variables and shows the dependent variable market value. Here, the total sample in the three specifications (4) is split between the 33.33% companies with the lowest ROA, (5) with the 33.33% medium ROA and (6) with the 33.33% highest ROA. The results show that the ESG score only has a significant positive impact of 0.001 at 5% significance level on the market value for the companies with the lowest ROA. For specifications (5) and (6), the ESG score is not significant. Even in the model with this subdivision by profitability, the influence of the other control variables is partly different. For example, the beta variable is not significant for highly profitable companies, while the sales per share, GDP growth rate and inflation rate are significant in contrast to low and medium profitable companies. The results support hypothesis 5 and existing findings in the literature that the ESG label or ESG rating of companies can be more important for their market valuation and investor perception than traditional financial indicators (Becker et al., 2022; Huang et al., 2020; Rzeźnik et al., 2021). In addition, the literature has already established that ESG engagement can be successfully used by companies to reduce investors' perception of risk, e.g. from poor fundamentals or potential environmental damage (Chava, 2014; Starks, 2009). However, while previous studies have increasingly focused on the effect of ESG labeling on investor perceptions, e.g., in terms of fund inflows (Becker et al., 2022), our study specifies the influence of a traditional performance measure (ROA) on the development of market value in the context of ESG at the individual company level. The results of our analysis underscore the fact that ESG ratings also appear to have a significant positive impact on market value when a traditional performance indicator is poor. Thus, a high ESG rating can also lead to an increase in the market value of unprofitable companies, which is reflected in these results. This phenomenon can therefore reinforce a mispricing on the stock market and thus also confirm hypothesis 3. Confirmation of hypothesis 3,4 and 5 is crucial to our paper, because on the one hand, it directly challenges a common assumption in the existing literature, namely that higher ESG scores inevitably lead to better financial performance and higher valuation (e.g. Kim and Li, 2022; Friede et al., 2015); and, on the other hand, challenges the one-dimensional view of the impact of ESG scores by showing that the influence of ESG is significant only for certain groups of companies. Our results suggest a more nuanced relationship, especially for

companies with different market values and in different regulatory environments. This also implies that an ESG price bubble is possible, for example, for sustainable but unprofitable companies and for medium-sized companies.

Table 2 Impact of ESG Score on Profitability of Low, Middle and High Market Valued Companies; and impact on Market Value of Low, Middle and High Profitable Companies, Fixed Effects Model, 2011-2021

	Dependent Variable: roa			*Dependent Variable: market value*		
	lowest valued companies	***middle valued companies***	***highest valued companies***	***lowest profitable companies***	***middle profitable companies***	***highest profitable companies***
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
ESG score	-0,004	-0.021***	-0.014**	0.001**	0.000	0.000
	(0,010)	(0,006)	(0,005)	(0,000)	(0,000)	(0,001)
Beta	-0,554	0,203	-0.399***	-0.025**	-0.008*	-0,012
	(0,346)	(0,246)	(0,111)	(0,009)	(0,004)	(0,009)
Capital expenditures	-3.001**	-2.772***	-1.377***	0,038	0,007	0,069
	(0,956)	(0,605)	(0,222)	(0,050)	(0,039)	(0,048)
Cashflow	0.100***	0.179**	0.173***	0.000	0.000*	0.000
	(0,022)	(0,062)	(0,046)	(0,000)	(0,000)	(0,001)
Leverage on capital	-0.048***	-0.070***	-0.069***	-0.001***	-0.001***	-0.003***
	(0,014)	(0,015)	(0,015)	(0,000)	(0,000)	(0,001)
Number of employees	-1.132**	-0.540	-0.952**	0,025	0.055***	0.127***
	(0,423)	(0,714)	(0,360)	(0,017)	(0,016)	(0,039)
Sales per share	0,366	0,082	0,188	0,081	-0,036	0.142*
	(0,637)	(2,180)	(0,315)	(0,049)	(0,024)	(0,069)
Investment ratio	9.463***	6,254	11.918**	0,241	-0,049	-0,021
	(2,819)	(4,669)	(4,025)	(0,169)	(0,054)	(0,101)
Dividend yield	-0,073	-0.200**	-0,063	-0.014***	-0.012**	-0.026***
	(0,045)	(0,081)	(0,045)	(0,003)	(0,005)	(0,004)
Market to book value	0.257**	0.312***	0.424***	0.014***	0.011***	0.033***
	(0,104)	(0,062)	(0,034)	(0,003)	(0,002)	(0,004)
EBITDA	21.892***	29.853***	6.314***	0.302***	0.365***	0.456***
	(5,140)	(3,791)	(0,557)	(0,047)	(0,059)	(0,058)
Interest expense on debt	-1.843*	-1,727	-0,482	-0.080***	-0.130***	-0.210***
	(0,906)	(1,841)	(0,420)	(0,023)	(0,032)	(0,033)
Total debt	-2,671	-5.300**	-1.764**	0,027	0.263***	0.202***
	(1,942)	(2,265)	(0,599)	(0,037)	(0,064)	(0,040)
GDP growth rate	0,08	0.313***	0.131**	0,001	0,002	0.003***
	(0,062)	(0,065)	(0,043)	(0,001)	(0,002)	(0,001)
Inflation rate	0.204**	-0,002	0,007	0,006	-0,003	-0.008*
	(0,082)	(0,149)	(0,039)	(0,003)	(0,006)	(0,004)
Interest rate	-0,044	0.387*	0.168***	-0,006	0,003	-0,008
	(0,080)	(0,174)	(0,048)	(0,004)	(0,006)	(0,006)
Political stability	-0,592	-1.304**	-1.192**	0,038	-0,022	0,033
	(1,249)	(0,486)	(0,492)	(0,023)	(0,026)	(0,044)
Constant	17.685***	10,805	13.274***	-0.331*	-0.440***	-1.122***
	(4,275)	(5,974)	(2,900)	(0,171)	(0,129)	(0,331)

Notes: Division of companies into terciles according to z-standardized market value and roa. Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

5. Robustness Check

5.1 ESG and Profitability and Market Value: Effect of Company Size

The robustness of the analysis was tested in five different ways; the results are shown in the appendix in tables A1 to A5. The results of the first robustness check in table A1 show that the impact of the ESG score on ROA and Market Value are largely stable when the companies are subdivided by size. The total assets of a company were taken as the indicator for company size; this approach is in line with the literature (Sheikh, 2019; Bruna et al., 2022; Azmi et al., 2021). A company is considered large if its total assets are in the top third of the total sample and small if its total assets are in the bottom third of the total sample. The subdivision was made on the basis of the z-standardized total assets. This analysis and classification is useful as previous studies have shown that company size can have an impact on ESG engagement and investment by companies as well as stakeholder interest in ESG activities (Velte, 2017; Nega and Diala-Nettles, 2018; Bruna et al., 2022). Similarly, company size plays a role when it comes to the application of transparency and ESG laws. It is also important to note that larger companies often benefit from these economies of scale, so size also has an impact on financial performance (Naeem et al., 2022). The results presented in table A1 indicate that the ESG score and associated ESG engagement only appears to have a negative impact on profitability for medium and large companies, but at the same time also leads to an improvement in market value for these groups of companies. While the profitability of small companies with low total assets is not negatively influenced by ESG, no positive influence on market value can be seen in this group either. The influence of the ESG score is most significant for the group of medium-sized companies in both models. Compared with the analysis of the influence on profitability, broken down by market value in table 2, the results are consistent, as the ESG score also has no significant influence for small companies and a highly significant influence for medium-sized and large companies in this study. The results suggest that ESG engagement means investments that do not translate into higher profitability, especially for medium and large companies. For small companies, the investments do not seem to have an impact, as they may be relatively small and therefore have no measurable impact on profitability and profit, or the structures are smaller and more efficient in implementing ESG strategies than for very large companies. The negative correlation between ESG and ROA could be strongest for medium-sized companies, as the requirements and pressure to implement ESG strategies are the same as for very large companies, but there are comparatively fewer liquid funds and resources for implementation. In terms of the impact on market value, the visibility of small companies on the stock market is too low to achieve a higher market value through ESG engagement. As the visibility and relevance of medium-sized and large companies is higher for investors and they are also increasingly traded in sustainable

financial products, their market value benefits from ESG engagement. These findings confirm the research of Lepoutre and Heene (2006), who showed that although company size is not a barrier to ESG activities, these activities depend on various conditions such as the availability of resources and the influence of external stakeholders, especially for small companies. These findings were also confirmed by Udayasankar (2008), who was able to show that the factors of visibility, resource access, company size and company size lead to active participation in social responsibility, i.e. ESG engagement, but that the relationship between company size and ESG is U-shaped, suggesting that there are other factors besides company size that can lead to active engagement. Drempetic et al. (2019) also showed that there is a positive correlation between company size and ESG activities. The study discusses various reasons for this, for example, that larger companies are more sustainable and under greater pressure to disclose more information to gain legitimacy than smaller companies; on the other hand, that larger companies have an advantage in the method of measuring sustainability.

5.2 ESG and Profitability and Market Value: Effect of Time

Secondly, the analysis with the dependent variables ROA and market value was carried out for two different periods: from 2012 to 2016 and from 2017 to 2021. The results are shown in Table A2. The ESG score has a significantly negative impact on companies' profitability in both the early and later years of the sample period, and this appears to be most pronounced in the most recent years. This means that the ESG engagement of the companies analyzed had a significant negative impact on profitability from 2012 onwards and beyond. The period from 2012 to 2016 reflects the initial phase of many ESG regulations and reporting requirements (Eccles et al., 2012), and thus the money and resources for their implementation, e.g. for setting up sustainability departments, had to be used, and ESG ratings and rating agencies also grew considerably. Since 2017, transparency requirements have increased, particularly in Europe and the UK, and the COVID-19 pandemic has also increased the focus on corporate sustainability responsibility (Gangi et al., 2022). However, the influence is most significant in recent years, indicating a significant increase in costs and investments for transparency requirements and regulatory compliance, as well as for meeting stakeholder demands. By comparison, the influence of the ESG score on the dependent variable of market value is only highly significant from 2017 to 2021. In particular, these years saw increased inflows and a growing number of sustainable financial products, which can have a positive impact on the market value of sustainable companies (Pavlova and de Boyrie, 2022; Alda, 2020; Becker et al., 2022). Over time, the influence of the control variables can also change for both models. These results regarding the influence of ESG on profitability and market value support the findings in the literature that show that the influence of ESG can change over time (Gao and Zhang, 2015). However, Gao and Zhang (2015) related

this changeable influence to short or long observation periods, with regard to the assumption that socially responsible companies have a long-term view and thus also the effects of these investments. This study explicitly examines the effects in different time periods to investigate the influence of increasing regulatory developments.

5.3 ESG and Profitability and Market Value: Effect of Industry

Thirdly, table A3 shows that the influence of ESG is not significant for all sectors. In the context of ESG, an industry bias can be assumed, as particularly heavily regulated industries naturally have better ESG ratings, while industries with increased ESG risks (e.g. tobacco and gambling) tend to receive unfavourable ratings (Akgun et al., 2021). For this purpose, this analysis was conducted analogous to the approach of Bruna et al. (2022) for sensitive sectors (utilities, oil and gas, industrials and basic materials) and non-sensitive sectors (all other sectors). This subdivision also reflects a separation into resource-intensive (sensitive industries) and non-resource-intensive industries (non-sensitive industries). The results in table A3 show that the impact of the ESG score on profitability and firm value is only significant for companies from non-sensitive sectors. The impact of ESG is consistent with the previous studies, i.e. the ESG score is negatively related to ROA and appears to have a positive impact on market value. The results show that the sector does indeed have a relevance when it comes to whether ESG engagement is worthwhile. One explanation for the insignificance of ESG for sensitive industries could be that they often already have stricter regulatory requirements for environmental, social and governance practices in order to avoid major damage and therefore already have to meet high standards in order to continue to be able to operate, so that an increase in the ESG score is less valued by investors and requires fewer resources. Ramirez-Orellana (2023) also postulate that sensitive sectors are generally under greater pressure to invest in core ESG strategies to avert greater potential harm to the environment in order to preserve their economic value. In addition, companies in sensitive sectors may place a higher value on transparency than actual implementation of strategies, which is supported by the study by Hughey and Sulkoski (2012), in which they found that in the sensitive and resource-intensive sectors of gas and oil, increased disclosure led to a better CSR reputation, regardless of quality and content, as long as companies only reported. Conversely, the significance in non-sensitive industries in this study can be explained by the fact that these industries have to set up new ESG monitoring systems etc., which requires investment, but that progress and an improvement in the ESG score is perceived more strongly by investors.

5.4 ESG and Profitability and Market Value: Effect of Region

Fourth, the analyses are conducted for companies in developed markets (industry cc) and emerging markets (emerging cc: frontier markets, stand-alone markets and others were also counted as emerging markets) for the dependent variables ROA and market value. The results in table A4 also show that the ESG score has a highly significant effect on profitability (negative effect) for developed markets, but not on market value in this study, while the ESG score variable for emerging markets is not significant in both models. The results show that ESG has a stronger negative impact on profitability in developed markets, which contrasts with some studies such as Friede et al. (2015), which, based on their collected literature review, suggest a uniformly non-negative relationship between ESG and financial performance. We argue that this discrepancy is due to differences in the regulatory and economic environments between developed and emerging markets, which were not fully taken into account in previous studies. Our broader data set allows us to uncover these regional differences, suggesting that the negative impact on profitability is more closely linked to strict ESG regulations in developed economies. The comparison of the results of the other control variables also shows differences between the two groups, for example, political stability has a positive impact on market value in emerging markets, while it does not seem to have an impact in developed markets. While in industrialized countries, for example in Europe, there is high pressure to invest in ESG due to new regulations and stakeholder demands (Zhang and Lucey, 2022), there is less pressure in developing countries due to weaker laws, or ESG investments are hindered by inefficient markets and a lack of transparency (Martins, 2022). However, it should be noted that not only ESG-specific rules and regulations are needed to improve ESG performance, but also regulatory requirements for good corporate governance inevitably lead to greater ESG engagement (Mooneeapen et al., 2022), as is the case in the US, for example, which has no specific ESG regulations in the developed country block, but high requirements for transparent and good corporate governance. In addition, the literature has already established a link between investor preferences for ESG investments and the political orientation of regions and the abnormal return of ESG investments (Blomqvist and Stradi, 2022). Preferences for environmental issues and political alignment also differ between developed and emerging markets. The findings of this research are consistent with the findings of Naeem et al. (2022), whose study showed that the ESG score has a greater impact on profitability (measured in ROE and ROA) for environmentally conscious companies in developed countries than in emerging markets. Our study adds value to the literature because it uses a comprehensive data set to examine the influences of ESG on the market value and profitability of companies in both industrialized and emerging markets; and also because all sectors, except the financial sector, were included in the study. Our study shows that the impact of ESG

varies depending on market conditions and that the regulatory burden on companies in developed countries has a measurable impact.

5.5 ESG and Profitability and Market Value: Effect of Leverage Level

Finally, a robustness check is carried out for companies with different debt levels and the dependent variables ROA and market value. The results from the literature show that the ESG score has a positive impact on the cost of debt, which could be due to the fact that companies with a high ESG score can raise significantly more debt capital and have lower interest rates (Priem and Gabellone, 2022; Gregory et al., 2013; Sheikh, 2019; Chava, 2014; Goss and Roberts, 2011). The results in table A5 show that the ESG score has a particularly negative influence on the profitability of companies with a medium debt ratio, while this influence is not significant for companies with low and high debt ratios. ESG engagement is linked to investment, so a medium level of leverage is potentially required, which can have a negative impact on profitability. For companies that are already indebted and therefore tend to have a higher cost of capital, the additional costs associated with high interest and repayment obligations can have a particularly negative impact on profitability (Hennessy und Whited, 2005). Companies that are less indebted have greater financial leeway to invest in ESG without significantly impacting profitability as they have lower interest payments and more free cash (Hennessy und Whited, 2005). However, the assumed positive impact of ESG on the cost of capital may not be as strong for companies with low and medium leverage. The results of the analysis suggest that interest expense and total debt have a significant negative impact on profitability, especially for companies with medium debt levels. These results are consistent with the findings of Alves and Meneses (2024), who found that a high ESG score indeed has a significant negative impact on the cost of capital of companies and thus lowers it, but that the most highly indebted companies in particular benefit from it. This reasoning is also consistent with the results in this paper and can provide a justification for the fact that the ESG score does not have a negative impact on profitability, especially for companies with very high levels of debt, as the positive effect of ESG engagement in the form of lower capital costs and a lower risk perception of the company (Chava, 2014; Godfrey, 2005; Starks, 2009,) due to an improved reputation is particularly strong here. These results are also consistent with the results from tables 1 and 2, which show that the ESG score has a particularly strong negative impact on profitability for medium-sized companies. As larger companies are associated with higher debt ratios in the literature (Sheikh, 2019), it can also be assumed in this study that the group of companies with a medium debt ratio includes medium-sized and larger companies. On the other hand, the results in table A5 show that the ESG score has a slightly positive correlation with the market value for companies with a medium leverage level. For companies with low and very high leverage levels, the influence is not significant. The results

suggest that ESG engagement is particularly beneficial for companies with a medium level of leverage that invest sufficiently in ESG strategies and tend to be geared towards growth without being too heavily indebted. The influence of ESG may not be significant for companies with a low level of debt because, as in Table 2, it only becomes relevant for companies whose fundamentals are mediocre to worse. The reason for this may be the effect of ESG as a risk-minimizing factor or insurance-like character for investors, which has already been proven in the literature (Chava, 2014; Godfrey, 2005; Starks, 2009; Goss and Roberts, 2011). Another explanation for the positive influence of ESG on the market value of moderately indebted companies can be found in trade-off theory. Fundamentally, an increase in the debt-equity ratio, in this case to a medium level of leverage, leads to a reduction in the average cost of capital, due to the influence of ESG and, for example, tax advantages (Pyles, 2014). This reduction in the cost of capital leads to a positive effect on the company's value, considering, for example, discounted cash flow models. However, as soon as the favorable effect of lower capital costs is exhausted, due to the increasing costs of financial distress or very high debt levels, the positive influence of ESG on market value is lost. Our findings on the impact of ESG engagement based on leverage levels provide new insights into the relationship between ESG and the cost of debt, and expand on previous research. While previous studies, such as those by Priem and Gabellone (2022) and Chava (2014), found a generally positive correlation between ESG and the reduction of the cost of debt, our analysis shows a differentiated effect: ESG engagement has a negative impact on profitability, especially for companies with medium leverage, suggesting that these companies face particular financial constraints. However, highly leveraged firms benefit from lower perceived risk due to ESG, which lowers their cost of capital. This suggests that the relationship between ESG and financial outcomes is not uniform across all levels of leverage and highlights the complexity of the role of ESG in corporate finance, particularly in medium-leverage contexts.

6. Conclusions

This study contributes to the ongoing debate on the financial impact of ESG by providing nuanced insights into the impact of ESG performance on profitability and market value, taking into account factors such as company size, leverage, industry sensitivity and regional differences.

Globally, ESG is becoming an important issue for companies when it comes to long-term business success, driven by regulations and stakeholder demands. Therefore, investing in ESG strategies is crucial for the economic development of these companies. To provide more clarity on the various impacts of these investments, this study analyzes the relationship between ESG performance, performance indicators, market economic factors and other corporate characteristics in companies worldwide. The focus is on the impact on corporate profitability and market value, as

these are important factors for the long-term success of companies. This study highlights the complex relationship between ESG performance and financial outcomes for companies across different regions and industries.

Empirical evidence suggests that while high ESG scores positively influence market value, they often come at the expense of lower profitability, particularly for mid-sized and larger companies and those with higher leverage. Furthermore, on closer inspection, the profitability of companies with a medium and high market value in particular is strongly negatively influenced by ESG investments, while the market value of companies with poor profitability in particular is increased. These results suggest a trade-off and demonstrate the potential for ESG performance to contribute to market mispricing, as investors may prioritize the perceived long-term benefits of sustainability over short-term financial performance. The results also suggest that sustainability-motivated companies are willing to give up some of their profits for ESG investments and high ratings, as their market performance and investor valuation receive additional benefits and value. Furthermore, ESG ratings only seem to matter for performance metrics in developed markets, which is not surprising given the lack of policy guidance in emerging markets.

Furthermore, the results show that the impact of ESG on company metrics is not the same in all contexts. In developed markets, where regulatory pressure and stakeholder expectations are more pronounced, the negative impact of ESG on profitability is more pronounced. In emerging markets, on the other hand, the impact of ESG ratings appears to be less significant, reflecting different levels of regulatory enforcement and market maturity. At the same time, the results indicate that the relationship between ESG and profitability and market value changes over the years, which can be explained, for example, by different levels of investment due to regulatory requirements. In particular, the influence of ESG has increased since 2017, partly due to increased regulatory requirements and partly due to an increased investor focus on sustainability. This trend suggests that companies need to carefully consider their ESG strategies to ensure that they do not jeopardize their profitability too much in order to achieve higher ESG ratings. ESG ratings also have a negative impact on profitability for companies with medium debt levels, which can be attributed to the link between sustainability ratings and capital raising on the one hand and the additional cost of capital on the other. The results also suggest that ESG investments pay off in terms of higher market value for companies especially in non-environmentally sensitive industries.

The results remain robust to the inclusion of company-specific and macroeconomic control variables in the regression. Similar to the previous literature, the overall results show a positive impact of ESG on market-based performance or firm value (Friede et al., 2015; Naeem et al., 2022; Ferrell et al., 2016; Jiao, 2010) and a negative impact of ESG on firm profitability (Champagne et al., 2021; Cornell and Damodaran, 2020; Gao and Zhang, 2015). This makes the trade-off that

companies have to make between the costs and benefits of ESG strategies visible. Future research should further explore these dynamics, particularly in the context of evolving global ESG standards and investor expectations.

APPENDIX

Table A1 Impact of ESG Score on Profitability and Market Value of Small, Middle and Large Companies, Fixed Effects Model, 2011-2021

	Dependent Variable: roa			*Dependent Variable: market value*		
	low total assets	***mid total assets***	***high total assets***	***low total assets***	***mid total assets***	***high total assets***
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
ESG score	-0,007	-0.017**	-0.010*	0,000	0.001***	0.001*
	(0,006)	(0,006)	(0,006)	(0,000)	(0,000)	(0,000)
Beta	-0,183	0,096	-0.530***	-0.016**	-0,006	-0.013*
	(0,347)	(0,225)	(0,097)	(0,007)	(0,004)	(0,006)
Capital expenditures	-5.546**	-5.381***	-1.263***	-0,013	0.149*	0,035
	(1,844)	(1,226)	(0,187)	(0,043)	(0,074)	(0,034)
Cashflow	0.137***	0.134**	0.134***	0.000	-0.000**	0.001**
	(0,015)	(0,055)	(0,039)	(0,000)	(0,000)	(0,000)
Leverage on capital	-0,018	-0.059***	-0.068***	-0,001	-0.001**	-0.002***
	(0,016)	(0,013)	(0,011)	(0,000)	(0,000)	(0,000)
Number of employees	-1.815***	-0.643*	-1.008**	0.056**	0.049***	0.092***
	(0,373)	(0,345)	(0,424)	(0,024)	(0,012)	(0,020)
Sales per share	-2.127**	-0,698	0,032	0,043	0,053	0,049
	(0,867)	(1,311)	(0,266)	(0,035)	(0,045)	(0,044)
Investment ratio	13.423***	9.867*	10.581*	-0,067	0,117	-0,122
	(2,175)	(4,379)	(4,697)	(0,066)	(0,091)	(0,171)
Dividend yield	-0,079	-0,057	-0.123*	-0.014***	-0.013***	-0.024***
	(0,065)	(0,095)	(0,055)	(0,003)	(0,004)	(0,005)
Market to book value	0.174**	0.431***	0.389***	0.014***	0.015***	0.024***
	(0,070)	(0,035)	(0,063)	(0,002)	(0,002)	(0,004)
EBITDA	53.616***	33.236***	6.525***	0.745***	0.542***	0.348***
	(5,279)	(4,060)	(0,533)	(0,154)	(0,100)	(0,050)
Interest expense on debt	-2,226	0,757	-0.430	-0.235**	-0,153	-0.131***
	(2,002)	(1,641)	(0,430)	(0,096)	(0,102)	(0,021)
Total debt	-11.900***	-9.328***	-1.700***	0.290***	0.140	0.169***
	(2,850)	(2,312)	(0,513)	(0,083)	(0,149)	(0,031)
GDP growth rate	0.084*	0.096**	0.179***	-0,002	0,001	0.004***
	(0,044)	(0,033)	(0,043)	(0,001)	(0,002)	(0,001)
Inflation rate	0.161*	-0,116	-0,021	-0.005***	-0,006	0.007*
	(0,081)	(0,066)	(0,044)	(0,001)	(0,006)	(0,003)
Interest rate	0,075	0.180**	0.172***	-0,001	-0,003	-0,005
	(0,097)	(0,075)	(0,045)	(0,005)	(0,006)	(0,005)
Political stability	-0,755	-2.031**	-0,636	0.108***	0.127***	-0,018
	(1,003)	(0,744)	(0,403)	(0,021)	(0,039)	(0,021)
Constant	26.987***	12.218***	14.007***	-0.472**	-0.443***	-0.684***
	(3,807)	(3,100)	(3,572)	(0,168)	(0,091)	(0,166)

Notes: Division of companies according to total assets z-score. Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

Table A2 Impact of ESG Score and Time on Market Value and Profitability, Fixed Effects Model

	Dependent Variable: roa		*Dependent Variable: market value*	
	2012-2016	*2017-2021*	*2012-2016*	*2017-2021*
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***
ESG score	-0.015*	-0.022***	0,000	0.000**
	(0,007)	(0,006)	(0,000)	(0,000)
Beta	-0,073	-0,159	0.010	-0.027***
	(0,234)	(0,186)	(0,010)	(0,006)
Capital expenditures	-1.599***	-1.263***	0.030	0,018
	(0,312)	(0,212)	(0,027)	(0,025)
Cashflow	0.134**	0.151***	0.000	0.000
	(0,046)	(0,041)	(0,000)	(0,000)
Leverage on capital	-0.069***	-0.095***	-0.001***	-0.001***
	(0,012)	(0,011)	(0,000)	(0,000)
Number of employees	-0,984	-0.669**	0.042***	0.065**
	(0,606)	(0,234)	(0,011)	(0,020)
Sales per share	0,163	0,921	0,062	0.089**
	(0,432)	(1,215)	(0,036)	(0,031)
Investment ratio	6,405	6.820	0,028	-0,037
	(3,523)	(4,243)	(0,108)	(0,098)
Dividend yield	-0.311***	-0,026	-0.016***	-0.015***
	(0,068)	(0,057)	(0,004)	(0,003)
Market to book value	0.445***	0.327***	0.010***	0.015***
	(0,083)	(0,061)	(0,002)	(0,002)
EBITDA	8.233***	8.796***	0.307***	0.279***
	(0,699)	(0,754)	(0,047)	(0,052)
Interest expense on debt	-0,683	-0,525	-0.109***	-0.145***
	(0,400)	(0,331)	(0,028)	(0,027)
Total debt	-1.716**	-2.019**	0.096***	0.225***
	(0,618)	(0,767)	(0,026)	(0,039)
GDP growth rate	0,085	0.143***	0,001	0.002**
	(0,050)	(0,039)	(0,002)	(0,001)
Inflation rate	0,047	0,037	0,002	0,003
	(0,054)	(0,061)	(0,002)	(0,003)
Interest rate	0,108	-0.130**	-0.012***	0.013*
	(0,061)	(0,042)	(0,004)	(0,006)
Political stability	0,194	-0,268	-0,001	0,004
	(0,535)	(0,573)	(0,029)	(0,015)
Constant	14.728**	11.440***	-0.356***	-0.511**
	(5,584)	(1,979)	(0,089)	(0,167)

Notes: Division of the sample by years. Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

Table A3 Impact of ESG Score in Sensitiv and Non-Sensitiv Industries, Fixed Effects Model, 2011-2021

	Dependent Variable: roa		*Dependent Variable: mv*	
	sensitiv industries	***non-sensitiv ind.***	***sensitiv industries***	***non-sensitiv ind.***
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***
ESG score	-0,007	-0.012**	0,000	0.001***
	(0,004)	(0,003)	(0,000)	(0,000)
Beta	-0,249	-0,361	-0,004	-0.020
	(0,179)	(0,199)	(0,004)	(0,009)
Capital expenditures	-2.085**	-1.376***	0,078	0,024
	(0,681)	(0,223)	(0,041)	(0,048)
Cashflow	0.160**	0.161**	0.000	0.000
	(0,062)	(0,029)	(0,000)	(0,000)
Leverage on capital	-0.062***	-0.076***	-0.001***	-0.002**
	(0,014)	(0,008)	(0,000)	(0,000)
Number of employees	-0.910*	-0,671	0.079**	0.059*
	(0,433)	(0,638)	(0,025)	(0,019)
Sales per share	0,632	0,459	0.075*	0,018
	(0,709)	(0,674)	(0,032)	(0,022)
Investment ratio	11.820*	10,123	0,004	-0,003
	(5,238)	(4,796)	(0,094)	(0,129)
Dividend yield	-0.129**	-0,054	-0.024***	-0.013**
	(0,045)	(0,039)	(0,006)	(0,004)
Market to book value	0.353***	0.490**	0.017***	0.024***
	(0,044)	(0,143)	(0,001)	(0,004)
EBITDA	9.791***	6.670***	0.489***	0.322***
	(0,913)	(0,193)	(0,094)	(0,055)
Interest expense on debt	-0.680	0,005	-0.184***	-0.113**
	(0,843)	(0,507)	(0,042)	(0,022)
Total debt	-3.449***	-1,851	0.180***	0,159
	(0,820)	(0,816)	(0,030)	(0,075)
GDP growth rate	0.158*	0.111*	0.003***	0.003***
	(0,077)	(0,039)	(0,001)	(0,000)
Inflation rate	-0,003	0,043	0.000	0,002
	(0,082)	(0,083)	(0,005)	(0,003)
Interest rate	0,088	0,049	0,001	-0,008
	(0,066)	(0,041)	(0,008)	(0,007)
Political stability	-1.213*	-0,363	0.054**	0.026**
	(0,593)	(0,444)	(0,020)	(0,006)
Constant	11.778***	9,936	-0.617**	-0.507*
	(2,594)	(5,949)	(0,189)	(0,160)

Notes: Division of companies by industry (sensitive: utilities, oil and gas, industry and basic materials; non-sensitive: all other sectors). Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

Table A4 Impact of ESG Score in Industry and Emerging Countries, Fixed Effects Model, 2011-2021

	Dependent Variable: roa		*Dependent Variable: market value*	
	industry countries	***emerging markets***	***industry countries***	***emerging markets***
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***
ESG score	-0.010**	-0,01	0,001	0,001
	(0,003)	(0,009)	(0,000)	(0,001)
Beta	-0,273	-0,114	-0.011**	-0,021
	(0,155)	(0,268)	(0,004)	(0,030)
Capital expenditures	-1.634***	-1.801***	0,024	0.132*
	(0,301)	(0,337)	(0,032)	(0,064)
Cashflow	0.173***	0.084*	0.000	0,001
	(0,044)	(0,041)	(0,000)	(0,001)
Leverage on capital	-0.070***	-0.047**	-0.001***	-0.002*
	(0,011)	(0,020)	(0,000)	(0,001)
Number of employees	-0.818**	-1.263***	0.065***	0.145**
	(0,356)	(0,347)	(0,012)	(0,055)
Sales per share	0,788	0.591*	0.034*	0,084
	(0,719)	(0,307)	(0,016)	(0,065)
Investment ratio	11.086**	6.908***	0,006	-0.090
	(3,940)	(1,734)	(0,056)	(0,288)
Dividend yield	-0.095**	-0,074	-0.023***	-0.011*
	(0,041)	(0,059)	(0,003)	(0,005)
Market to book value	0.381***	0.525***	0.017***	0.039***
	(0,045)	(0,085)	(0,001)	(0,006)
EBITDA	8.229***	7.380***	0.363***	0.376***
	(0,732)	(0,611)	(0,054)	(0,058)
Interest expense on debt	-0,033	-0,879	-0.154***	-0.089***
	(0,462)	(0,634)	(0,023)	(0,027)
Total debt	-3.060***	-1.223*	0.256***	-0,059
	(0,703)	(0,637)	(0,031)	(0,036)
GDP growth rate	0.131**	-0,025	0.002***	0,007
	(0,044)	(0,041)	(0,001)	(0,004)
Inflation rate	0,035	-0,003	0,002	0.000
	(0,092)	(0,048)	(0,003)	(0,003)
Interest rate	0,075	-0,028	0,001	-0,001
	(0,116)	(0,038)	(0,007)	(0,005)
Political stability	-0,606	-0,952	0.010	0.137***
	(0,380)	(0,970)	(0,016)	(0,031)
Constant	10.925***	19.611***	-0.512***	-1.439**
	(2,987)	(2,438)	(0,086)	(0,549)

Notes: Division of companies by region (emerging markets: frontier marktes, stand-alone markets, others and industry countries). Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

Table A5 Impact of ESG Score on Profitability and Market Value of Companies with Low, Middle and High Leverage on Capital, Fixed Effects Model, 2011-2021

	Dependent Variable: roa			*Dependent Variable: market value*		
	lowest financial leverage	***middle financial leverage***	***highest financial leverage***	***lowest financial leverage***	***middle financial leverage***	***highest financial leverage***
Independent Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
ESG score	-0,019	-0.013**	-0,007	0,001	0.001*	0.000
	(0,011)	(0,006)	(0,006)	(0,001)	(0,000)	(0,000)
Beta	0,106	-0.280	-0.596***	-0,015	-0,006	-0.016***
	(0,289)	(0,195)	(0,147)	(0,010)	(0,007)	(0,005)
Capital expenditures	-2.510***	-1.901***	-1.225***	0,104	0.080**	0,013
	(0,668)	(0,436)	(0,298)	(0,087)	(0,033)	(0,034)
Cashflow	0.258***	0.146**	0.092**	0.000	0.000	0.000*
	(0,037)	(0,052)	(0,034)	(0,000)	(0,000)	(0,000)
Market value	-0.086***	-0.080***	-0.057***	0.001	0.002***	-0.001***
	(0,012)	(0,014)	(0,010)	-(0,001)	(0,000)	(0,000)
Number of employees	-0,744	-0,453	-1.248**	0.070***	0.086**	0.044***
	(0,542)	(0,332)	(0,433)	(0,019)	(0,027)	(0,009)
Sales per share	1,669	0,203	0,443	0.183***	0,001	0,029
	(1,280)	(0,564)	(0,596)	(0,044)	(0,028)	(0,040)
Investment ratio	10.322*	15.688***	5,799	0,029	-0,147	-0,012
	(4,660)	(3,909)	(3,695)	(0,115)	(0,092)	(0,117)
Dividend yield	-0,086	-0,071	-0.092*	-0.019**	-0.023***	-0.015***
	(0,069)	(0,048)	(0,044)	(0,007)	(0,004)	(0,002)
Market to book value	0.504***	0.626***	0.232***	0.026***	0.035***	0.009***
	(0,107)	(0,049)	(0,058)	(0,005)	(0,005)	(0,002)
EBITDA	9.262***	7.049***	8.430***	0.504***	0.407***	0.270***
	(1,337)	(0,572)	(0,947)	(0,128)	(0,053)	(0,041)
Interest expense on debt	-0,685	-0,183	-0,487	-0,024	-0.209***	-0.096***
	(1,140)	(0,526)	(0,357)	(0,108)	(0,019)	(0,023)
Total debt	-1,193	-2.384***	-2.393**	-0.160	0.239***	0.216***
	(1,324)	(0,588)	(0,790)	(0,185)	(0,041)	(0,031)
GDP growth rate	0.168***	0.139**	0.104**	0.003*	0.004**	0.002**
	(0,049)	(0,059)	(0,043)	(0,001)	(0,001)	(0,001)
Inflation rate	0,066	0,084	-0,064	-0,007	-0,001	0.009***
	(0,112)	(0,053)	(0,046)	(0,004)	(0,003)	(0,002)
Interest rate	0,054	0,032	0,099	-0,002	-0,002	-0,004
	(0,083)	(0,038)	(0,058)	(0,010)	(0,007)	(0,004)
Political stability	-0,929	-0.842*	-0,551	0.161***	0.000	-0.010
	(0,592)	(0,376)	(0,561)	(0,033)	(0,019)	(0,015)
Constant	8,285	7.664**	17.181***	-0.640***	-0.703**	-0.369***
	(4,665)	(2,656)	(3,585)	(0,138)	(0,239)	(0,069)

Notes: Division of companies into terciles according to leverage on capital. Coefficient significance levels are marked with *, **, and *** indicating 10%, 5%, and 1%, respectively. Time effects not reported. Standard errors in parentheses.

Table A6 Descriptive Statistics

	Variable Obs	*Mean*	*Std. dev.*	*Min*	*Max*
market value (z-score)	67 020	-0,08	0,44	-0,64	3,00
return on assets	65 736	5,14	7,75	-28,73	29,28
ESG score (lagged)	39 894	43,10	21,03	0,31	95,15
beta	67 018	1,06	0,62	-0,54	3,62
capital expenditures (lagged)	64 784	-0,09	0,39	-0,52	3,00
cashflow	67 103	15,40	15,20	-210,59	71,46
leverage on capital	71 907	33,63	26,18	0,00	152,80
number of employees (log)	61 628	8,05	2,01	2,30	12,34
sales per share (z-score)	71 912	-0,07	0,41	-0,73	3,00
investment ratio	71 861	0,04	0,04	0,00	0,27
dividend yield	68 103	1,78	2,02	0,00	10,29
market to book value (lagged)	57 012	2,57	2,21	-9,59	19,48
EBITDA (z-score)	69 219	-0,09	0,42	-0,58	3,00
interest expense on debt (z-score)	69 995	-0,09	0,47	-0,65	3,00
total debt (z-score)	71 087	-0,09	0,46	-0,59	3,00
GDP growth rate	78 315	2,38	2,71	-11,66	23,40
inflation rate	77 550	2,19	2,11	-2,60	36,08
interest rate	72 370	1,40	2,43	-0,76	18,50
political stability	78 617	0,43	0,60	-2,01	1,62

Notes: market value, capital expenditures, sales per share, EBITDA, interest expense on debt and total debt z-standardized; number of employees logarithmized; ESG-score, capital expenditures and market to book value are lagged variables

Table A7 Proportion of Countries in Sample

Country	*Total no of companies with esg score*	*percentage of sample (%)*	*Country*	*Total no of companies with esg score*	*percentage of sample (%)*
Argentina	37	0,50%	*Mexico*	50	0,68%
Australia	197	2,68%	*Netherlands*	78	1,06%
Austria	30	0,41%	*New Zealand*	48	0,65%
Belgium	41	0,56%	*Norway*	65	0,88%
Brazil	84	1,14%	*Poland*	30	0,41%
Canada	349	4,75%	*Romania*	1	0,01%
China	520	7,07%	*Russia*	34	0,46%
Denmark	53	0,72%	*Saudi Arabia*	28	0,38%
Finland	81	1,10%	*Singapore*	58	0,79%
France	169	2,30%	*South Africa*	92	1,25%
Germany	225	3,06%	*South Korea*	135	1,84%
Greece	17	0,23%	*Spain*	61	0,83%
Hong Kong	60	0,82%	*Sweden*	289	3,93%
India	130	1,77%	*Switzerland*	145	1,97%
Indonesia	37	0,50%	*Taiwan*	134	1,82%
Ireland	40	0,54%	*Thailand*	129	1,75%
Israel	21	0,29%	*Turkey*	63	0,86%
Italy	100	1,36%	*United Kingdom*	653	8,88%
Japan	421	5,73%	*USA*	2 509	34,12%
Luxembourg	33	0,45%	*Vietnam*	20	0,27%
Malaysia	86	1,17%	***TOTAL***	**7 353**	**100,00%**

Table A8 Proportion of Industries in Sample

GICS sector	*Industry*	*Total no of companies with esg score*	*percentage of sample (%)*
10	*Energy*	359	4,88%
15	*Materials*	695	9,45%
20	*Industrials*	1 451	19,73%
25	*Consumer Discretionary*	1 038	14,12%
30	*Consumer Staples*	531	7,22%
35	*Health Care*	1 092	14,85%
40	*Financials*	0	0,00%
45	*Information Technology*	940	12,78%
50	*Communication Services*	399	5,43%
55	*Utilities*	279	3,79%
60	*Real Estate*	566	7,70%
	not specified	3	0,04%
Total		7 353	100,00%

Table A9 Variable Description

variable	*description*
return on assets	Teturn on Assets: (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 *(dependent) in %*
market value	Market value: share price multiplied by the number of ordinary shares in issue, z-standardized *(dependent)*
ESG score	Companys overall ESG rating from 0-100, lagged L1
beta	Relationship between the volatility of the local market index and the stock
capital expenditures	Capital expenditures represent the funds used to acquire fixed assets other than those associated with acquisitions, z-standardized and lagged L1
cashflow	Cashflow: Funds from Operations / Net Sales or Revenues in %
leverage on capital	Leverage on total capital: (Long Term Debt + Short Term Debt & Current Portion of Long Term Debt) / (Total Capital + Short Term Debt & Current Portion of Long Term Debt) in %
number of employees	Log(employee): logarithm of the number of employees (full and part time)
sales per share	Sales per share: per share amount of the company's sales or revenues, z-standardized
investment ratio	Investment ratio: capital expenditures / total assets
dividend yield	Dividend yield: (dividends per share / adjusted share price)*100 in %
market to book value	Market to book value: market value of the ordinary (common) / balance sheet value of the ordinary (common) equity in the company, lagged L1
EBITDA	Earnings before interest, taxes, depreciation & amortization, z-standardized
interest expense on debt	Interest expense on debt: service charge for the use of capital before the reduction for interest capitalized, z- standardized
total debt	Total debt: all interest bearing and capitalized lease obligations. It is the sum of long and short term debt, z- standardized
total assets	Total assets: represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets
GDP growth rate	GDP growth rate: gross domestic product of a country as the monetary value of the final goo services produced in a country during a specified period of time in %
inflation rate	CPI (%YOY) NADJ in %
interest rate	Official country interest rate in %
political stability	Political Stability: measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Ranging from approximately -2.5 to 2.5

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